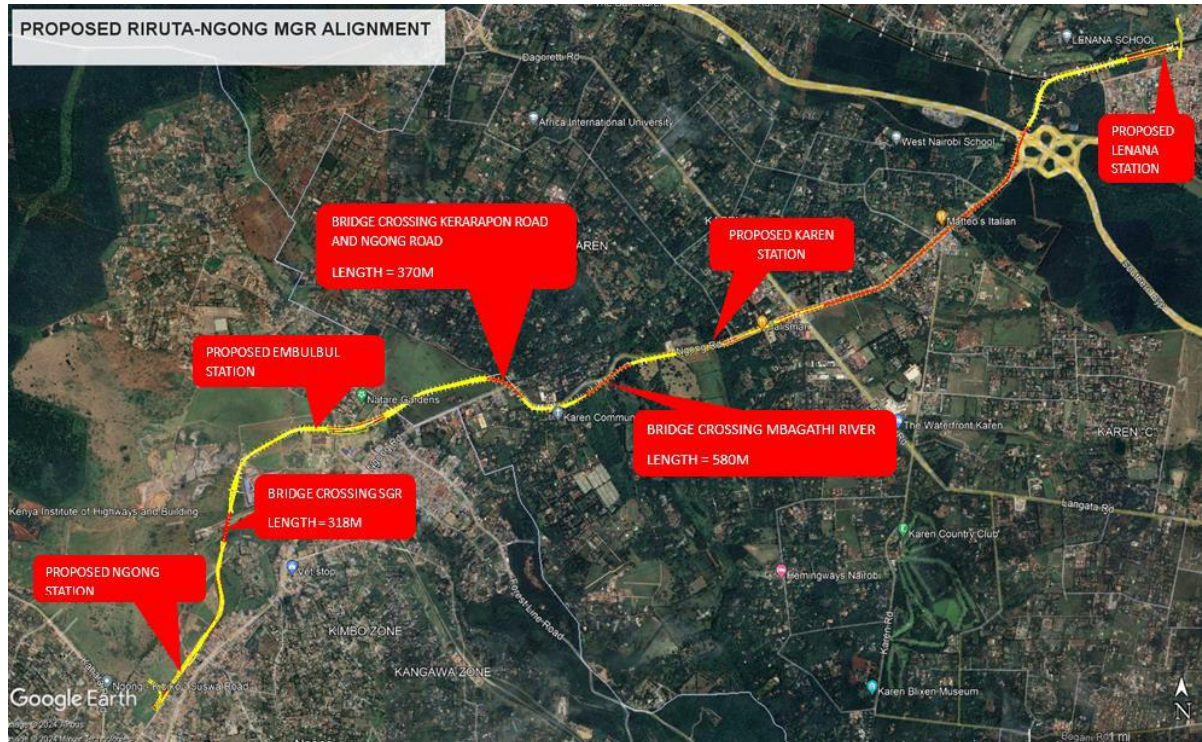


CONSULTANCY SERVICES UNDERTAKING RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE CONSTRUCTION OF THE RIRUTA-NGONG MGR COMMUTER



ENVIRONMENTAL SOCIAL AND IMPACT ASSESSMENT (ESIA)

FINAL REPORT

MAY 2024

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Certification

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Assignment: Environmental and Social Impact Assessment and Resettlement Action Plan Study for Proposed Riruta – Ngong (MGR) Commuter Project

Report Title: ESIA Study Report

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Acronyms

AIDS	Acquired Immunodeficiency Syndrome
ASL	Above Sea Level
BOD	Biochemical Oxygen Demand
CAPP	Child Abuse Protection Plan
CBD	Central Business District
CBD	Convention on Biodiversity
C-ESMP	Construction Environmental and Social Management Plan
CSR	Cooperate Social Responsibility
DCC	Deputy County Commissioner
DOSH	Directorate of Occupation Safety and Health
ECDE	Early Childhood Development Education
EMC	Environmental Management and Coordination
EMCA	Environmental Management and Coordination Act
EPRP	Emergency Preparedness and Response Plan
ERT	Emergency Response Team
ESHS	Environmental, Social, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMoP	Environmental and Social Monitoring Plan
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Safeguards
GOK	Government of Kenya
GRM	Grievances Redress Mechanism
HIV	Human Immunodeficiency Virus
HSMP	Health and Safety Management Plan
IFC	International Finance Corporation
ISS	Integrated Safeguard Systems
KBC	Kenya Broadcasting Corporation
KeNHA	Kenya National Highways Authority
KEPHIS	Kenya Plant Health Inspectorate Service
KeRRA	Kenya Rural Roads Authority
KFS	Kenya Forest Service
KLDA	Karen Langata District Association
KM	Kilometer
KURA	Kenya Urban Roads Authority
KRC	Kenya Railway Corporation
LPG	Liquefied Petroleum Gas
M	Meter
MGR	Meter Gauge Railway
NCCAP	National Climate Change Action Plan
NEMA	National Environment Management Authority
NLC	National Land Commission
NMR	Nairobi Metropolitan Railway
No.	Number
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Act

PAPs	Project Affected Persons
PPE	Personal Protective Equipment
PWD	People Living with Disability
RAP	Resettlement Action Plan
RoW	Right of Way
SEA	Strategic Environmental Assessment
SGR	Standard Gauge Railway
STD	Sexually Transmitted Diseases
Sq	Square
TMP	Traffic Management Plan
VCT	Voluntary Counselling and Testing
VET	Veterinary
WIBA	Work Injury Benefit Act
WMP	Waste Management Plan
WRA	Water Resource Authority
WSP	Water Service Providers

Chemical Symbols

°C	Degrees Centigrade
CO _x	Carbon Oxides
NO _x	Nitrogen Oxides
SO _x	Sulphur Oxides
PM _{2.5}	Particulate Matter

Executive Summary

Introduction

Railway transport operated by Kenya Railways Corporation is the second most popular mode of transport in Kenya, after road transport for both freight and passenger traffic. Rail transport comprise of a meter-gauge network and the new standard gauge network. The meter-gauge network is the longest with a total length of approximately 2,052Km of rail within Kenya including five branch lines while Standard Gauge Railway (SGR) has total 592Km of rail network. Both railways connect the port city of Mombasa to the interior, running through the national capital of Nairobi. The main metre-gauge line terminates at Malaba the border town with Uganda while the Standard Gauge Railway SGR terminates at Suswa Town. In addition, Kenya Railways operates a commuter passenger service train service between the Nairobi central business District and towns and estates within the Nairobi metropolitan area including Ruiru, Athi river, Kikuyu, Kahawa, Embakasi, Lukenya and Syokimau. The network is a metre-gauge line and 165Km long.

In keeping with its mandate, Kenya Railways Corporation is committed to providing the country with safe, reliable and efficient railway transport services. The railways master plan sets out to transform the national railway network through the rolling out of the mass commuter rail system for the country's metropolis and the construction of the Standard Gauge Railway (SGR) network. Kenya Railways Corporation (KRC) is the implementing agency for the proposed 12.5Km long Riruta- Ngong (MGR) commuter project. The proposed railway line project will connect to an existing railway line in the residential suburb of Riruta in Nairobi County and extend to Ngong town in Kajiado County passing along Karen and Embulbul centres. In addition, there will be train stations proposed within the targeted centres to include: Riruta, Karen, Bulbul and Ngong. The proposed project is aimed at facilitating movement, lowering the cost of living and creating jobs. In addition, the proposed project is anticipated to reduce traffic congestion along Ngong Road, cost of transport to the city as well as revitalize the existing meter-gauge commuter railway line in Nairobi. This justifies the proposed railway project as it is in line with the Nairobi 2030 Commuter Rail network strategic plan.

The Project

According to Kenya Railways Corporation Master Plan, the project is envisaged to be part of the mass public transport system within the Nairobi Metropolitan Railway (NMR). The proposed project is located within both Nairobi and Kajiado Counties and it cuts across 3No. Constituencies namely Dagoretti South, Langata and Kajiado North.

Within Nairobi County, the railway line commences off the existing Nairobi – Kikuyu MGR line near Lenana high school main gate, in Lenana/Riruta area in Dagoretti South Sub-County. The line then traverses through the Ngong Road Forest (Km 1+100 to Km 1+650) and exits the Southern Bypass over an elevated bridge as it enters Langata Sub-County. It then runs within

Ngong Road corridor (within the median) up to Karen shopping centre; thereafter, it crosses to the Left-Hand side of the road corridor. Along the median, the project has the potential to interact directly and indirectly with institutions (African Wildlife Foundation, St. Christopher International School, Nairobi Montessori School etc), commercial premises (Filling stations (Total, Rubis and Shell), Vermac furniture, Pannju hardware, Big Smoke restaurant etc) and public utilities (power, water supply, sewerage pipelines, access roads, street lighting, drainage channels, and internet cables). Relocation of utilities is anticipated as they are located within the proposed line corridor. Notable features along the corridor from Karen to Kerarapon Drive include: Karen Shell petrol station, Nairobi City Water and Sewerage offices, Zamani Business Park, Karen Surgery Health Center). Notable access include: Tree Lane, access Road to Karen Surgery, access to Karen View Estate and access to KEPHIS. Komboni Floweriest have displayed their seedlings within the road reserve from Tree Lane access to Ngong Dairy section.

From Kerarapon Drive the line is proposed to pass through private and government land (KBC, Police Leadership Academy and VET properties) hence potential land uptake.

It is worth noting that safety risks as well as traffic challenges are anticipated where the line crosses access roads to estates, institutions and business premises. Notable accesses with potential impacts include: Wambiri Road, Ngando – Satellite Road, Southern By-Pass, Karen Plain Road, Dagoretti – Karen Road, Tree Lane, KEPHIS access Road, Karen View Estate Access, Kerarapon Drive and Kerarapon Road. The project section from Tree Lane Access Road to Karen View Estate Access is observed to have different tree species along the proposed corridor that will be cut to pave way for the construction. In addition, the line will cross 3No. notable surface water resources namely Mutuini along the southern Bypass Interchange, Mbagathi and Isilanke River with likelihood of siltation and pollution.

The proposed Railway Line has 4No. proposed commuter stations namely;

- Lenana Station (KM0+300)
- Karen Station (KM5+100)
- Bulbul Station (KM8+650)
- Ngong Station (KM11+325)

ESIA Study

Implementation of major projects in Kenya is preceded by the Environmental and Social Impact Assessment studies. It is a requirement to undertake the Environmental and Social Impact assessment according to the regulations stipulated in The Environmental Management and Coordination Act (EMCA), 1999 (Amendment 2015) and the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 (Amendments 2019). The main objective of the ESIA study was to identify the impacts associated with the construction of the proposed Riruta-Ngong commuter railway project and establish appropriate mitigation measures for integration into the implementation. Environment and Social Management Plans (ESMP) was

developed as part of the ESIA Report to provide reference tools for integration while an ESMoP was prepared to guide on supervision. The scope of the ESIA Study covered the following;

- (i) Review of the proposed project design concepts and project implementation activities as a basis for identification of environmental and social linkages
- (ii) Establish quantified baseline conditions on environment and social conditions to drive the impacts identified and preventive measures
- (iii) Identify potential environmental and social impacts associated with the proposed project
- (iv) Identify suitable mitigation and preventive measures appropriate for identified impacts
- (v) Development of a comprehensive environment and social management plan for integration into the project implementation.

In accordance with the EMC (EIA/EA) Regulations (Amendment 2019) transportation and related infrastructure projects to include: railway lines fall under High-Risk Project category (Section 3(4) (b) of the Legal Notice No. 31 of 30th April 2019).KRC, therefore, desires to undertake ESIA Full Study for the proposed intervention projects to ensure compliance with the established regulations. The reports will be submitted to NEMA for review and consideration for EIA License.

General Findings

- (i) Road transport is the main mode of transportation for goods and passengers within and around the project area. However, challenges arise especially during the peak hours (morning and evening) when the roads experience increased vehicular movements leading to traffic jam. As a result, passengers experience long travel hours in addition to increased transportation cost (increased fuel and fares),
- (ii) The proposed railway line project traverses two counties namely Nairobi and Kajiado. Within Nairobi County, the railway traverses two Sub-Counties Dagoretti South and Langata while within Kajiado County it traverses only Kajiado North Sub-County. The proposed intervention project is geared toward improving transportation in the areas of Lenana, Karen, Embulbul and Ngong. Proximity of these areas to Nairobi Central District in addition to affordable housing has contributed to influx of people into the areas hence the proposed project is justified as it will address transportation challenges faced by the residents,
- (iii) The project area falls within Athi River drainage basins as all the rivers and streams drain into it for onward flow downstream into the Indian Ocean. Notable rivers within the project railway line corridor include Mutuini draining the Southern Bypass interchange area, Mbagathi River draining the section between KBC to Kenya Defence Staff Collage and Isilanke stream draining the section within VET Farm. There exist drainage channels running along Ngong Road and accesses (Kerarapon Drive and Kerarapon Road). The drainage channels are observed transporting wastewater and solid waste materials leading to blockages,

- (iv) The proposed project corridor was observed to have direct interaction with existing public utilities (water pipeline, power lines, sewer line and internet cables). Observed section with likelihood for damage and relocation of utilities is the Karen centre to Southern Bypass Interchange,
- (v) Land take and loss are among the significant impact from the proposed project. From the proposed design, the railway line alignment is noted to cross private properties along the VET to KBC section with potential for land take. In addition, the VET farm acts as grazing land for community livestock. Construction of the Ngong station and associated components will contribute to loss of grazing land,
- (vi) As observed during site visit, the project corridor is well vegetated with trees and a forested area. Km1+100-km1+670 of the corridor is within Ngong Road forest with apiculture as a key economic activity (bee keeping). In addition, the section between Tree Lane Access Road to Karen View Estate has notable indigenous and exotic tree species. Vegetation clearing in these areas will cause habitat destruction, loss of tree cover and potential loss of bee keeping activities within Ngong Road Forest,
- (vii) The alignment section from Karen shopping centre to Tree Lane Access Road is a built-up area with numerous commercial premises, institutions and roadside businesses likely to interact with the project. There is need for socio-economic study for businesses to assist in livelihood restoration and RAP study to assess potential structure and property damage.
- (viii) The project corridor interacts directly or indirectly with socioeconomic activities and institutions. Some limited impacts will be expected in this regard
- (ix) The project area is well served by communication and transport services which actively interacts with the proposed project corridor with expected significant impacts

Anticipated Impacts

Impacts identification and prediction were the key processes in this study exercise to estimate the magnitude, extent and duration of the potential impacts. This was achieved through reviews and analysis of interaction between the proposed project and the existing environment and social setting. The extent of the impact related to the area of influence of the impact, which could be site-specific, localized within the project area, regional (county) or even national. Distinction was made between significant positive and negative impacts, direct and indirect impacts, immediate and long-term impacts and cumulative impacts.

Environmental impacts for the project are determined by breaking down the project into its activity components and examining the task in each component. Among the broad areas of impacts include natural resources, physical environment, social and economic environment and public health, safety and security. Among the key environmental and social aspects likely to be affected by the proposed railway line intervention project include:

Positive Impacts

- Knowledge transfer

- Increased Land value
- Increased Government revenue
- Market for construction materials
- Employment opportunities
- Improved local economy
- Poverty reduction during construction phase,
- Reduced time/man hours lost due highroad traffic,
- Efficient transport system
- Increased land value

Negative Impacts

- Waste management and disposal,
- Disruption of surface drainage system from earthworks,
- Impacts to water resources from potential pollution and siltation,
- Land degradation due to the sourcing of materials i.e. borrow pits and spoil areas,
- Air pollution from dust and emissions
- Soil erosion from loosely packed soil profile,
- Loss of vegetation,
- Noise and vibration
- Potential deforestation and habitat loss
- Health and safety impacts.
- Potential disruptions to public utilities
- Potential land loss, assets and other properties

Climate Change

Climate change issues linkages to the project may be viewed at 2No. Levels, namely impacts of climate change to the project and potential contribution of the project to climate change.

Climate change effects could be possible drought and/or extraordinary heavy rains, increased temperatures and strong winds. Heavy rains have potential for possible flash floods and runoff that may exceed drainage structural designs. This may lead to damages of the drainage structures, project equipment and machines as well as project components (buildings). Increased rainfall and absence of vegetation cover exposes land to high erosion especially steep slopes leading to excessive silt transportation to the water resources, blockage of drainage culverts. Additionally, silt transfer and increased flows downstream may lead to water quality impacts and water resources catchment and intake damages and hence effects to settlements, water supply and habitats. High temperatures may lead to heat stress among the workers leading to low work production. Strong winds will have the potential to damage construction equipment and reduced visibility from dust generation which not only is it a safety risk from accidents due to intrusion but also public health risk. The project implementation has potential need to limited vegetation removal along the construction corridor. This implies limited reduction of carbon storage.

Emissions from construction equipment will contribute carbon into the atmosphere adding to climate change effects.

There is need to develop a comprehensive approach for addressing the vulnerabilities and risks that are associated with climate variability and change.

Stakeholders Engagement

The Constitution of Kenya 2010 Article 69 (d) indicates that the state shall encourage public participation in the management, protection and conservation of the environment. Additionally, Section 17-1 of The Environmental Impact Assessment and Audit Regulations, 2003 requires that an ESIA should “seek the views of any person who may be affected by the project”. During the ESIA process, stakeholders from all levels National, County Government, institutional heads, business people, transport representatives and residents in the project affected area (Riruta, Lenana, Karen, Embulbul and Ngong) were consulted. The stakeholder engagement involved briefing on the project background, scope, regulatory requirements and the measures the proponent through the contractor was going to put in place to mitigate the negative impacts from the implementation of the proposed railway line project. Stakeholder’s views were sought through interviews, group discussions and a number of public meetings and administration of individual questionnaires.

The views and opinions of the stakeholders were captured and documented in the meeting minutes and an attendance list was signed by the meeting attendees. The meetings took place between November 2023 and April 2024 with a total of 614No. participants as shown in the table hereunder.

Meeting schedules and attendance

Date	Stakeholder’s targeted	Venue	Male	Female	Total attendance
29 th Nov. 2023	Ngong Stakeholders (KR)	Ngong CDF Social Hall	32	16	48
17 th Jan. 2024	Vet-Farm (Vet Farm Offices)	Vet Farm Offices	9	2	11
2 nd Feb. 2024	Ngong Town Stakeholders	Ministry of Education Hall – Ngong	103	25	128
27 th Feb. 2024	Lenana School	Lenana Primary School	10	1	11
28 th Feb. 2024	Lenana/Riruta Stakeholders	New Lenana Primary School	32	16	48
12 th April 2024	Karen Residents (KLDA)	St. Christopher International school			155
15 th April 2024	Embulbul Residents	Deliverance Church – Embulbul	80	83	123

26 th April 2024	Karen areas businesses and residents		50	55	90
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Environmental and Social Management Plan

The proposed commuter railway line and associated components project poses issues of concern related to social and economic development as well as environmental conservation and for this reason, a management plan outline would be necessary on the project implementation. The plan would provide the key environmental and social concerns, appropriate preventive actions and responsibilities, targets to be achieved and where possible estimate of the respective costs. The plan will also provide basic success indicators for monitoring purposes. Broad indications of the responsibilities have also been discussed along with the possible implementation constraints anticipated while detailed actions are tabulated in a matrix for ease of reference and review. It should also be noted that the matrix is not complete in itself and continuous reviews would be necessary throughout the project implementation period.

The Environment, Social, Health and Safety Management (ESHS) will be the responsibility of the Contractors' procurement requiring that all bids integrate appropriate safeguards for implementation and compliance. In this regard, ESHS will form an important aspect of the contractual obligations of the Contractor. The Project Proponent as well as the Supervision Consultant will also adopt the ESHS requirements for monitoring. In order to ensure full integration of the environment and social concerns into the project under the ESHS, the ESMP will constitute an important annex to the construction contracts that the Contractor will then upgrade to a Construction Environment and Social Management Plan (C-ESMP) reflecting the realities of the project implementation for reference in the environment and social integration.

A Code of Conduct will be established by the Contractor taking into consideration the issues, impacts, and mitigation measures identified in relevant documents. The types of issues under the Code of Conduct will include the following among others labour influx, sexual harassment, gender-based violence and maintaining a safe environment. A code of conduct will contain obligations on all project staff and the Contractor should ensure that the workers are sensitized and familiarized with the code of conduct before they append their signatures. Additional obligations may be added to respond to particular concerns of the project location and the sector requirements.

The Construction Environment and Social Management Plan (C-EMP) is an upgraded version of the ESMP prepared by the Contractor to illustrate the realities of the project works implementation. The Contractor will, upon finalization of the Construction Plan and approval of the same by the Supervision Consultant, adopt the works items and for each present practical actions that will be undertaken to realize achievement of the ESMP. The Construction Environment and Social Management Plan (C-ESMP) will also reflect and also assist in realizing the ESHS Requirements.

Conclusion and Recommendations

The implementation of the proposed Riruta – Ngong MGR commuter railway including associated components represent a significant infrastructure linking the targeted towns (Riruta, Karen, Embulbul and Ngong) to the Nairobi Central Business District. The proposed project is anticipated to decongest Ngong Road hence reducing traffic snarl-ups by providing efficient and faster means of transport as well as improving the livelihood of residents through provision of alternative and affordable means of transport.

Environmentally, the proposed project will reduce generation of greenhouse gases into the atmosphere brought by emissions from vehicles as a result of fossil fuel combustion. Though the train will run on diesel fuel, the emissions will not be significant compared to the number of vehicles operating within the project area, since the train is anticipated to ferry about 10,000 passengers every day.

Socially and economically the proposed project will contribute to growth and development of the area as the land values will appreciate as more people and socioeconomic activities will be attracted to the project area. Other social benefits will include increased businesses opportunities, growth of construction industry, increased revenue by the government etc. The proposed project has addressed safety challenges by providing separation of crossing gradient through under passes to facilitate safe vehicle and train movements.

The proposed project will have significant positive impacts such as ease of transportation and decongestion of the roads. However, the ESIA Study has identified negative impacts likely to occur due to the implementation of various project activities. Such impacts include loss of land (grazing land) and other public and private properties, utilities disruptions, and forest habitat loss. It is for this reason that an Environmental and Social Management Plan (ESMP) has been developed to provide a policy direction on compliance by mitigating the project impacts. The ESMP is to be adopted with necessary amendments throughout the project cycle. The costs for implementing mitigation and monitoring plan have also been prepared together with responsible institutions and the timeframe for implementing various corrective measures. The ultimate goal is to enhance the foreseen benefits that the proposed project will produce including environmentally, socially and economically.

The proposed development will have a social linkage due to the nature of its locality. The project will be expected to interact and co-exist with the neighbouring communities, especially considering the anticipated growth in population density upon operations commencement. As a result, influencing on the land use practices and patterns around the corridor as well as the nearby areas of Ngong, Dagoretti and Lenana, which could potentially contribute to unplanned development and land use patterns. Unless appropriate interventions are considered as part of the long-term railway line development, potential encroachments will arise causing safety and operational challenges.

The ESIA Report therefore recommends that the proposed development should be considered for implementation. However, the proposed mitigation and enhancement measures recommended in this ESIA Report must be implemented to ensure that project benefits are realized or optimized.

Recommendations

- (i) The Contractor should adopt the Environment and Social Management Plan (ESMP) in this ESIA Report and prepare a Construction Environment and Social Management Plan (C-ESMP) reflecting realities of the project implementation to form the main compliance reference document. The document will be shared with and supervised by the Supervision Consultant and as well as the Client,
- (ii) The contractor should undertake relocation of public utilities (water, sewer, drainage, power, internet and street lights) before construction begins to avoid disruption of the services which might be a potential source of conflict with the project area residents,
- (iii) All material sites should have an EIA undertaken and approved by NEMA and the resultant management plans integrated. The material sites must be cordoned off or fenced during use, and rehabilitated after use.
- (iv) Limited vegetation clearance and felling of trees should be observed and confined only along the railway line corridor. Appropriate tree count and records should be done in order to undertake tree planting in identified locations as replacement initiatives,
- (v) Workers must be provided with complete protective and safety gear. They must have working boots, complete overalls, helmets, gloves, earmuffs, nose-masks, goggles etc.
- (vi) Fully equipped first aid kit must also be provided at the camp sites and near the working areas. The project should promote HIV/AIDs awareness along the entire project corridor during the project implementation phase. Awareness, prevention and training programmes should be integrated into the project implementation,
- (vii) Undertake annual environmental audits for the project components so as to assess level of compliance to the International and National laws, guidelines and standards governing the environmental sector,
- (viii) To ensure full integration of the ESMP and other environmental, social and safety aspects to the project construction works, both the contractor and the Resident Engineer should have environment and social safeguard teams. The teams from both sides should work together in ensuring OHS aspects are adhered to for project sustainability,
- (ix) Sensitize and create awareness to the neighbouring communities on the coexistence with the railway infrastructure with special focus on security and safety aspects,
- (x) The project should operationalize a grievance redress mechanism to deal with all complaints arising due to project conflicts

1.1 Project Background

Kenya Railways is a State Corporation established by an Act of Parliament (Cap 397) of the Laws of Kenya, and commenced operations on January 20, 1978. The mandates of the Corporation are:

- (i) Provide skills and technology for the railway sector
- (ii) Provide efficient and effective railway services
- (iii) Leverage our assets to grow business
- (iv) Promotion, facilitation and participation in national and metropolitan railway network development.

In keeping with its mandate, Kenya Railways Corporation is committed to providing the country with safe, reliable and efficient railway transport services. The railways master plan sets out to transform the national railway network through the rolling out of the mass commuter rail system for the country's metropolis. The Corporation aims to expand railway connectivity in the country and integrate it with other networks within the region. This will be achieved through construction of new lines, upgrade and rehabilitation of existing lines, as well as development of associated infrastructure.

Among the interventions undertaken over the years include revitalization of Nairobi Commuter Railway comprising of refurbishment of the Nairobi Central Railway Station and construction of 10 new commuter rail stations namely, Athi River, Githurai, Kikuyu, Donholm, Pipeline, Mwiki, Ruiru, Dandora, Kahawa, and Embakasi Village. Further 7.2km of Embakasi Village Line was upgraded from 60 to 80 pound. Also, the capacity for Nairobi commuter rail service was expanded through refurbishment of coaches and introduction of additional routes, that is: Nairobi – Limuru and Nairobi – Lukenya.

As part of implementation of commuter rail master plans for Nairobi Kenya Railways Corporation (KRC) intends to develop the proposed 12.5Km long Riruta-Ngong (MGR) commuter train project. The proposed railway line project will connect to an existing railway line in the residential suburb of Riruta in Nairobi County and extend to Ngong town in Kajiado County passing along Karen and Embulbul centres. In addition, there will be train stations proposed within the targeted centres to include: Riruta, Karen, Bulbul and Ngong. The proposed project is aimed at facilitating movement, lowering the cost of living and creating jobs. In addition, the proposed project is anticipated to reduce traffic congestion along Ngong Road, cost of transport to the city as well as revitalize the existing meter-gauge commuter railway line in Nairobi. This justifies the proposed railway project as it is in line with the Nairobi 2030 Commuter Rail network strategic plan.

1.2 Kenya Railways Corporation

Kenya Railways is a State Corporation established by the Act of Parliament pursuant to Cap 397 of the Laws of Kenya to undertake rail development and operations. The Corporation is governed

by the Kenya Railways Act and legal and statutory regulations. In addition, KR is certified under the ISO 9001:2015 Standard and adheres to rail operating manuals, policies and operating procedures that meets contractual, applicable legal, and statutory requirements. The functions of Kenya Railways as outlined in Cap 397 of the Kenya Railway Act include:

- (i) Development, operation, and maintenance of the railway infrastructure in the country;
- (ii) Ensure safety and security of the railway transport;
- (iii) Ensure funding and financing of the Corporation activities;
- (iv) Facilitate partnerships between the public and private sectors in the development, operation and maintenance of railways;
- (v) Ensure compliance with the relevant regional and international conventions on transport that guide the economic and environmental sustainability of railway transport;
- (vi) Collaborate with the County Governments in ensuring safe and uninterrupted railway operations;
- (vii) Undertake research for the purpose of encouraging innovations in the railway sector;
- (viii) Conduct technical capacity development at Railway Training Institute;
- (ix) Ensure effective and efficient service delivery in railway operations; and,
- (x) Management of the rail assets, including land, buildings, workshops, permanent way, signalling & telecommunication facilities, rolling stock, vessels on Lake Victoria, and Railway Museum.

1.3 Project ESIA Justification

The proposed Riruta-Ngong (MGR) commuter railway will improve passenger movements into the Central Business District as well as reducing congestion along our roads. Currently residents targeted by the project experience transportation challenges ranging from traffic jam due increased vehicle traffic during peak hour leading to high cost of transportation in addition to the long time period spent. The proposed intervention project is anticipated to address the above challenges and spur economic and social development of the targeted areas. The benefits from the proposed railway construction are also felt far to the lowest level of the society, directly or indirectly, such as to include improved livelihood from employment, low transport budget and general service delivery.

While appreciating the benefits from railway line and associated components construction projects, it will also be necessary to recognize the associated negative impacts of the project to the environmental and social settings. Among the negative impacts may include loss of vegetation from clearance, spoil generation from earth works, disruption and damage of public utilities, environmental pollution from construction activities, relocation of roadside businesses, risks to health and safety of the residents and contractor employees. Others include higher noise to the residents from locomotive movement, air quality impacts from emissions, demand for construction water and safety and security risks during operations.

In view of these observations, the proposed project was screened to determine the need for undertaking Environmental and Social Impact Assessment based on:

1. Project characteristics,
2. The Second Schedule of EMCA (as amended in the Environmental (Impact Assessment and Audit) Regulations amendments of 2019, which lists the projects that must undergo an EIA;
3. Internationally acceptable environmental best practices

The environmental consultant carried out reconnaissance site visits to familiarise the Project Team with the Project Area and to collect primary environmental and social baseline data, obtain opinion of the local communities and establish the potential social and economic benefits or negative impacts of the project and mitigation measures. From the screening exercise the expert made decision on desired approach to the ESIA and the required level of assessment. The following guided on decision making:

- Legal Notice no 31 of the National Environment (Impact Assessment and Audit) of 2019 classifies the proposed Project (specifically, construction of railway lines) as High Risk which can be approved through the preparation and submission of ESIA Full Study Project Reports
- The nature and extent of the potential impacts of the Project

1.4 ESIA Study

Implementations of major projects in Kenya are preceded by the Environmental and Social Impact Assessment studies. It is a requirement to undertake the Environmental and Social Impact assessment according to the regulations stipulated in The Environmental Management and Coordination Act (EMCA), 1999 (Amendment 2015) and the Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 (Amendments 2019). The main objective of the ESIA study was to identify the impacts associated with the construction of the commuter railway project and establish appropriate mitigation measures for integration into the implementation. Environment and Social Management Plans (ESMP) was developed as part of the ESIA Report to provide reference tools for actions while an ESMoP was prepared for tracking implementation.

The scope of the ESIA Study covered the following;

- (i) Review of the proposed project design concepts and project implementation activities as a basis for identification of environmental and social linkages
- (ii) Establish quantified baseline conditions on environment and social conditions to drive the impacts identified and preventive measures
- (iii) Identify potential environmental and social impacts associated with the proposed project

- (iv) Identify suitable mitigation and preventive measures appropriate for identified impacts
- (v) Development of a comprehensive environment and social management plan for integration into the project implementation.

1.4.1 ESIA Study Plan

The ESIA Study commenced immediately after signing of contract followed by an initial meeting of the consultant and the Client on 11th October 2023. A series of field assessments were conducted between the 16th January to the 19th January 2024 including intensive public consultations took place on various dates between November 2023 and April 2024 under the moderation of the County Administrative Office.

1.4.2 Study Objective

The main objective of the ESIA study is to ensure that the proposed railway line and associated components development takes into consideration appropriate measures to mitigate any anticipated impacts to the environmental and social setting for sufficient information in the planning, design, construction, maintenance and commissioning use of the proposed 11.5km long Riruta-Ngong (MGR) commuter project. The study has been undertaken within the provisions of Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 (Amendments 2019).

The Environmental Management and Coordination (Impact Assessment and Audit) Regulations, 2003 (Amendments 2019) amended the 2nd Schedule of the Regulations placing construction of railway lines under the High-Risk Projects category that requires preparation of ESIA Full Study Report. The proposed project falls under high-risk category due to its interactions with sensitive environment (Ngong Road Forest), potential land take, direct interactions with social features to include utilities and impacts on surface water crossing. Having considered the above project interactions, an ESIA Full Study Report in accordance with Section 2(4) of the Legal Notice No. 32 of the EMC (EIA/EA) Regulations (Amendment 2019) will effectively address the linkages.

1.4.3 Scope of ESIA Study

The proposed railway line corridor is in existence but with direct interactions with public utilities (water, power, internet, sewer, roads and drainage systems), institutions and commercial premises. Section between Karen and Southern bypass interchange has the most interactions with institutions and commercial premise. In accordance with the Environmental (Impact Assessment and Audit) Regulations, 2003 (Amendments 2019), the project falls under the High-Risk Projects. The scope of the ESIA study is development of Environment and Social Impact Assessment (ESIA) Study Project Report that includes detailed analysis of the project design concepts, evaluation of baseline conditions, impacts on the environment and social aspects, results from public and stakeholders' consultations as well as recommendations on appropriate

mitigation measures. The ESIA Project Report also presents a comprehensive Environment and Social Management Plan (ESMP) as well as a monitoring plan.

The ESIA Project Report comprises the following;

- (i) A comprehensive evaluation of the project design proposed in the engineering report and consider its effects on safety, comfort and convenience of the users,
- (ii) Description of the project area such as to cover environmental baseline conditions including land use patterns within the site limits with respect to long term influence from the railway operations,
- (iii) Analysis of policy, legal and institutional framework governing transport sector and in particular railway transport,
- (iv) Establish linkages between the proposed construction and maintenance works project and the anticipated impacts focused on the physical environment, social status and general benefits to the national economy,
- (v) Identification and analysis of project alternatives to the proposed project work,
- (vi) Social and economic implications of the project through structured stakeholders and public participation involving government officials, community groups, business people, land owners, public institutions, opinion leaders, etc.,
- (vii) Mitigation measures to be taken during and after the implementation of the project works,
- (viii) Environment and Social Management Plan (ESMP) and Environment and Social Monitoring Plan (ESMoP) for adoption through the project implementation.

1.5 ESIA General Approach

This ESIA study adopted an integrated approach where documentary review, intensive field investigations with rapid interviews and discussions with the stakeholders and public along the project corridor. The study was designed to ascertain the linkage between the railway line project and the environmental and social setting. Identification of anticipated impacts was determined on the basis of the proposed work activities, baseline conditions established and information obtained from the documents reviewed and field investigations.

Due to environmental and social challenges associated with the railway line and associated components construction activities, a comprehensive Environmental and Social Impact Assessment Study (ESIA) is necessary for every new project to evaluate the current environmental and social status (baseline conditions), establish potential impacts, establish the potential for social and economic benefits and estimate the project cost, obtain opinion of the local communities and develop appropriate mitigation and remedial actions for integration in the project design and implementation. The following is a general approach to the process.

1.5.1 Reconnaissance Visit

A comprehensive physical evaluation of the project area was undertaken taking into consideration physical and biological environmental status, human settlement and socio-economic activities. Field visits involved rapid interviews of members of public, groups of persons and institutional officials. The proposed project corridor extent is well-defined that enabled determination of potentially affected physical environmental features. However, the effects maybe felt on a wider impact zone covering up to a radius of 3km from the area. The fieldwork session was, therefore, designed to establish the baseline conditions and the potential positive and negative impacts over this impact zone in terms of physical environment, social and economic trends, population trends, biodiversity and climatic patterns.

1.5.2 Environmental Screening and Scoping

The environmental screening was done to ensure that the project ESIA study adequately addressed all the crucial environmental and social concerns. This was done by narrowing down the MGR project issues requiring detailed assessment and analysis, which involved engagement with the project stakeholders as well as collection of relevant project primary and secondary data. Rapid assessment of the project site and the surrounding areas was undertaken. The proposed project falls under category 2 of projects to be subjected to ESIA study as provided for by the second schedule of the Environmental Management and Coordination Act of 2015 and Category B under the World Bank Environmental and Social Safeguards (ESS). The objectives of the environmental screening were: -

- (i) To identify key stakeholders for structured engagement
- (ii) To ensures that the ESIA study focused on key and relevant environmental and social impacts
- (iii) To identify available project data and any existing data gaps
- (iv) To come up with the required ESIA study resources and time line

1.5.3 Documentary Review

Relevant documents were reviewed to obtain available secondary data and information along the project corridor traversing two counties namely Nairobi and Kajiado. The document review provided understanding of micro social and economic conditions, demographic trends and land use practices. Document review also yielded information on the biophysical environment and social economic factors. Among the secondary data/information included:

- (i) Project Terms of Reference
- (ii) Project background documents
- (iii) Project maps
- (iv) Project design layouts
- (v) Nairobi and Kajiado County Integrated Development Plan (2018 – 2022)
- (vi) National Development and Economic Survey

(vii) Relevant policies, regulations and any relevant literature sources.

1.5.4 Biophysical and Social Environment

Studies of the biophysical environment provided a profile of the study area and specifically emphasized on physiography of the corridor, soils and geology, climatic conditions, hydrology and drainage characteristics and ecological setting and resources among other factors. Social and economic settings were also observed including settlements, commercial development, institutional presence, roadside trading, service lines and amenities as well as traffic movements. Specific observations include;

- (i) The terrain trends
- (ii) Vegetation cover characteristics
- (iii) Drainage types,
- (iv) Soil types
- (v) Water resources
- (vi) Integrated social and economic activities
- (vii) Institutional features.

1.5.5 Field Assessment

The field assessment for baseline data collection on the existing social-economic and environmental conditions through observations, recordings (including photography along the proposed corridor and its vicinity) were conducted to evaluate the current environmental status with respect to physical, biological and social-cultural perspectives. Field work was a systematic inspection backed with available documentation and direct interviews planned to enable determination of the exact physical environmental features to be affected within the proximity of the railway line corridor. The field assessments achieved the following:

- (i) Available information and data gathered from the public and public offices
- (ii) Verification of the environmental features including land cover variations
- (iii) Social and economic features:
- (iv) Rapid stakeholders' interviews
- (v) Institutions and organizations along the corridor.

1.5.6 Public and Stakeholders Consultation

Stakeholders' consultations and participation were undertaken along the project corridor to capture the views, opinions, concern and fears of potential interested and affected parties with the main focus mainly on social and conservation aspects as well as the perceived associated impacts. The engagement process entailed one on one interviews and holding of public

consultative meetings. In ensuring comprehensive and an all include stakeholders' consultations; the process involved the following;

- (i) Developing a consultation plan and communication of the same to the stakeholders directly and through the local County Commissioners Office;
- (ii) Rapid interviews that involved interactions with Stakeholders in their respective areas of operations along the project road corridor
- (iii) Undertaking structured stakeholder participation meetings with the key agenda being to explain the project concepts, anticipated environmental and social impacts, propose mitigation measures and the expected involvement of the stakeholders through the project implementation.
- (iv) The stakeholder participation meetings also provided a forum for clarifications, questions and answers, opinions and suggestions. The proceedings are documented and integrated into the report annex.

Further stakeholders' engagements would also be achieved through public disclosure of the ESIA Project report through NEMA review process.

1.6 Reporting

The process of report writing involved participation of the team members through analysis of respective data and information. This is translated into findings and anticipated impacts. It also provided a basis for development of mitigation measures and an Environment Monitoring Plan for incorporation into the project implementation and other investigation. The Project Report will be submitted following a timeframe agreed in the contract such as to cover the requirements of National Environmental Management Authority (NEMA) guidelines. The proposed report schedule is as follows;

- (i) Terms of Reference prepared by the consultant and submitted to NEMA for review (NEMA approved the ESIA process)
- (ii) Contribution to the Inception Report as part of the feasibility studies and design process;
- (iii) Preparation of a Draft ESIA Study Report to be reviewed by the client (KRC) and raised comments addressed;
- (iv) Preparation of a Final ESIA Study Report for endorsement by KRC and submissions to NEMA for review and issuance of License.

1.7 Study Team

The key professionals involved in the ESIA process include the following:

- (i) Environmentalist/Team Leader
- (ii) Sociologist

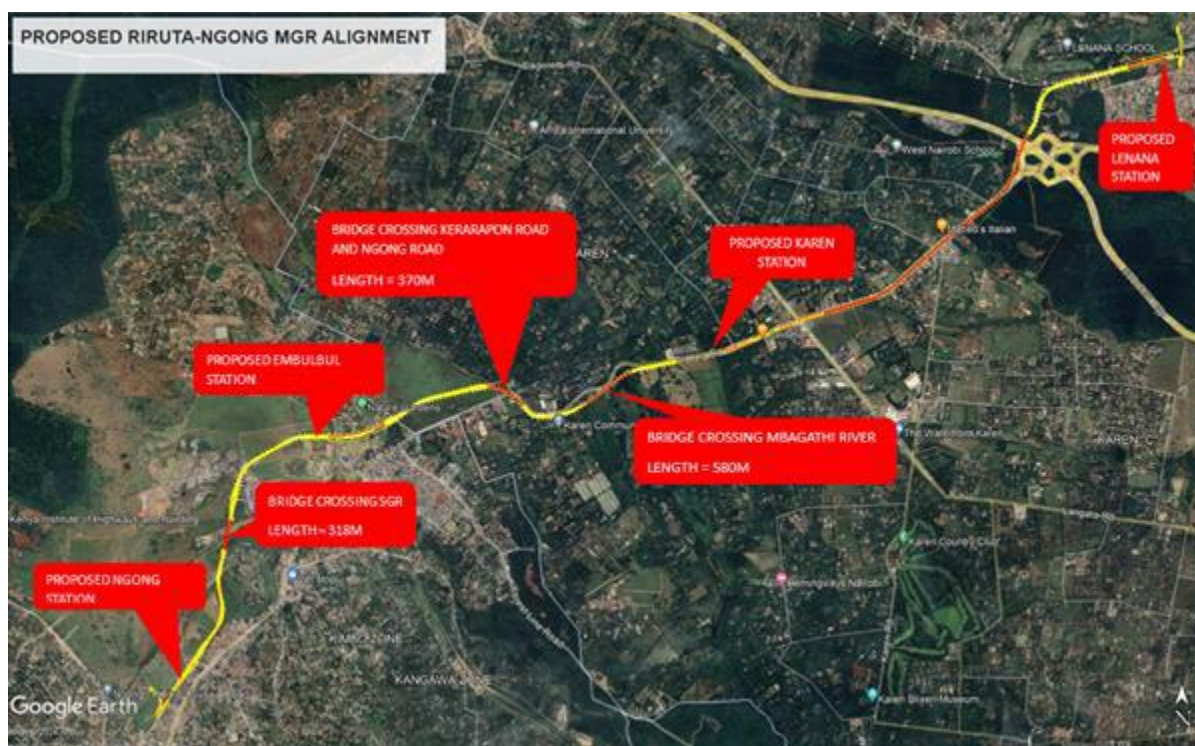
- (iii) Civil Engineer
- (iv) Environmental Quality Measurement Expert
- (v) Field Support Staff

Chapter 2: Project Description

2.1 Project Location

The proposed project is located within both Nairobi and Kajiado Counties and it cuts across 2No. Sub-Counties in Nairobi County namely Dagoretti South, Langata and Kajiado North Sub-County in Kajiado County. Within Nairobi County, the railway line commences at Lenana/Riruta area where it branches off the main Nairobi-Kikuyu MGR Line following the existing railway reserve. The line then traverses through the Ngong Road Forest (KM 1+100 to Km 1+650) before exiting to the Southern Bypass Road. This section is located in Riruta Ward of Dagoretti South Sub-County. From the southern Bypass Interchange, it runs along Ngong Road corridor (within the median) up to Karen shopping centre; thereafter, it crosses to the Left-Hand side of the road corridor running along the road reserve to Kerarapon Road. This section covers Karen area of Langata Sub- County. From Kerarapon Road to Ngong the project corridor is located within Ololua and Ngong Wards of Kajiado North Sub-County in Kajiado County. In addition, there are 4No. Stations located in Lenana, Karen, Embulbul and Ngong.

Figure 1: Project Aerial View



2.2 Project Overview

The proposed commuter transport intervention project aims to address transportation challenges experienced by the targeted areas. Currently residents of the project target areas rely on public and private transport system which are characterized by challenges ranging from traffic jam due to increased number of vehicles during peak hours leading to high cost of transportation in addition to the long time period spent to one's destination. The proposed intervention project is anticipated to address the above challenges and spur economic and social development of the targeted areas. The proposed project will comprise the construction of a 12.5km long railway track from Lenana to Ngong Town, construction of suspended bridges, level crossing, overpasses, drainage systems, train stations with associated components.

2.3 Proposed Project Corridor Status

The proposed Riruta-Ngong Meter Gauge Railway (MGR) line commences at Lenana/Riruta area where it branches off the main Nairobi-Kikuyu MGR Line. The line is anticipated to have potential interaction with the Ngando – Sattelite road as well as the sewer line main trunk. Currently the corridor towards Ngong Road Forest is being used as farm land by the community. It is worth noting that the community is aware they are farming along railway reserve and have no problem relocating. Lenana access Road cuts across the corridor at Lenana High School main gate. Storm water management along this section is a challenge as flooding was observed. The project will have direct interaction with the proposed Lenana Primary School as the railway corridor is within the school proximity. The railway line will cut across Ngong Road Forest characterized by tree vegetation, including croton, pine, cypress, etc, as well as apiculture activities.

The Ngong Road Median anticipated for use by the proposed project is limited in width as it is being used to separate the dual carriage Ngong Road. The width in some section is narrow and considered not enough to accommodate the proposed project. In addition, there exists drainage system for surface water management emanating from the road pavement. Street lights are also observed as well as U-turns along the Median corridor. At the Karen Roundabout, there is increased traffic from vehicles moving either towards Karen, Ngong, Dagoretti or Nairobi. The left-hand side of the road corridor at Karen is observed to have roadside businesses and a bus terminus.

From Karen center towards Ngong town, there are observed access roads serving premises, businesses and institutions. Other utilities with possible direct interactions with the proposed project include sewer main, water mains, power lines and internet cables. Various tree seedling species both indigenous and exotic align the proposed corridor from Karen Surgery Health Clinic to KEPHIS access road. Flower and tree seedling vendors display their merchandises along the road reserve anticipated to accommodate the proposed project. Km 5+900 is observed as a notable flood prone area as the terrain is flat receiving storm water from the higher catchments. Mbagathi River crosses the proposed corridor at km 5+299.

Traffic challenges are anticipated when accessing both Kerarapon Road and Drive especially at peak hours. The railway line traverses government land and public land. Only VET farm is observed to have crops and tree vegetation cover with potential interactions with the project.

2.4 Project Design Concepts

In the design of Riruta – Ngong MGR commuter line, some key design concepts have been considered to ensure safety, efficiency, and functionality. Below is a comprehensive list of design concepts considered:

- (i) **Alignment and Route Selection:** The best route for the railway line has been determined by considering factors such as terrain, land use, population density, and environmental impact. The design aims to minimize curves, gradients, and crossings to optimize speed and safety.
- (ii) **Grades and Curvature:** The line is designed to minimize gradients (slopes) and curves to ensure safe train operations considering factors like train dynamics, visibility and reduced energy consumption.
- (iii) **Track Layout and Configuration:** The design of the track layout has been done to accommodate various train movements, including passing loops to enable efficient traffic flow.
- (iv) **Clearances and Dimensions:** The line has been designed to allow for adequate clearances for trains, structures, and equipment along the railway line and road corridor, including overhead clearances for bridges.
- (v) **Alignment with Other Modes of Transportation:** The design of the line aims to coordinate with other modes of transportation, such as roads to facilitate intermodal connectivity and seamless transportation networks.
- (vi) **Safety and Signaling:** The line design incorporates safety features such as grade separation crossings, signals, barriers, and warning systems to prevent accidents and ensure safe operation.
- (vii) **Structures and Infrastructure:** The design of bridges and other crossing structures has been done to overcome natural obstacles and accommodate the railway line. The design has ensured that the structures are durable, cost-effective, and environmentally sustainable.
- (viii) **Environmental Considerations:** The design of the line has ensured minimal environmental impact through careful route selection, habitat preservation, noise mitigation measures, and sustainable construction practices.
- (ix) **Accessibility and Inclusivity:** Design of stations, platforms, and facilities has been done to be accessible to people of all abilities, including those with disabilities and special needs as well as the aged. The line aims at serving diverse communities and promote social inclusion.
- (x) **Resilience and Disaster Preparedness:** The line has been designed considering resilience measures to mitigate the impacts of natural disasters, extreme weather events,

and other emergencies on the railway infrastructure. Design incorporates resilience against floods, earthquakes, landslides, and other hazards, as well as climate change dynamics.

- (xi) **Maintenance and Lifecycle Costs:** The line has been designed for ease of maintenance, inspection, and repair to ensure long-term reliability and cost-effectiveness.
- (xii) **Regulatory and Legal Compliance:** The design of the line has ensured compliance with relevant regulations, standards, codes, and permits governing railway design, construction, operation, and safety. All necessary approvals from the regulatory agencies and stakeholders have been secured.

2.5 Scope of Work

The scope of this Project encompasses a diverse range of activities including; subgrade works, bridge works, culvert and drainage works, track works, station building works, installation of communication and information systems, as well as power and water supply. This comprehensive approach ensures that all aspects of the project are addressed effectively and contribute to its successful completion.

Embankment and cutting sections: Length of cut section is approx. 3.4Km and length of fill section approx. 3.9Km. Slope protection works along the proposed alignment will include:

- (i) Vegetation cover/grassing.
- (ii) Herringbone, predominantly for embankments with a height \geq 6 meters.

2.5.1 Bridge Works

The Riruta - Ngong commuter line project has 5No. Proposed bridges as listed below:

- (i) Bridge from Southern Bypass to Karen Shopping Center with a proposed span of 2978.5m
- (ii) Bridge Crossing Mbagathi River at Km 6+229 with a proposed span of 578m
- (iii) Bridge crossing Ngong road and Kerarapon Road at Km 7+335 with a proposed span of 658m
- (iv) Bridge at KM 8+538 with a proposed span of 638m
- (v) Bridge crossing the Standard Gauge Railway at Km 10+339 with a proposed span of 318m

2.5.2 Drainage Structures

Provision of both drainage and vehicular underpass culverts along the alignment is envisaged. The actual location of these structures will be determined on site to fit the topography of the areas traversed by the railway line. At least two vehicular underpasses have been planned at KFS and Kerarapon drive. About ten drainage culverts are planned along the line.

2.5.3 Side Drains

Mortar rubble trapezoid side drains will be applicable and are to be designed with a bottom width of 0.4m and a depth of 0.6m, ensuring the provision of an efficient drainage system along the alignment.

2.5.4 Track Works

The alignment of this Project starts at Riruta/Lenana area shortly after K544 of the existing meter gauge railway line and terminates at Ngong Town. The total length of the line is 12.09 Km with 327meter long station loop lines at the proposed stations to facilitate movement to and from the station platforms and the catch sidings.

2.5.5 Turnouts and wye tracks

4 No. Turnouts are set to be installed at the proposed stations, with a switch angle of 1:9 to facilitate movement to and from the station platforms, loop lines and catch sidings/dead ends. The EPC Contractor is also required to provide catch sidings/dead ends at the proposed stations, to facilitate catching and stopping of runaway wagons and to also serve as additional wagon parking bays. At the proposed Ngong Station turning triangle, 3 wye tracks measuring 249 meters, 116 meters, and 217 meters in length will be constructed to facilitate the smooth and efficient turning of locomotives.

2.5.6 Sleepers

The proposed MGR line will require provision of modern and durable concrete sleepers to ensure firm, safe and steady anchorage of the rails. Timber sleepers will be provided at the turnouts due to their versatility in production and manufacturing.

2.5.7 Ballast

After the track installation, ballasting will be done and inspected to ensure that it meets the specified gradations and quality standards. This approach will guarantee optimal load transfer, stability and effective drainage within the track system.

2.5.8 Station Buildings

Each station will have a plinth area of 376.62m², designed to accommodate essential facilities such as ticketing stalls, waiting bays, and washrooms. Accessibility for People with Disabilities (PWDs), children and the aged will be prioritized with the installation of ramps at all station entrances to ensure effortless entry. Additionally, the stations will feature platforms measuring

250m in length by 5m in width, with a height of 1.2m from the top of the rail. These platforms are designed to be covered by platform canopies ensuring safe, comfortable and efficient access to the trains, enhancing overall convenience and serviceability for commuters.

2.5.9 Communication equipment, information and power systems

Operation and management of the proposed MGR line will require provision of power at the stations and radio communication between the stations and terminals. These information and communication systems are vital to ensuring smooth and efficient functioning of the proposed line, enabling coordination and safety across entire railway network.

2.6 Proposed Project Components

The proposed project components scheduled for implementation include:

2.6.1 The Railway Line

- ✓ Railway gauge: 1000mm
- ✓ Number of lines: Single Track
- ✓ Design Speed: 50km/h
- ✓ Minimum curve radius: Normal 250m, Difficult 110m
- ✓ Ruling gradient: 2.5%
- ✓ Curve Super elevation (mm): 10
- ✓ Axle load: 18t

2.6.2 Track and subgrade features

Main design basis includes the following: -

- ✓ Code for design on subgrade of railway - TB10001-2005.
- ✓ Code for design on special roadbed of railway -TB10035-2006.
- ✓ Slope rate embankment is 1:1.50 and the cutting slope 1:1
- ✓ Width of ditch: 0.6m bottom; constructed of 0.3m thick mortar rubble.
- ✓ The bed is replaced with 0.4m thick FM1+0.1m medium-coarse sand sandwiched with two cloth, one-membrane waterproof geotextile and the bottom layer of the subgrade bed is replaced with 1.0m thick FM2.
- ✓ Slope protection works; M7.5 mortar rubble herringbone frame and vegetation protection.

2.6.3 Railway Stations

The station designs will comply with the minimum specifications for building and civil works in Kenya and other relevant codes of practice, in order to guarantee the basic functions of these facilities. The station design comprises of station platform, ticketing booths, public washrooms, administrative offices, security office, passenger waiting hall and firearm room. Supporting interventions will include stairs and ramp for physically challenged. In addition, the building will be

installed with power, internet, water supply and sanitation. Architectural facilities such as platforms, ticketing booths, turnstiles, and toilets are designed on paved areas in full coordination with the structural, electrical, mechanical elements of the design.

The proposed MGR line has 4No. Proposed Stations namely;

- Lenana Station (KM0+300)
- Karen Station (KM5+100)
- Bulbul Station (KM8+650)
- Ngong Station (KM11+325)

2.6.4 Drainage Systems

Design features of the culvert:

- ✓ The wing walls of exits and entrances are designed and constructed on a skew angle; reinforced concrete foundation is adopted.
- ✓ Slab culvert", "rectangular culvert" or "frame culvert" can be adopted in the rectangular part at the center according to the design requirements.
- ✓ 10 cm thick concrete pads are settled under the ends of trapezoidal section and reinforced concrete foundation of exit and entrance wing walls, and 30 cm thick crushed stone cushion are settled under concrete pads of exit and entrance wing walls, to prevent the wing walls from reversing and slipping away. If the foundation layers are pebbles or crushed layer, crushed cushion is not necessary.

2.6.5 Safety and Security Aspects

At every station entry there will be a security gate to be manned by contracted guards or the Kenya police. The guards will be operating in shifts (day or night) and will be housed in a guard house. In addition, a police office will be provided at the station. Fencing around the station and along the railway corridor will be done. Fencing will be designed for the station area boundaries in public areas and perimeter walls will be provided in other locations. The enclosed area will have public lighting for which the type of electrical connection and location of mains will be provided.

2.7 Proposed Implementation Schedule

The works are estimated to be completed within a construction period of 12 month with a 12months defect liability period during which the contractor is expected to maintain the system and carry out repair works which may occur to the satisfaction of the proponent and supervision project engineers.

2.8 Estimated Project Cost

Based on the final designs carried out for the project works, cost estimates have been derived from the proposed work. The proposed Riruta – Ngong MGR Commuter Project is envisaged to cost approximately **Ksh: 8,212,028,998.68** (Eight Billion Two Hundred and twelve Million, twenty-Eight Thousand, nine hundred and ninety-Eight and sixty-Eight Cents).

Chapter 3: Project Alternatives

3.1 Overview

Consideration of alternatives in the ESIA process is crucial during project scoping exercise as it helps in making informed decisions on negative impacts minimization and maximizing the positive impacts. Regulation 16(b) of Environmental (Impacts Assessment and Audit) Regulations, 2003

(Amendment 2019) requires identification and analysis of project alternatives through the ESIA process. The most feasible alternative should be selected based on least negative impacts and cost benefit analysis. In this regard, the following alternatives have been considered.

3.2 Intervention Alternatives

3.2.1 No Project Alternative

This alternative implies that the project Riruta – Ngong commuter project construction will not be undertaken including its associated components. Adopting this option is the most environmentally reasonable as would surely avoid most of the negative effects associated with the project. However, the positive impacts accruing from the proposed railway line intervention project would also not be realized. This alternative means that the railway link from Lenana to Ngong would not be constructed hence the existing transport challenges such as congestion of the roads, high bus fares, loss of time from traffic and efficient and affordable means of transport would not be realized. More importantly, the option would deny the Government opportunity of earning revenue in addition to service delivery to the public from efficient transport system. The ‘no project’ alternative only serves to show what will happen to the status quo but it is not a development option under these conditions and circumstances. This option is therefore not viable.

3.2.2 Project Alternatives

Stations Location Alternative

The most suitable station locations are around the centres (Riruta, Karen, Embulbul and Ngong). Placement of railway stations should ensure that the stations are within walking distance hence passengers not incurring more transportation fare, safe and addressing passenger needs. Having the stations within reach by the general public will contribute to increased movement of passengers hence leading to realization of the project objective.

Realignment Alternative

The proposed commuter MGR project corridor (Southern Bypass Interchange to Karen Shopping Centre) can be developed along the road reserve or the road median. Development of the project components along the road reserve corridor was observed to have social and economic negative impacts. The railway line would be constructed within proximity to institutions, commercial premises and having direct interactions with public utilities (water, sewer, power and drainage). This corridor might be relatively expensive given the required engineering works that may be needed to ensure the project doesn’t block frontage of businesses and institutions. Additionally, the cost of relocating services (water, sewer, power) will be high increasing the total project cost.

However, along the Ngong Road median, there are limited interruptions as there only exist street lighting poles and roadside drainage. The above reason makes the alignment along the median the most preferred as opposed to the road reserve as not only will it reduce cost of construction but also avoid interfering with the public utilities, institutions and commercial premises.

Crossings Alternative

The project design has proposed provision of over passes as opposed to level crossings along access roads. Provision of overpasses will ensure limited traffic and safety risks as there will be no direct interactions between the train and vehicles. Provision of overpasses along access roads is the preferred option as opposed to level crossing.

3.2.3 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 railway station works will be done using locally sourced materials that meet the Kenya Bureau of Standards requirements. The technology to be adopted will be the most economical and sensitive to the environment.

Chapter 4: Policy, Legal and Institutional Framework

4.1 Overview

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

delaying the project. This implies a need to engage the affected communities from the earliest stages of project planning

4.2 Constitution of Kenya

Article 42 of the Bill of Rights of the Kenyan Constitution provides that ‘every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. Part 2 of Chapter 5 of the constitution is dedicated to Environment and Natural Resources. Article 69 in Part 2 provides for among others sustainable utilization and exploitation of natural resources, public participation on matter affecting the environment, establish environmental assessments and monitoring systems.

Further, Article 70 states that if a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress. Development Projects should ensure compliance with the constitution in so far as equitable sharing of the resources, between the stakeholders. Further, the projects should ensure the sustainability of livelihoods and biological resources within the project areas are protected. Any development proposals should also be cognizant of the increased powers under the Constitution given to communities and individuals to enforce their rights through legal redress.

Relevance:

The project should observe the above stated conditions in as far as environmental protection is concerned. For instance, in the protection of the rights of every Kenya to a clean environment and the right of Project Affected Persons (PAPs) especially during the construction phase of the project.

4.3 National Policies

The constitution of Kenya provides the supreme safeguard document on which policies and regulations in the country are pegged. Following is an outline of the policy and legal framework governing Environmental Health and Safety in development projects in Kenya.

4.3.1 Kenya Vision 2030

Kenya Vision 2030 is the country’s new development blueprint covering the period 2008 – 2030. It aims to transform Kenya into a newly industrialized, “middle income country providing a high quality of life to all its citizens by the year 2030”. The vision was developed through an all-inclusive

and participatory stakeholder consultative process, involving Kenyans from all parts of the country.

In regards to the environment, Kenya aims to be a nation living in a clean, secure and sustainable environment by 2030. It also states that Kenya will harmonize environment-related laws for better environmental planning and governance. Specific strategies will involve promoting environmental conservation in order to provide support to the economic pillar flagship projects and for the sake of promoting the now Sustainable Development Goals.

Section 3.4 under states that “The 2030 vision aspires for a country firmly interconnected through a network of roads, railways, ports, airports, water and sanitation facilities and telecommunications. By 2030, it will become impossible to refer to any region of the country as “remote”. Furthermore, to ensure that the main projects in the country are implemented, investment in the nation’s infrastructure will be given the highest priority”.

Poor infrastructure was identified as a major constraint to doing business and movements. Good infrastructure was greatly cited as necessary in order to improve their livelihoods. Infrastructure is also important in improving our security. Successful transition to Vision 2030 calls for a considerable shift in the manner in which Kenya deploys her resources to acquire the necessary capacity and access to infrastructure services (transport, telecommunications, energy, water, sewerage and sanitation and meteorological services) by firms and citizens in their wealth creation efforts.

Relevance:

Kenya Vision 2030 is anchored on several foundations one of them being infrastructural development. KRC intends to construct Riruta – Ngong Commuter railway which will address transportation challenges experienced in our roads such as traffic, congestion and time wasting. In addition, the project will facilitate efficient and affordable transport hence contribute towards increased economic development of the settlement.

4.3.2 Nairobi Metro 2030

Nairobi Metro 2030 was developed in the year 2008 to provide a guide for the NMR play its role in the National growth strategies under the Kenya Vision 2030. It is a transitional document that brings into focus challenges faced under urban growth and development. The document provides forum to achieve sustained rates of economic growth necessary for successful economic and social development. The Metro 2030 provides links with the Central Government through Kenya Vision 2030 and other development plans as well as seeking to strengthen the Local Authorities as part of the devolvement of power and recognizing need for ensuring efficient and effective management of resources at the grassroots.

Nairobi Metro 2030 carries the vision for Nairobi Metropolitan Region to be a World Class African Metropolis supportive to the overall national agenda under the Kenya Vision 2030. The agenda to achieve this vision is the need to enhance mechanisms for economic growth, employment creation, improved lifestyles and improved infrastructure.

Relevance:

The Nairobi Metro 2030 is anchored on several foundations one of them economic growth. Therefore Riruta – Ngong Commuter railway Project contributes to the Nairobi Metro 2030 by providing an efficient transportation alternative.

4.3.3 National Biodiversity Strategy, 2007

The overall objective of the National Biodiversity Strategy and Action Plan (NBSAP) is to address the national and international undertakings elaborated in Article 6 of the Convention on Biological Diversity (CBD). It is a national framework of action to ensure that the present rate of biodiversity loss is reversed and the present levels of biological resources are maintained at sustainable levels for posterity. The general objectives of the strategy are to conserve Kenya's biodiversity to sustainably use its components; to fairly and equitably share the benefits arising from the utilization of biological resources among the stakeholders; and to enhance technical and scientific cooperation nationally and internationally, including the exchange of information in support of biological conservation.

Relevance:

The project area has a myriad of habitats for various flora species including Ngong Road Forest. Therefore, the above strategy will need to be adhered to throughout the project's cycle to ensure it is sustainably implemented for conservation of these species. Tree count after cutting should be recorded and same number of trees planted on identified sites

4.3.4 Guidelines for Prevention and Control of Soil Erosion in Road Works, 2010

The guideline's main objective is to benefit all persons engaged in the road works (Engineers, consultants, contractors and supervisors) and are not informed on the extent of damages caused by uncontrolled run-off from the road corridor. It acknowledges that road works potentially result in environmental hazard through the spillage of carbon products, contaminating the surrounding land, dust and noise pollution, interference with the drainage pattern hence extensive soil erosion. The guidelines therefore focus to minimize the damages to the environment through the use of innovative construction methods and procedures which are less damaging to the environment in controlling soil erosion. The guidelines discuss several issues on the soil and water conservation principles which entail:

- (i) The design and construction of water ways and soil erosion control measures in road drainage systems;
- (ii) Soil erosion control measures needed in upper and lower catchment areas and on the steep valleys;
- (iii) Soil erosion and their mitigation measures against anticipated damages from the road drainage discharge;

Relevance

The guidelines are applicable to the proposed project as they provide some of the mitigation measures to alleviate potential environmental degradation especially during the construction phase of the project.

4.3.5 National Policy on Environment, 2013

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

The main goal of this Policy is “A better quality of life for present and future generations through sustainable management of the environment and natural resources” Finally, the main objectives of the National Environmental Policy are:

- (i) Promote and support the use of innovative environmental management tools – such as incentives, disincentives, total economic valuation, indicators of sustainable development, SEA, EIA, Environmental Audit, and payment of environmental services – in environmental management;
- (ii) Promote and enhance cooperation, collaboration, synergy, partnerships and participation in the protection, conservation, better management of the environment by all the stakeholders.

Relevance

The Policy requires that projects such the proposed railway line construction activities promote environmental sustainability. Additionally measures or safeguards ensuring sustainability be promoted at all levels of project implementation.

4.3.6 National Land Policy, 2007

The Land Policy 2007 applies to the proposed project as it passes adjacent to areas of ecological sensitivity, i.e. forests and rivers. Environment management principle: Fragile ecosystems shall

be managed and protected by developing a comprehensive land use policy bearing in mind the needs of the surrounding communities. Zoning of catchment areas to protect them from further degradation and establishing participatory mechanisms for sustainable management of fragile ecosystems will also be done. It will also develop procedures for co-management and rehabilitation of forest resources while recognizing traditional management systems and sharing of benefits with contiguous communities and individuals. It as well states that all the national parks, game reserves, islands, front row beaches and all areas hosting fragile biodiversity are declared fragile ecosystems.

Conservation and sustainable management of land based natural resources: The sustainable management of land based natural resources depends largely on the governance system that defines the relationships between people, and between people and resources. To achieve an integrated approach to management of land based natural resources, all policies, regulations and laws dealing with these resources shall be harmonized with the framework established by the Environmental Management and Coordination Act (EMCA), 1999. The land policy has a vision of 'efficient, sustainable and equitable use of land'. It designates all land in Kenya as Public, Community or Private. It also recognizes and protects customary land rights.

The key relevant issues:

- (i) The exercise of (these) powers (compulsory acquisition and development control) should be based on rationalized land use plans and agreed upon public needs established through democratic processes (Section 43);
- (ii) Ensure that the exercise of development control takes into account local practices and community values on land use and environmental management (Section 51(f));
- (iii) Ensure effective public participation in the exercise of development control (Section 51(g));
- (iv) Strategies for sharing benefits should be developed taking into account the nature of the resources involved and the contribution that diverse actors make to the management of the resources (Section 98).

The policy also addresses land management. Key issues include Section 3.4.3.2 – ecosystem protection (including wetlands). Measures for protection are required with sub-section 135 addressing fragile ecosystems to be managed and protected. Sub-section 137 focuses on Protection of watersheds, lakes, drainage basins & wetlands shall be guided by among other principles prohibition of settlement and agricultural activities in the water catchment areas, identification, delineation and gazettement of all water courses and wetlands as well as integrated resource management based on ecosystem structure. Section 3.4.3.3 addresses urban environment management on the face of the rapid urban development in the country. The section calls for control of waste dumping, regulation of quarrying activities and rehabilitation of land and material dumping sites.

Relevance

This proposed project entails development of railway line within the existing ROW. However, the alignment will cut through private land in some sections hence need for extra land, there is need for KRC in collaboration with the National Land Commission adhere to the principles in the land policy and compensate the respective ascertained owners of the land parcels and properties.

4.3.7 National Climate Change Action Plan 2018 – 2022

As a response to the threats posed by climate change, the Government of Kenya has taken measures to secure the country's development against the risks and impacts of climate change. The enactment of the Climate Change Act (Number 11 of 2016) requires the Government to develop five-year National Climate Change Action Plans (NCCAP) to guide the mainstreaming of adaptation and mitigation actions into sector functions of the National and County Governments.

NCCAP 2018 – 2022 aims to further Kenya's development goals by providing mechanisms and measures to achieve low carbon climate resilient development in a manner that prioritizes adaptation. This plan builds on the first Action Plan (2013 – 2017) and provides a framework for Kenya to deliver on its Nationally Determined Contribution (NDC) under the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC). The NCCAP 2018 – 2022 guides the climate actions of the National and County Governments, the private sector, civil society and other actors as Kenya transitions to a low carbon climate resilient development pathway.

Relevance

The proposed project will reduce greenhouse gasses emission to the environment. The proposed project will decongest our roads reducing the numbers of passenger vehicles as it is anticipated approximately 10,000 people will be using the train daily. Measures outlined in the above action plan should be considered throughout the project's cycle for low carbon climate resilient development.

4.3.8 Integrated Transport Policy, 2009

This policy was formulated in 2009 by Ministry of roads and transport with the aim of resolving the transport problems such as poor quality of transport services and unexploited regional role of the transport system.

The primary objective of National Transport Policy is to improve the economic, environmental and social environment globally. Its vision is to be a world class integrated transport system responsive to the needs of people and industry. Its mission is to develop, operate and maintain an efficient, cost effective, safe, secure and integrated transport system that links the transport policy with other sectoral policies, in order to achieve national and international development objectives in a socially, economically and environmentally sustainable manner.

Relevance

The policy aims to foster efficient and quality transport systems. The construction of the railway will lead to expansion and innovation thus enhancing the transport sector therefore contributing to the economic growth of the country.

4.3.9 Environmental Guidelines for Roads and Bridges 2010

The guideline for roads and bridges provides detailed analysis of environmental issues arising from road works along with mitigation measures that have been used in the national and the international environment before and after the road construction period hence achieving sound environmental management for the road transportation system. It also addresses environmental practices to be followed during the development stages i.e. from tender, feasibility, design, construction, operation and maintenance phase. The guidelines are expected to be used in conjunction with existing and future regulations and guidelines developed by the government in particular NEMA. Emphasizes on the environmentally sustainable guidelines that calls for health and Environmental quality objectives (ecosystem protection, clean air, avoiding mobility and mortality). The guidelines recommend;

- (i) Preparation of full EIA study to be completed at feasibility and updated at the design stage,
- (ii) The certificate for environmental compliance should be issued prior to the issuance of certificate of road completion,

Relevance

The guidelines are applicable to the proposed project as they provide some of the mitigation measures to alleviate potential environmental degradation from the project construction works (access roads and bridges).

4.3.10 National Policy on Water Resources Management and Development 1999

While the National Policy on Water Resources Management and Development (1999) enhances a systematic development of water facilities in all sectors for promotion of the country's socio-economic progress, it also recognizes the by-products of this process as wastewater. It, therefore, calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution. Economic activities, therefore, should be accompanied by corresponding waste management systems to handle liquid effluents and other wastes emanating there from that should also include appropriate measures to ensure environmental resources and people's health in the immediate neighborhood are not negatively impacted by the effluent.

In addition, the policy provides for charging levies on wastewater on quantity and quality (similar to polluter-pays-principle) in which those contaminating water are required to meet the appropriate cost on remediation, though the necessary mechanisms for the implementation of this principle are still being formulated.

Relevance

The proposed project will adhere to this policy by ensuring proper management of wastewater emanating from construction activities. Relocation of sewer lines along the project corridor will be done in a way that will not contribute to environmental pollution.

4.4 Legal Aspects

4.4.1 Environment Management and Coordination Act, 1999 (Amendments 2015)

Part II of the Environment Management and Coordination Act, 1999 states that every person in Kenya is entitled to a clean and healthy environment in accordance with the Constitution and relevant laws and has the duty to safeguard and enhance the environment. In order to partly ensure this is achieved, Part VI of the Act directs that any new programme, activity or operation should undergo environmental impact assessment and a report prepared for submission to the National Environment Management Authority (NEMA), who in turn may issue a license as appropriate.

Section 3 of the Act also states that every person shall cooperate with the State Organs to protect and conserve the environment and ensure sustainable development and use of natural resources. In order to partly ensure this is achieved, Part VI under Section 58 of the Act directs that any proponent for any project to undertake and submit to NEMA an Integrated Environment Impact Assessment (unless exempted by NEMA), who in turn may issue a license as appropriate.

This will be partly achieved through sustainable land use practices that are in conformity with conservation measures as emphasized under Section 51 of the Act. This includes sustainable land use methods, selection and management of sensitive areas including buffer zones and catchments, control of alien species and encouraging traditional conservation knowledge integration among others.

Relevance:

This is the main legislation governing environmental management and integration in all projects and implemented through a series of Regulations as outlined in the following sub-sections. They are, therefore, relevant to this project.

4.4.2 Environmental Management Regulations

4.4.2.1 EMC (Water Quality) Regulations, 2006 (Legal Notice No. 120)

These regulations were drawn under section 147 of the Environmental Management and Coordination Act 1999. In accordance with the regulations, every person shall refrain from acts that could directly or indirectly cause immediate or subsequent water pollution and no one should throw or cause to flow into water resources any materials such as to contaminate the water. The regulation also provides for protection of springs, streams and other water sources from pollution.

Relevance:

Applies anytime there is a discharge of effluent into the environment without meeting the established standards. This requires all time compliance through the project cycle.

4.4.2.2 EMC (Impact Assessment and Audit) Regulations, 2003 (Amendments 2019)

Part V Section 31 states that an Environmental audit is expected to be undertaken on the development activities likely to have adverse environmental impacts. The audit exercise is expected to be conducted by a qualified environmental inspector registered in accordance with regulation 14. Section 31(3) the Environmental Audit study is prepared based on the baseline information provided in the Environmental Impact Assessment report study which will be used as baseline information upon which subsequent environmental control audit studies shall be undertaken.

According to section 31(7) information required to be included in the audit report is mentioned; past and present impacts of the project, responsibility and proficiency of the operators of the project, existing internal control mechanisms to identify and mitigate activities with negative environmental impacts, existing internal control mechanisms to ensure workers health and safety, existence of environmental awareness and sensitization measures including environmental standards and regulations, law and policy for managerial and operational personnel.

The ESIA Report is guided by the established EMC (EIA/EA) Regulations 2003 (Amendment 2019). In accordance with the Second Schedule of the Regulations, construction of railway lines falls under the High-Risk project. Projects falling under the High-Risk category are required to submit ESIA Full Study Report.

Relevance:

The Regulation prescribes that all projects falling within the 2nd schedule such as the proposed should be subjected to an Environmental and Social Impact Assessment Study. The Regulation provides a guide for the environmental officers on the requirements during the assessment and audit process.

4.4.2.3 EMC (Waste Management) Regulations, 2006 (Legal Notice No. 121)

The regulations are formed under sections 92 and 147 of the Environmental Management and Coordination Act, 1999. Under the regulations, a waste generator is defined as any person whose activities produces waste while waste management is the administration or operation used in handling, packaging, treatment, conditioning, storage and disposal of waste. The regulations require a waste generator to collect, segregate and dispose each category of waste in such manners and facilities as provided by relevant authorities. Regarding transportation, licensed persons shall operate transportation vehicles approved by NEMA and will collect waste from designated areas and deliver to designated disposal sites.

Relevance:

The Regulation guides on sustainable management of solid waste generated from construction activities from source to disposal points including handling. The proposed project will require all time compliance with the regulation.

4.4.2.4 EMC (Noise and Excessive Vibration Pollution Control) Regulation, 2009

Part II section 3(1) of these Regulations states that: no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment and section 3(2) states that in determining whether noise is loud, unreasonable, unnecessary or unusual. Part II Section 4 also states that: except as otherwise provided in these Regulations, no person shall (a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or (b) cause to be made excessive vibrations which exceed 0.5cm per second beyond any source property boundary or 30m from any moving source.

Relevance:

The Regulation provided guidelines on noise and excessive vibration management. The proposed project activities will generate noise and excessive vibration above permissible levels hence need for all time compliance with the regulation.

4.4.2.5 EMC (Air Quality Control) Regulations, 2013

Air quality in Kenya is regulated by the enactment of the Environment Management and Co-Ordination (Air Quality Control) Regulations, 2013. The objective of the Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, 1999. The emission standards for mobile sources are stipulated under KS 1515: 2000 (Kenya Standard Code of Practice for inspection of Road Vehicles) Section 4:4.2 Standard Emissions Test. The concentration of carbon monoxide (CO)

shall not exceed 0.5% volume and hydrocarbons (HC) concentrations shall not exceed 0.12% volume (1,200 ppm).

The First and Second Schedule of the Environment Management and Co-Ordination (Air Quality) (Control) Regulations, 2013 stipulate the ambient air quality tolerance limits for residential, rural and other areas; and the list of priority air pollutants from mobile sources e.g. motor vehicles.

Relevance:

This would be relevant for construction earth movers, vehicles and excavation works as well as operations particularly with respect to utilization of the railway line.

4.4.2.6 EMC (Conservation of Biodiversity and Resources Access to Genetic Resources and Benefit Sharing) Regulations, 2006

Part II of Regulations, section 4 states that no person shall engage in any activity that may have adverse impacts on ecosystems, lead to introduction of exotic species or lead to unsustainable use of natural resources without an EIA license. The regulation puts in place measures to control and regulate access and utilization of biological diversity that include among others banning and restricting access to threatened species for regeneration purposes. It also provides for protection of land, sea, lake or river declared to be a protected natural environmental system in accordance to section 54 of EMCA, 1999.

Relevance:

Has relevance on activities interfering with natural habitats and genetic species therein. The affected species need to be identified during an ESIA process and restoration plan established before the sub-project implementation commences.

4.4.2.7 EMC (Wetlands, Riverbanks, Lakeshores and Seashores Management Regulations) 2009

Wetlands are areas permanently or seasonally flooded by water where plants and animals have become adapted and incorporates riparian and coastal zones. This regulation seeks to ensure wetland resources are utilized in a sustainable manner compatible with the continued presence of wetlands and their ecological goods and services. The sustainable use of wetlands should be integrated into development plans to ensure sustainable use and management of the resources.

The main purpose is to provide for the conservation and sustainable use of wetlands and their resources in Kenya. Environmental Impact Assessment and Environmental Audit as required under the EMCA is mandatory for all activities likely to have adverse impact on the management of wetlands.

Relevance:

This regulation should be complied with throughout the project cycle in respect to sustainable management and protection of wetlands from degradation.

4.4.3 Sustainable Solid Waste Management Act 2022

The act establishes the legal and institutional framework for the sustainable management of waste, towards the realization of the constitutional provision on the right to a clean and healthy environment and for connected purposes. The objects of the act are: promote sustainable waste management; improve the health of all Kenyans by ensuring a clean and healthy environment; reduce air, land, fresh water and marine pollution; promote and ensure the effective delivery of waste; create an enabling environment for employment in the green economy in waste management, recycling and recovery; establish an environmentally sound infrastructure and system for sustainable waste management; promote circular economy practices for green growth; mainstream resource efficiency principles in sustainable consumption and production practices; and inculcate responsible public behaviour on waste and environment.

The act provides for general principles including: the polluter pays principle in which the cost of cleaning up any element of the environment that has been damaged by pollution, the cost of the beneficial uses of the environment that have been lost as a result of the pollution, and any other costs associated with or incidental to the pollution shall be paid by the polluter; and zero waste principle in which products and processes are designed and managed to reduce the volume and toxicity of waste and materials, and to conserve and recover all resources, and to prevent the burning or burying of resources, in order to treat waste as a resource that can be harnessed for wealth creation, employment and the reduction of pollution.

The act provides for public and private entities to segregate waste and section 13 provides for extended user responsibility.

Relevance:

The project client must ensure the client adheres to this Act. The Act calls for sustainable waste management by ensuring zero waste generation and if unavoidable, intervention measure (reduce, recycle, repurpose etc.) should be in place. Also, the Act states the generator of the waste is responsible for its management and safe disposal.

4.4.4 The Water Act, 2016

Section 22 and sub-sections and 2 of the Act allows the Water Resources Authority the responsibility to take any lawful action that will protect established water catchment and the water resources thereof. Section 36 of the Act outlines requirements to be met for abstraction and use of water while Section 40 provides procedures of obtaining a water abstraction permit including undertaking Environment Impact Assessment study for the target abstraction point as well as appropriate consultations with the relevant stakeholders in accordance with the environmental

impact assessment as per the Environmental Management and Coordination Act, 1999. Part of the water abstraction conditions are listed under Section 43 of the Act while groundwater abstraction is guided by the Fourth Schedule of the Act.

Under Part IV, Section 107 of the Water Act 2016, it is required that a Licensee will undertake necessary measures to intercept wastewater emanating from the water use or traversing their jurisdiction by constructing and maintaining appropriate drainage and/or sewer systems and other structures. The Licensee will also obtain necessary approvals from other Agencies whose service lines interact with the drains, sewers or other structures for control of pollution. Section 108 of the Act provides for regulations of discharge of trade effluents with potential to harm environment or human health into drains or sewers. Part VIII and Section 143 prohibits any person to throw, convey rubbish, dirt, refuse, effluent, trade effluent or other offensive matter into water resources and likely to cause pollution of the water.

Relevance:

The statute established to coordinate sustainable utilization of water resources including protection of the same from pollution and degradation (abstraction, use and disposal of wastewater thereof).

4.4.5 Forest Conservation and Management Act, 2016

This Act makes provision for the conservation and management of public, community and private forests and areas of forest land that require special protection, defines the rights in forests and prescribes rules for the use of forest land.

Section 42 (1) requires that all indigenous forests and woodlands be managed on a sustainable basis for purposes of conservation of water, soil and biodiversity, riparian and shoreline protection, cultural use and heritage, recreation and tourism, sustainable production of wood and non-wood products, carbon sequestration and other environmental services, education and research purposes, habitat for wildlife in terrestrial forests and fisheries in mangrove forests. Section 45 (1) outlines that if all or a section of the forest may be affected by an institution or organization, there should be an agreement drawn up between the two parties.

Relevance:

Has relevance on activities interfering with natural habitats and genetic species therein. The affected trees and woodlots need to be identified through a comprehensive tree count before the project and a replanting plan established before the project implementation commences.

4.4.6 Kenya Railways Corporation Act (Cap 397), Amendment 2012

The Act establishes the Kenya Railways Corporation (KRC) and its connected mandate/ functions. Section 13 mandate KRC to among others provide within Kenya, both for the passengers carried by the Corporation and other persons, hotels, other living accommodation and places of refreshment; and such other amenities or facilities for passengers carried by the Corporation and other persons making use of the services performed or the facilities provided by the Corporation.

Section 14 provides for the acquisition of land for the purposes of the Corporation; negotiation and agreement with private landowner in line with land act; and through the minister for public land or where there is no agreement with private landowner.

Relevance:

KRC has the mandate to ensure efficient railway transport while ensuring passenger comfort. This is achieved by providing complementary services such as stations.

4.4.7 Environment and Land Court Act 2011 (Amendment) 2016

This is an Act of Parliament to give effect to Article 162(2) (b) of the Constitution to establish a superior court to hear and determine disputes relating to the environment and the use and occupation of land. The Environment and Land Court is one of the Courts contemplated by article 162(2). It is a Superior Court and has the same status as the High Court. The court is established under section 4 of the Environment and Land Court Act No. 19 of 2011. It has jurisdiction to hear any other dispute relating to environment and land. The jurisdiction of the court is provided for under section 13 of the Act. The Court has original and appellate jurisdiction to hear and determine all disputes in accordance with Article 162(2) (b) of the Constitution and with the provisions of the Act or any other written law relating to environment and land.

Relevance:

If matters/disputes relating to environment and land are not agreed between the relevant parties, the matter can be taken to court as the court has powers to deal with such disputes relating to environment, land administration and management.

4.4.8 Land Registration Act 2012

The principal concern of this act is the registration of interests in land. The Act applies to the registrations of interests in all public lands as stated in the constitution article 62, registration of interests in all private land as stipulated in article 64 of the constitution and registration and recording of community interest in land. It also provides for compulsory acquisition of land. The act is also meant to revise, consolidate and rationalize land laws; and to provide for the sustainable administration and management of land and land-based resources.

The various administrations under the act have been mandated to manage public land on behalf of the public so as to ensure their sustainability. They are also to give recommendations on national land policy, monitor land use planning and natural resources and developing and encouraging alternative land dispute resolution mechanisms.

Relevance:

The project land that will be acquired by KRC will require title deed showing proof of ownership

4.4.9 Public Health Act (Cap. 242)

Section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drains or refuse pits in such a state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or wastewater flowing or discharged from any premises into a public street or into the gutter or side channel or watercourse.

Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin. On the responsibility of local authorities, Section 129 of the Act states in part “It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes...”. Section 136 states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitate the breeding or multiplication of pests shall be deemed nuisances and are liable to be dealt with in the manner provided by this Act.

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

Relevance:

- ✓ *For all projects with direct or indirect implications on the health of the workers or the neighbouring communities.*
- ✓ *All health and safety measures should be in place to ensure the workers and the neighbouring communities are not exposed to risks.*

4.4.10 Penal Code (Cap. 63)

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

Relevance:

This statute controls public nuisance including safety and security from construction activities

4.4.11 Land Laws (Amendment) Act, 2016

This is an Act of Parliament to amend the laws relating to land so as to align them with the Constitution, to give effect to Articles 68(c)(i) and 67(2)(e) of the Constitution, to provide for procedures on evictions from land, and for connected purposes. This Acts amends The Land Registration Act, 2012, the Land Act, 2012 and the National Land Commission Act, 2012

Relevance:

KRC will adhere to the above Act while conducting its management and administration issues concerning land in relation to the project.

4.4.12 Land Act (No. 6 of 2012)

Part II Section 8 provides guidelines on management of public land by National Land Commission on Behalf of both National and County Governments. This law in Section 8(b) stipulates that the Commission shall evaluate all parcels of public land based on land capability classification, land resources mapping consideration, overall potential for use, and resource evaluation data for land use planning. Section 8(d) stipulates that The Commission may require the land to be used for specified purposes subject to such conditions, covenants, encumbrances or reservations as are specified in the relevant order or other instrument.

In managing public land, the Commission is further required in Section 10(1) to prescribe guidelines for the management of public land by all public agencies, statutory bodies and state corporations in actual occupation or use. In these guidelines, management priorities and operational principles for the management of public land resources for identified uses shall be stated. This in essence means that the Commission shall take appropriate action to maintain public land that has endangered or endemic species of flora and fauna, critical habitats or protected areas. As well the Commission shall identify ecologically sensitive areas that are within public lands and demarcate or take any other justified action on those areas and act to prevent environmental degradation and climate change.

Relevance:

This part of the law seeks to preserve and direct management of fragile public land held by the various public bodies for sustainable development.

4.4.13 Climate Change Act, 2016

This is an Act of Parliament to provide for a regulatory framework for enhanced response to climate change, to provide for mechanism and measures to achieve low carbon climate development, and for connected purposes. Part IV section 15 demonstrates how Climate change should be integrated into every public sector entity.

Section 3 (2) states that the Climate Change Act shall be applied in all sectors of the economy by both the national and county governments with focus on:

- Mainstreaming climate change responses into development planning, decision making and implementation;
- Building resilience and enhancing adaptive capacity to the impacts of climate change;
- Formulation of programmes and plans to enhance the resilience and adaptive capacity of human and ecological systems to the impacts of climate change;
- Mainstreaming and reinforcement of climate change disaster risk reduction into strategies and actions of public and private entities;
- Mainstreaming intergenerational and gender equity in all aspects of climate change responses;
- Providing incentives and obligations for private sector contribution in achieving low carbon climate resilient development;
- Promoting low carbon technologies improve efficiency and reduce emissions intensity by facilitating approaches and uptake of technologies that support low carbon, and climate resilient development;
- Facilitating capacity development for public participation in climate change responses through awareness creation, consultation, representation and access to information;
- Mobilization and transparency in managing public and other financial resources for climate change response;
- Providing mechanisms for, and facilitation of climate change research and development, training and capacity building;
- Mainstreaming the principle of sustainable development into the planning for and decision making on climate change response; and
- Integrating climate change into the exercise of power and functions of all levels of governance, and to enhance cooperative climate change governance between the national government and county governments

Relevance:

KRC proposed project being a Transit Oriented Development will have to adhere to the requirements and provision of this Act

4.4.14 Physical Planning Act (Cap. 286)

Section 24 of the Physical Planning Act gives provision for the development of local physical development plan for guiding and coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council and for specific control of the use and development of land. The plan shows the manner in which the land in the area may be used. Section 29 of the Physical Planning Act gives the county councils power to prohibit and control the use of land, building, and subdivision of land, in the interest of proper and orderly development of its area. The same section also allows them to approve all development applications and grant development permissions as well as to ensure the proper execution and implications of approved physical development plans. On zoning, the act empowers them to formulate by-laws in respect of use and density of development.

Section 30 states that any person who carries out development within an area of a local authority without development permission shall be guilty of an offence and the development shall be invalid. The act also gives the local authority power to compel the developer to restore the land on which such development has taken place to its original conditions within a period of ninety days. If no action is taken, then the council will restore the land and recover the cost incurred thereto from the developer. In addition, the same section also states that no person shall carry out development within the area of a local authority without development permission granted by the local authority. At the same time, sub-section 5, re-enforce it further that, no licensing authority shall grant under any written law, a license for commercial use for which no development permission had been granted by the respective local authority.

Section 36 states that if in connection with development application a local authority is of the opinion that, the proposed activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an Environmental Impact Assessment report. The environmental impact assessment report must be approved by the National Environment Management Authority (NEMA) and followed by annual environmental audits as spelled out by EMCA 1999.

Relevance:

The proposed project is expected to be compatible with the existing physical plans and approved development and land use.

4.4.15 HIV/AIDS Prevention and Control Act (No. 14 of 2006)

Part 11, Section 7 requires HIV and AIDs education in the work place. The government is expected to ensure provision of basic information and instruction on HIV and AIDs prevention and control to employees of all Government ministries, Departments, authorities, and other agencies; and, Employees of private and informal sectors. The information on HIV/AIDs is expected to be

treated with confidentiality at the work place and positive attitudes shown towards infected employees and workers.

Relevance:

During the railway line project implementation, the contractor is expected to create awareness to the employees and the local communities on the issues related to HIV/AIDs.

4.4.16 Traffic Act (Cap. 403)

The road authority is expected to erect and maintain traffic signs as prescribed so as plainly to indicate to drivers entering or leaving such roads or areas where speed limit restriction begins and ends. Under the Traffic sign rules part 13, temporary traffic sign signal unit may be used for purposes of controlling the movement of vehicles on the road where the road works are in progress or where the width of the carriageway is temporary restricted.

Section 30 (1)(2) outlines that it is a requirement for all drivers and operators to have valid licenses. Section 30 (6) states that drivers of commercial vehicles are required to undergo a driving test every three years successfully as a condition for license renewal. Section 47, states that no driver or operator is allowed to drive recklessly, or at speed, or in a manner which is dangerous to the public, having regard to all the circumstances of the case, including the nature, condition and use of the road and the amount of traffic which is at the time or which might reasonably be expected to be on the road.

Section 71, gives permission to the authority or the authority representative to close the roads for purpose of preventing damage caused to any road, carry out any works considered necessary in connection with maintenance/improvement of road or close whole or part of road to vehicles of particular type at any time for any period. Section 91 (1) outlines activities in regards to encroachment on and damage to roads, whereby, Section 91(2) states that it shall be lawful for the highway authority to remove anything whatsoever which has been placed or erected on a road or land reserved in contravention of this section.

Relevance:

Compliance with this Act is expected throughout the project cycle through KRC partnering with relevant road agencies to ensure traffic flow within areas the railway line interacts with the road.

4.4.17 Work Injury Benefit Act, 2007

This act provides for compensation for employees on work related injuries and diseases contracted in the course of employment and for connected purposes. The act includes compulsory insurance for employees. The act defines an employee as any worker on contract of service with employer will be relevant during construction phase.

Part II of the Act requires Employers to obtain and maintain insurance policy for their employees while Part III Section 10 provides for compensation of employees who gets involved in accidents resulting in disablement or death and is entitled to benefits unless it is a result of misconduct of the employee. Under Section 34, in the event of death arising from the occupational accident, the compensation shall be paid to the dependents of the employee in accordance. Part VII section 45 requires that an employer provide and maintain appliance and services for rendering first aid to his employees. Section 48 instructs that an Employer shall defray any expenses reasonably incurred by an employee as a result of an accident arising out of and in the course of the employment.

Relevance:

The Contractor shall be prevailed upon to ensure prevention measures but where injuries occur, the law shall be applied accordingly. In addition, the contractor will register all workers and offer insurance cover for work related compensation.

4.4.18 Children Act, 2001

Part 2, Section 10 protection from child labour and armed conflict; states that (1) Every child shall be protected from economic exploitation and any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development. Section 13 protection from abuse (1) states that a child shall be entitled to protection from physical and psychological abuse, neglect and nay form of exploitation including sale, trafficking or abduction by any person. Section 15, on Protection from sexual exploitation states that a child shall be protected from sexual exploitation and use in prostitution, inducement or coercion to engage in any sexual activity, and exposure to obscene materials.

Relevance:

During the implementation process of the project the contractor will need to employ workers who are above 18yrs of age. The Labour Management Plan document will also give guidelines on labour recruitment and employment procedures.

4.4.19 National Gender and Equality Act (No 15 of 2011)

Section 8, of the National Gender and Equality Act 2011 requires the promotion of gender equality and freedom from discrimination in accordance with Article 27 (1) which states that every person is equal before the law and has the right to equal protection and equal benefit of the law. Article (3) provides that women and men have the right to equal treatment including the right to equal opportunities in political, social, economic and cultural spheres and Article (4) The State shall not discriminate directly or indirectly against any person on any ground, including race, sex, pregnancy, marital status, health status, ethnic or social origin, colour, age, disability, religion, conscience, belief, culture, dress, language or birth.

Relevance:

During the railway line project implementation, the contractor is expected to give equal opportunities in the employment level for both men and women in accordance to the Acts recommendation.

4.4.20 Sexual Offences Act, (No. 3 of 2006)

Part 3, section (1) states that a person commits the offence termed rape if; (a) he or she intentionally and unlawfully commits an act which causes penetration with his or her genital organs; (b) the other person does not consent to the penetration; or (c) the consent is obtained by force or by means of threats or intimidation of any kind. Part 4 on Attempted Rape states that any person who attempts to unlawfully and intentionally commit an act which causes penetration with his or her genital organs is guilty of the offence of attempted rape and is liable upon conviction for imprisonment for a term which shall not be less than five years but which may be enhanced to imprisonment for life. Part 5 on Sexual Assault section (1) states that any person who unlawfully - (b) manipulates any part of his or her body or the body of another person so as to cause penetration of the genital organ into or by any part of the other person's body, is guilty of an offence termed sexual assault.

Part 11, section (1) on indecent act with child or adult; states that any person who commits an indecent act with a child is guilty of the offence of committing an indecent act with a child and is liable upon conviction to imprisonment for a term of not less than ten years. Part 26, section (1) states that, any person who, having actual knowledge that he or she is infected with HIV or any other life threatening sexually transmitted disease intentionally, knowingly and wilfully does anything or permits the doing of anything which he or she knows or ought to reasonably know (a) will infect another person with HIV or any other life threatening sexually transmitted disease; (b) is likely to lead to another person being infected with HIV Sexual relationships which pre-date position of authority or trust. Deliberate transmission of HIV or any other life threatening sexually transmitted disease or any other life threatening sexually transmitted disease; (c) will infect another person with any other sexually transmitted disease, shall be guilty of an offence, whether or not he or she is married to that other person, and shall be liable upon conviction to imprisonment for a term of not less than fifteen years but which may be for life.

Relevance:

- ✓ *During the railway line project implementation process, the contractor will need to have a code of conduct governing all the workers,*
- ✓ *There will be need to have a sexual harassment desk for any cases reported,*
- ✓ *Any sexual harassment cases should be recorded and reported to the nearest police station.*

4.4.21 Persons with Disabilities Act (No. 14 of 2003)

Part 3, section 12 states that no person shall deny a person with a disability access to opportunities for suitable employment. Section 12 (2) states that a qualified employee with a disability shall be subjected to the same terms and conditions of employment and the same compensation privilege, benefits, fringe benefits, incentives or allowances as qualified able-bodied employees. (3) states that an employee with disability shall be entitled to exemption from tax on all income accruing from his employment.

Section 15, (1) Subject to subsection (2) states that's no employee shall discriminate against a person with a disability in relation to (a) the advertisement of employment, (b) the recruitment for employment, (d) the determination or allocation of wages, salaries, pensions, accommodation, leave or other such benefits, (f) the provision of facilities related to or connected with employment;

Relevance:

- ✓ *During the railway line project implementation, the contractor should include persons with disabilities in his employment frameworks,*
- ✓ *There should be no discrimination on any persons with disabilities regarding their age, sex and colour in terms of payment,*

4.4.22 Occupational Safety and Health Act, 2007

Section 13 part 1(a) the employee is expected to ensure his own safety and health and of the other person who may be affected by his acts or omissions at work place, (c) requires the employee at all times to use protective equipment or clothing provided by the employer for purpose of preventing risks to his safety and health, (f) report to the supervisor any accidents or injury that arise in connection with his work Part 2 states that any employee who fails to follow this section commits an offence and shall on conviction be liable to a fine or imprisonment.

Section 21 provides that the employer or self-employed person to notify the occupational health and Safety Officer of any accidents, dangerous occurrence, or occupational poisoning which has occurred at the work place. Section 32 gives power to the occupational safety and Health officer to enter inspect examine by day or night, a work place which he has reasonable cause to believe to be a work place and any part of any building of which forms a work place. Section 55 requires all plant, machinery and equipment whether fixed or mobile for use at work place to be used for designed work and operated by a competent person.

Relevance:

This statute handles issues of health and safety especially during the project construction phase.

4.4.23 Employment Act, 2007

This is an Act of parliament that applies to all employees employed by any employer under a contract of service. This Act repeals the Employment Act (Cap 226). The Act highlights on the following;

- (i) Employment relationship;
- (ii) Protection of wages;
- (iii) Rights and duties in employment such as: (Basic minimum conditions of employment in terms of contracts and agreements;
- (iv) Hours of work
- (v) Entitlement to leave including sick leave
- (vi) Provision of medical attention
- (vii) Provision of clean drinking water

Employment of children is prohibited as directed in the following sections of the Act in accordance with the following sections;

- (i) Section 53. (1) notwithstanding any provision of any written law, no person shall employ a child in any activity which constitutes worst form of child labour
- (ii) Section 56. (1) No person shall employ a child who has not attained the age of thirteen years whether gainfully or otherwise in any undertaking. (2) A child of between thirteen years of age and sixteen years of age may be employed to perform light work which is
 - Not likely to be harmful to the child's health or development; and
 - Not such as to prejudice the child's attendance at school, his participation in vocational orientation or training programmes approved by the Minister for labour or his capacity to benefit from the instruction received

Relevance:

The project will adhere to the Act by ensuring no under aged is employed as well as ensuring workers' rights are protected

4.4.24 The County Government Act 2012, Amendment 2016

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

- (i) County integrated development plan
- (ii) County Sectoral plans
- (iii) County spatial plan
- (iv) Cities and urban areas plan as stipulated by Urban Areas and Cities Act

The act also stipulates that the County Government will be –responsible for functions stipulated in article 186 and assigned in the Fourth Schedule of the Constitution which includes control of air pollution, noise pollution, other public nuisances and outdoor advertising.

Relevance:

The Proponent will ensure the project will be compliant with County Government Act 2012 by controlling all forms of pollution. Additionally, an Environmental and Social Management/monitoring plan has been provided in this report with measures for mitigating potential environmental pollution anticipated from the development of the project.

4.4.25 National Construction Authority Act 2011

This is an act of parliament that provides for the establishment, powers and functions of the National Construction Authority and for connected purposes. Among other functions, the authority is responsible for promotion and ensuring quality assurance in the construction industry and encourages standardization of construction techniques and materials.

Relevance:

The construction of various infrastructure components as envisaged in project design plans will have to be in line with all relevant provisions of this act.

4.4.26 Explosives Act Cap 115

Section 7(1) stipulates that No person shall keep, store or be in possession of any unauthorized explosive in or on any premises except in an explosives factory or explosives magazine or unless the explosive is kept for private use, and not for sale or other disposal, and in accordance with rules or unless the explosive is kept for use in the construction of railway, road or other public work, in quantities not exceeding two thousand five hundred kilograms in weight and is stored in a temporary magazine approved by an inspector and under conditions specified in writing by an inspector.

Section 7(2) stipulates that any person who contravenes the provisions of this section or any condition imposed or prescribed there under or mentioned therein shall be guilty of an offence and liable to a fine not exceeding three thousand shillings or in default of payment to imprisonment for a term not exceeding one year.

4.5 International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability, 2012

The International Finance Corporation (IFC), a division of the World Bank Group that lends to private investors, has a Sustainability Policy and set of Performance Standards (PSs) on Social and Environmental Sustainability (January 2012). It should be noted that even for Projects that

do not anticipate seeking financing from the IFC, the IFC PSs are typically applied as a benchmark of international good practice.

The PSs are directed towards providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate and, manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of direct investments for the IFC (including project and corporate finance provided through financial intermediaries), the IFC requires that its clients apply the PSs to manage environmental and social risks and impacts so that development opportunities are enhanced (IFC, 2012). A summary of the scope of the IFC PSs and the applicability to the Project is set out in the table below:

Table 1: Summary of IFC Performance Standards

Title	Key Requirement	Relevance to the Project
Assessment and Management of Social and Environmental Risks and Impacts	<p>This PS relates to integrating and managing environmental and social performance throughout the life of a project in line with national regulations and international standards.</p> <p>The standard requires the development of an Environmental and Social Management System (ESMS) that entails a structured approach to managing environmental and social risks and impacts.</p>	The proposed project will be associated with a number of environmental and social impacts which will need to be identified and appropriately managed.
Labour and Working Conditions	<p>This standard aims to ensure that the client establishes, maintains and improves a worker-management relationship that promotes the fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labour and employment laws and international standards (as defined by the International Labour Organisation (ILO). In particular, PS2 addresses child labour and forced labour, and promotes safe and healthy working conditions, and protecting and promoting the</p>	<p>Project workers (for all Project phases) will need to be provided with fair labour and working conditions.</p> <p>This will apply to all categories of workers irrespective of whether directly engaged by the developer or contractor (direct workers), engaged through third parties (contracted workers), and workers engaged by the client's primary suppliers (supply chain).</p>

	health of workers by recognizing the role of employees.	
Resource Efficiency and Pollution Prevention	This PS aims to abate pollution to air, water, and land that may threaten people and the environment at the local, regional and global levels. This Performance Standard promotes the ability of private sector companies to adopt such technologies and practices where feasible.	The proposed project will require a number of resources (such as water, aggregate, and fuel). All required resources will need to be used efficiently and all wastes managed in accordance with the waste management hierarchy, where avoidance of waste generation is the first priority to avoid or minimize pollution as much as possible.
Community, Health, Safety and Security	The role of this PS is to anticipate and avoid adverse impacts on the health and safety of the affected communities throughout the life of the project as a result of routine and none routine events. The PS also requires an assessment of how use of security by the Project to safeguard personnel and property could impact on community security taking into account considerations of human rights.	Implementation of the proposed Project Railway line will need to ensure that the health, safety and security of all communities along its alignments are not compromised. This is particularly crucial due to the urban set-up of the Project areas with a number of nearby settlements and social infrastructure.
Land Acquisition and Involuntary Resettlement	PS5 aims to anticipate and avoid physical and economic displacement or, where avoidance is not possible, to minimize adverse social and economic impacts.	Although the Project construction activities are expected to take place within the road reserves, sections of the alignment cut across private land with potential for damage. It is therefore the responsibility of the client to ensure that any displacement (physical or economic) is appropriately managed. This PS also caters for acquisition of additional land if required to meet the requirements of the Project design.
Biodiversity Conservation and Sustainable Management of Living Resource	<p>This PS aims to protect and conserve biodiversity based on the Convention on Biological Diversity. It divides habitat into three categories, modified, natural, and critical, and guides on the required level of assessment for Projects in each type of habitat.</p> <p>For modified habitats, impacts on biodiversity should be minimized and mitigation measures implemented appropriately.</p>	This PS is applicable since the proposed Railway line alignment traverses along Ngong Road Forest and is in proximity to Ololua Forest with biodiversity value hence requiring sustainable management and conservation

	<p>For projects in natural habitat, mitigation measures should be designed to achieve no net loss of biodiversity where feasible.</p> <p>For projects in critical habitats, the project's mitigation strategy should be described in a Biodiversity Action Plan and be designed to achieve net gains of those biodiversity values for which the critical habitat was designated.</p>	
Indigenous Peoples	<p>This PS deals with safeguarding Indigenous Peoples. The aim of this PS is to protect the interests of Indigenous Peoples during project implementation. On a broader scale, it requires project implementation to avoid adverse impacts on Indigenous Peoples as well as ensuring their participation and consent.</p>	<p>This PS does not apply since no indigenous people as per the requirements of this standard have been identified along the proposed Project corridor as the project targeted areas are cosmopolitan.</p>
Cultural Heritage	<p>Cultural heritage, according to this PS, refers to tangible forms of cultural heritage, such as tangible movable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values; unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls; and certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles</p>	<p>This PS is not applicable since no cultural heritage sites are known to exist along the proposed Project corridor.</p>

4.6 Institutional Arrangement

4.6.1 Kenya Railways Corporation

This establishes Kenya Railways Corporation and mandates it to provide a co-ordinate and integrated system within Kenya, including rail inland waterways transport services, port facilities in relation to inland waterways transport services and auxiliary road services in connection therewith. In addition, it gives KRC the powers to provide all reasonable facilities for the carriage of passengers and goods. The proposed project implementation falls under KRC mandate hence Kenya Railways Corporation

Consultant: APEC/CRDC Consortium

making KRC the project owner (proponent). KRC will be responsible for coordination and implementation of all activities of commuter railway project.

4.6.2 National Environment Management Authority

NEMA is established under section 7 of the Environmental Management and Co-ordination Act, No. 8 of 1999. The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and coordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment.

In addition to NEMA, the Act provides for the establishment and enforcement of environmental quality standards to be set by the Cabinet Secretary in consultation with the Authority, which will govern the discharge, limits to the environment by the proposed project. NEMA must approve the project before implementation and also participates in subsequent stages of construction environmental management and annual audits review.

4.6.3 Nairobi and Kajiado County Governments

Under the 2010 constitution County Governments are in charge of: Physical Planning, Public Health, Social Services and Housing, Primary Education Infrastructure, Inspectorate Services, Public Works, Environment Management, Agriculture, Livestock Development and Fisheries, Trade, Industrialization, Corporate Development, Tourism and Wildlife, and Public Service Management. The proposed Riruta-Ngong MGR Commuter Project is expected to directly interact with some of the above infrastructure hence making County Governments a stakeholder.

4.6.4 Water Resource Authority (WRA)

WRA (formerly WRMA) is responsible for regulation of water resources issues such as water allocation, source protection and conservation, water quality management and pollution control and international waters. Its roles and responsibilities are as follows:

- Planning, management, protection and conservation of water resources;
- Planning, allocation, apportionment, assessment and monitoring of water resources;
- Issuance of water permits;
- Water rights and enforcement of permit conditions;
- Regulation of conservation and abstraction structures;
- Catchments and water quality management;
- Regulation and control of water use; and
- Coordination of the Integrated Water Resource Management (IWRM) Plan.

The proposed project construction works have linkage with the surface water resources (Mbagathi River, Mutuini River and Silenke stream). In addition, the proposed development might consider ground water supply for project construction and operation. This calls for collaboration between project proponent and WRA in ensuring the project activities don't pollute ground and surface water sources as well as over abstraction of water.

4.6.5 National Construction Authority (NCA)

During implementation of project, NCA will be critical by ensuring the contractors are accredited by the authority, and construction works meet quality assurance in the construction industry.

4.6.6 Directorate of Occupational Safety and Health Services

DOSHS is responsible for the enforcement of Occupational Safety and Health Act (OSHA), 2007 and associated regulations. Construction sites must be registered with the Directorate, and management plans, training and emergency preparedness done in accordance with the relevant guidelines issued by DOSHS.

The contractors of the railway project will be required to register construction sites with the authority as work places before the commencement of the construction works. DOSHS will also undertake workers safety and health inspections at its own initiative or upon receiving reports on any issues associated to its mandate.

4.6.7 Kenya National Highway Authority (KeNHA)

KeNHA was established by the Kenya Roads Act 2007. The Kenya National Highways Authority (KeNHA) is mandated to manage, develop, rehabilitate and maintain the international trunk roads linking centers of international importance, crossing international boundaries and terminating at international ports (Class A), national trunk roads linking nationally important centers (class B) and the primary roads which link the provincially important centers to each other or to other higher class roads (class C roads).

In regards to this project, the contractor through the proponent will ensure the project affected roads under the jurisdiction of KeNHA are designed and constructed to KeNHA standards. The designs will also be submitted to KeNHA for approval before construction.

4.6.8 Kenya Urban Roads Authority (KURA)

KURA was established by the Kenya Roads Act 2007. KURA is an autonomous road agency, responsible for the management, development, rehabilitation and maintenance of National Urban Trunk Roads. KURA has established a Directorate of Urban Roads Planning and Design headed by a Director. Within it there is a Department of Environmental and Social Safeguards.

In regards to this project, the contractor through the proponent will ensure the project road designs are done and constructed to KURA standards. The designs will also be submitted to KURA for approval before construction.

4.6.9 Kenya Rural Roads Authority (KeRRA)

The Kenya Rural Roads Authority (KeRRA) is a State Corporation within the State Department of Infrastructure under the Ministry of Roads and Transport and established through the Kenya Roads Act, 2007. The Head Office is situated in Nairobi and there are 47 No. County Offices. KeRRA is responsible for the management, development, rehabilitation and maintenance of rural/secondary Trunk Roads under Class C. Part II Section 6 of the Kenya Roads Act, establishes the Kenya Rural Roads Authority (KeRRA), and Section 19 outlines the mandate of Authority.

In regards to this project, the contractor through the proponent will ensure the project road designs are done and constructed to KeRRA standards. The designs will also be submitted to KeRRA for approval before construction.

4.7 Project Management Institutional Structure

An ideal project management structure is proposed for the organization in this project has the following components;

4.7.1 Project Proponent (KRC)

The proponent will be required to procure services of a reputable construction company to undertake construction activities for the proposed project. In addition, the proponent will identify supervision consultant for daily supervision of construction activities on His behalf. The proponent is required to ensure the project is in compliance with the National Laws and Regulations governing the development of the proposed project.

4.7.2 Contractor

The contractor will be required to establish an environmental office to continuously advise on environmental components of the project implementation. Elements in the environmental and social management plan are expected to be integrated in the project with appropriate consultations with the key Stakeholders involved through the supervising environmental expert. The environmental officer of the contractor is also expected to fully understand the engineering and management aspects of the project for effective coordination of relevant issues.

4.7.3 Supervisor

The supervisor will be engaged to ensure effective implementation of the environmental management plan. It is expected that supervisor engages the services of an environmental expert who should in return understand the details of the recommendations on environment management and especially the proposed action plans, timeframes and expected targets of the management plan. The environmental supervisor expert should also be the liaison person between the contractor and the Client on the implementation of environmental concerns as well as issues of social nature associated with the project.

Chapter 5: Environmental and Social Baseline Conditions

5.1 Environmental Baseline

This chapter provides a brief analysis of the existing environmental conditions of the project areas and the immediate surroundings. The purpose of appreciating the existing situation is to enable identify linkages with the project activities and operations for an informed formulation of impacts and mitigation measures. The project area falls within the Athi River drainage basin with majority of the rivers and drainage channels discharging into Mbagathi River. The vegetation present is influenced by Ngong Road forest, Ololua forest and Ngong Hill forest. However, the demand for land for settlement has contributed to vegetation clearance. The general topography of the project corridor rises from Lenana area to Ngong Town with Karen centre and the Mbagathi River valley among notable lowest points.

The following section outlines a general description of the environmental features as observed during the field assessments.

5.1.1 Topography

Nairobi county lies at the edge of Athi Kapiti Plains and the lower slopes of Kikuyu and Aberdare escarpment with an altitude of about 1,800m a.s.l. Topography of Nairobi, slopes from West to East and is influenced by the traversing water courses (rivers and streams) originating from the southern lower slopes of the Aberdares and Kikuyu Springs and the Ngong Hills that tend to follow the same trend towards the Indian Ocean via the Athi River Basin. The topography of Kajiado County is divided into three different areas namely Rift Valley, Athi Kapiti plains and Central Broken Ground. The Rift Valley is a low depression on the western side of the county running from north to south made up of steep faults giving rise to plateau, escarpments and structural plains. The Athi Kapiti Plains consist mainly of gently undulating slopes, which become rolling and hilly towards the Ngong Hills with altitude ranging from 1,580 to 2,460m a.s.l. The Central Broken Ground is an area stretching 20 – 70km wide from the north-eastern border across the county to the southwest where altitude ranges from 1,220 to 2,073m a.s.l. Ngong Town is located within the Central Broken Grounds.

The topography of the project area varies from one project targeted area to another due to the change in altitude. Lenana area has an altitude of 1800mas which rises towards Karen shopping center 1840masl and Embulbul 1853masl with Ngong Town being the highest point at 1905masl. It is noted that most of the land surface in the region have been interfered by human activities over the years through excavations with significant implications on the micro hydrology and drainage patterns. While the topography would allow surface runoff flow, there is significant challenge of flooding during the rains in Ngong area due to unauthorized spoil disposal on open land spaces.

Figure 2: Topographical Features



Flat Terrain



Spoil dump



5.1.2 Drainage

The project area lies within Mbagathi River drainage sub catchment with most of its surface run off discharging in it. Mbagathi River sub catchment constitute to Athi drainage Basin with onward flow downstream into Indian Ocean. Three rivers act as the main drainage outfall for the proposed railway corridor. River Silanke drains the parts of Embulbul and VET, Mbagathi drains the parts of KBC to Kenya Defence Staff College while Mutuini drains the Southern Bypass section. Other physical features influencing drainage include the sloppy terrain which facilitate surface run off movement. The flat terrain and the low laying points River valleys have the potential for flooding.

Within the VET and KBC land there exist no drainage systems hence water movement flows naturally but due to the flat nature of the land there is potential for stagnation. The major access roads and main Ngong road sections has lined drainage channels that facilitate surface run off movement emanating from the road surface as well as area catchments. The drainage sections along Karen centre seems to have been neglected and are getting choked under overload of siltation and overgrown with vegetation affecting the free flow of surface runoff. Loose soils on parts of the road pavement sections seem to easily get washed down into the open drains causing siltation and blockages in culverts. In addition, Solid waste dumped by roadside businesses (hotels and shops) close to the drains get washed into the channels causing blockage and pollution at the outfalls.

Drainage channels also act as median for waste water transfer to the outfalls arising from spills and blockage from sewer manholes and hence causing pollution. There is need for the project design to consider designing and constructing drainage channels for the management of storm water emanating from the project corridor and ensure linkage to the outfall. This will ensure no conflict with the neighbours from discharging the same to the open environment.

Figure 3: Sample Drainage Features



5.1.3 Hydrology

Rivers within the project area constitutes part of the Athi River basin that ultimately drains in Indian Ocean downstream. Notable rivers with direct interaction with the railway line corridor include Km 1+200 Mutoini River Km 6+299 Mbagathi and Km10+200 Isilanke River. The climatic conditions influence the recharge of the rivers as they experience increased flows during the rainy seasons as compared to the dry seasons.

Figure 4: Surface Water Resources



5.1.4 Geology and Soils

Volcanic Basanites are the most common rock types in Ngong area and are generally overlain by nephrites. Mbagathi phonolitic trachyte rocks found mainly near Mbagathi River are also encountered in parts of Ngong. The project area is overlain by relatively shallow mainly black

cotton soils which in some areas grade into more greyish coloured loamy soils. These soils are products of weathering of the underlying volcanic rocks. Between the black cotton soil and bedrock is a layer of lateritic soil that is greyish-brown in colour and often contains rounded gravel. The soils retain water for an extended period of time after the rains hence poorly drained and low fertility.

The project area section between Mbagathi River crossing to Lenana area geology surface rocks exclusively comprise Pleistocene and Tertiary volcanic material. The intense tectonic activity associated with the formation of the Great Rift Valley, led to a series of widespread eruptions and lava flows, which occurred from Mid-Miocene to Upper Pleistocene times. The thick volcanic sheet is underlain at great depths (probably more than 700 m) by metamorphic rocks of the Basement complex (gneisses and schists) of the Mozambican System. The geology is characterized by the following formations:

Kerichwa Valley Tuffs: The Kerichwa Valley Series is an extensive and complex formation, which embraces the most recent volcanic material further to the south across the Mbagathi river. There are also some remnants of this formation overlying the Mbagathi Phonolitic Trachytes on either side along the Mbagathi Valley. These are the formations, which provide the characteristic Nairobi Building Stone, quarried widely within and adjacent to the Nairobi area

Nairobi Phonolites: A dark Grey, porphyritic lava containing both feldspar and biotite insets, the Nairobi Phonolites occurs as a number of distinct flows with phonolitic sands intercalated between the various lava units. Such sands make good potential aquifers, given adequate recharge conditions. Within the Karen area, the Nairobi Phonolites are encountered overlying the Mbagathi Trachytes. Due to over-abstraction, the potentially fair aquifers within the Nairobi Phonolites have gradually become less reliable.

Mbagathi Phonolitic Trachytes: The Mbagathi Trachytes overlie the Athi Tuffs, and have been exposed along Mbagathi Valley.

Upper Athi Series: The Athi Tuffs and Lake Beds are a stratified group of tuffs, ashes and sediments laid down discordantly on top of the older Kapiti Phonolites. The relatively soft rocks are usually light grey in colour when fresh and yellowish grey when weathered.

5.1.5 Biodiversity

5.1.5.1 Flora

The Ngong Hills Forest system with a coverage of about 3,077ha. Influences the tree species within and around Ngong town and the surroundings. Among the species include Croton, Cypress, Eucalyptus, Grevillea and bamboo. Within the project corridor fauna varies due to increased human activities namely settlements, agriculture and mining. The major vegetation

cover in VET area include: Boma Rhodes grass, eucalyptus trees and grevillea woodlot trees. In addition, crop farming is also practiced to include beans, maize, kales etc. vegetation within the Police Leadership Academy include short shrubs and grass which offer grazing rangeland to the livestock. Within KBC land the vegetation include grass and scattered trees. The project section between Mbagathi River crossing to Kerarapon Road is observed to have trees mainly croton, blue gum, grevillea and acacia shrubs. Potential falling of trees along this section is anticipated to pave way for the proposed project.

Nairobi has both terrestrial and aquatic ecosystems with various sub-types including forests (indigenous and exotic), grasslands and aquatic vegetation. In addition to these, there is a common scenario of ornamental plant species especially flowers, decoration shrubs and hedges planted on residential plots or along the road corridor. **Ngong Road Forest Reserve:** It is located to the South of Nairobi central business district comprising of indigenous and exotic tree species. The forest interacts directly with the proposed project as the railway line cuts through the forest from Lenana across the Southern Bypass. Notable trees species include *Loeseneriella Africana*, *Clausena Anisata*, *Croton Aethiopica*, *Ficus Thoningii* and the seriously endangered *Brachylaena Huillensis* (Muhugu). **Ololua Forest Reserve:** It is located in the Karen suburb at a distance of about 20Km from city centre. The reserve covers ~250 acres of indigenous trees and home for the institute of primate research. It is managed by Kenya forest service under the Kajiado conservancy. The Mbagathi River cuts across the forest and forms swamps in some sections. The Ngong Road forest directly interacts with the proposed railway line project corridor hence impacted negatively from potential tree cut. At km6+299 there is a Mugumo trees which will be affected by the project during corridor clearance activities.

Figure 5: Sample Flora



Ngong Road Forest



Vegetation within Mbagathi Catchment



Vegetation along KEPHIS Access



Tree Vegetation VET Farm

5.1.5.2 Fauna

Ngong Hill Forest is also habitat to several bird species (eagles) and mammals such as Sykes' monkeys. Ngong road forest sanctuary and project corridor have both indigenous and exotic tree species which are habitat for different birds, monkeys and reptile species. Vegetation clearance to include tree falling will have impact to wildlife habitat.

Figure 6: Sample Fauna



Monkeys within Ngong Road Forest

5.1.6 Climatic Conditions

The project area climatic conditions vary as the section between Lenana to Mbagathi River crossing identifies with climatic conditions in Nairobi County while the section between Mbagathi River crossing to Ngong identifies with Kajiado County Climatic conditions.

Kajiado County has a bi-modal rainfall pattern where the short rains fall between October and December while the long rains fall between March and May. The rainfall gradient increases with altitude and its pattern is not uniform across the County. The long (March to May) rains is more pronounced in the western part of the County while the short (October to December) rains are

heavier in the eastern part. The rainfall amount in Kajiado County ranges from as low as 300mm in the Amboseli basin to as high as 1,250mm in the Ngong hills and the slopes of Mt. Kilimanjaro. Temperature varies with altitude and season where high temperatures of about 34°C are experienced around Lake Magadi while low temperatures of 10°C are experienced at Loitokitok on the eastern slopes of Mt. Kilimanjaro.

Equatorial position of Nairobi County and its altitude above sea level predominantly control the climate of Nairobi region. The county experiences subtropical highland climate and receives bimodal rainfall; long rains between March and May and short rains between October and December with mean annual rainfall ranging from 800mm to 1,300mm. The minimum and maximum temperature ranges from 12 to 28°C respectively with annual mean of about 19°C. Relative humidity ranges from daily maximum of 88% in the month of May to daily minimum of 36% in the month of April. Daily evaporation ranges from a minimum of 89mm in the month of July to maximum of 19mm in the month of March.

5.1.7 Waste Management

The railway line corridor traverses along centre and towns namely Lenana, Karen, Embulbul and Ngong. The above areas are characterized by commercial premises, road side businesses, institutions and settlements that generate waste (solid and liquid) from the daily operations and activities. It is appreciated that these towns and centre have made efforts in the management of solid waste through contracting services of waste handlers to collect and transport the waste to landfills. However, with the temporarily closure of Ngong Dumpsite by the Kajiado County Government management of solid waste is proving to be a challenge for Ngong Town residents. Haphazard waste disposal and open burning was noted along the project Railway corridor within the open spaces and access road reserves in Embulbul and Ngong Town the semi-permanent road side business within Karen Centre areas. In addition, the drainage channels were choked with solid waste deposits leading to blockage inhibiting free flow of water especially at Karen stage. Spoil dumping is also observed along the police leadership academy section that has contributed to water stagnation during rainy seasons.

Liquid waste management within the project area is either through on-site or off-site sanitation. The project area within Kajiado County does not have a convectional system for the management of liquid waste and the residents rely on pit latrines and septic tanks. Areas within Nairobi County are served by sewerage system running along the Ngong Road reserve. The proposed project is anticipated to interact directly with the existing sewerage network running from Tree Lane access Road to the Karen Centre roundabout.

5.1.8 Air Quality

Being within an urban centre, the project area has a mix of social, institutional and commercial activity defining the air quality. Key air quality components include carbon dioxide, particulate

matter, carbon monoxide, nitrogen oxides, and sulphur oxides. Particulate matter (dust) arises from road surfaces; open burning of solid waste, exhausts from vehicles and odour from decomposing organic and liquid waste. Due to the varying sources of air pollutants within the project corridor, the quality also varies and so are the related impacts especially on human beings. Air quality impacts are likely to be high along the Karen Centre to Southern Bypass Interchange and Embulbul to Ngong Town compared to the Tree Lane access road to Karen View Estate access road due to numerous trees vegetation presence. The above situation is attributed by the high dispersal from the winds and vegetation presence hence maintaining the effective air pollutant concentrations very low.

Air quality sampling was undertaken for three project sites. Air quality monitoring locations were selected before the project commencement since construction activities would have impact to the air quality of the project area. Air quality measurement locations are provided in Table below:

Table 2: Air Quality Measurement Locations

LOCATION	COORDINATES	DATE
Site one (Lenana)	1°18'08.9"S 36°43'53.0"E	7 th March 2024
Site Two (Karen)	1°19'22.3"S 36°42'21.3"E	7 th March 2024
Site Three (Ngong)	1°21'05.9"S 36°39'23.0"E	7 th March 2024

Figure 7: Sample Air Quality Measurement Locations



Maximum nitrogen dioxide levels recorded for during very short time intervals exceeded the NEMA limits. NO₂ is formed during photochemical reactions in air, involving emissions from engines which involve combustion of fossil fuels. The average level of NO₂ is also above the NEMA limit level, i.e. 0.05 ppm. All sampled site's records main contribution is from road traffic as a result of combustion of fossil fuels.

The maximum and average sulphur dioxide recorded was below the NEMA limit level. Hydrocarbons, Ammonia and volatile organic compounds recorded were all below the detection limit of the sensors, and thus below the NEMA limit levels for property boundary.

Hydrogen sulphide maximum concentration levels for sites recorded were 2.07 ppm and the average concentrations recorded was 1.87 ppm while the NEMA limits for ambient air is 0.1 ppm. The sampled sites, notably Lenana, Karen and Ngong, are located in highly vegetative areas, decay of organic matter can be attributed to the presence of hydrogen sulphide in the ambient air.

Carbon Dioxide and oxygen levels were also recorded. NEMA does not give any limit levels for these parameters since they are not pollutants. However, the data was recorded during the day, and the proposed site is surrounded by trees and other vegetation, high and good levels of oxygen was recorded in all the sites monitored. Carbon dioxide is consumed; oxygen is produced during photosynthesis, demonstrating the importance of forest cover to reduce global warming since carbon dioxide is one of the greenhouse gases.

Average and Peak PM₁₀ for site one was elevated and therefore above the NEMA limit of 150µg/m³, this can be attributed to the unpaved-road running along the Lenana School boundary to connect the residents to Ngong road and traffic passing in close proximity to the sampling site. Average and Peak PM₁₀ levels recorded for the other two sites, Karen and Ngong during the sampling period for all the sampled sites were below the NEMA limit levels.

The proposed project construction will involve use of vehicles and equipment that depend on fossil fuel as their source of energy, movement along unpaved surface and earth works activities with potential to emit dust. Anticipated air quality impacts during project operations will arise from operating the commuter train run by diesel engines as well as backup generators within the railway stations.

Table 3: Air Quality Results

Site	Air quality parameters monitored (max recorded)										
	CO (ppm)		NO ₂ (ppm)	SO ₂ (ppm)	VOCs (ppm)	PM (µg/m ³)		HC (ppm)	H ₂ S (ppm)	O ₂ (%Vol)	CO ₂ (%Vol)
						Average	max				
Site 1	1.5		0.22	BDL	BDL	196	645	BDL	1.81	20.9	0.045
Site 2	2		1.39	BDL	BDL	4	115	BDL	1.72	20.98	0.055
Site 3	BDL		1	BDL	BDL	<1	26	BDL	2.07	21	0.041
NEMA limits (ambient)	8 h	1 h	24 h	24 h	24 h	24 h		INS	24 h		1h
	5.0	10	100	125	600	150		700	150		4.0
	mg/m ³	mg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³		ppb	µg/m ³ (0.11		mg/m ³
	4.3	8.6	0.05	0.05	600				ppm)		
	ppm	ppm	ppm	ppm	ppb						

NEMA Limits (property boundary)	NA	NA	150 µg/m ³ (24 h)	125 µg/m ³ (24 h)	NA	70 µg/m ³ (24 h)		NA	50 µg/m ³ (0.03 ppm) (24 h)		NA
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5.1.9 Noise and Vibration

Noise and vibration are also limited to commercial noise that is generally below the established standards. Transport related noise is also significant, especially along Ngong Road, Southern Bypass and Dagoretti – Karen Road but minimal along access roads serving residential areas due to few vehicles transiting the area. Economic activities (road side businesses, welding and light industries) are among the notable sources of noise along the project corridor. Ambient noise levels within Ngong Road Forest is influenced by nature (birds and windy whistling).

Noise baseline measurements were conducted at three locations. These three locations were representative of the acoustic environment around the vicinity of the Project. Noise monitoring locations were selected before the project commencement since introduction of machines and equipment would have impact to the general noise level of the project area. Noise measurement locations are provided in Table below:

Table 4: Noise Measurement Locations

LOCATION	COORDINATES	DATE
Site one	1°18'08.9"S 36°43'53.0"E	7 th March 2024
Site Two	1°19'22.3"S 36°42'21.3"E	7 th March 2024
Site Three	1°21'05.9"S 36°39'23.0"E	7 th March 2024

Figure 8: Sample Noise Measurement Sites



The LAeq value at each of the sampling sites measured for sampling durations of 3hours did not exceed 85 dB(A). Site 1 and 2 are located in areas with activities such as road traffic and also train activities. The baseline levels at site 2 were above the NEMA limits as it was located on road side of Karen to Ngong next to water company offices in Karen shopping centre. The activities of

the proposed project will add to the baseline noise levels recorded. The results of the survey indicate that the noise levels at the sites sampled were within the recommended limits set by NEMA, the Kenya government and World Health organization (WHO). Below are the noise measurement results:

Table 5: Noise Measurement Results

Site	Duration	Noise levels dB(A)		Comments
	hh:mm	LAeq	NEMA	
Site 1	03:00:32	61.5 dB(A)	60	Within Limit
Site 2	03:00:07	67.8 dB(A)	60	Above Limit
Site 3	03:01:54	47.4 dB(A)	60	Within Limit

Introduction of heavy construction machinery during the railway line construction works and associated components is likely to influence the noise and vibration levels within the project area.

5.2 Social Baseline

5.2.1 Administrative

The Proposed project is located within Nairobi and Kajiado Counties as described below

5.2.1.1 Nairobi County

Nairobi County is one of the 47 counties in the Republic of Kenya. It borders Kiambu County to the North and West, Kajiado to the South and Machakos to the East. The County has a total area of 696.1 Km squared and is located between longitudes 36° 45' East and latitudes 1° 18' South. It lies at an altitude of 1,798 meters above sea level. The city county consists of eleven gazetted sub-counties and eighty-five electoral wards.

5.2.1.2 Kajiado County

Kajiado County is located in the Southern part of Kenya. The county borders the Republic of Tanzania to the Southwest, Taita Taveta County to the Southeast, Machakos and Makueni Counties to the East, Nairobi County to the Northeast, Kiambu to the North and Narok County to the West. The county covers an area of 21,872 Sq. Km. The county has five (5) sub-counties and twenty-five wards.

Overly, the project traverses Dagoretti South, Langata and Kajiado North Constituencies under - Dagoretti South, Langata and Kajiado North sub-counties, which have a total of 3No. Locations namely Riruta, Karen and Ooloolua and 7No. sub-locations namely Bulbul, Kerarapon, Ooloolua (in Kajiado North), Karen, Langata (in Langata), Riruta and Lenana (in Dagoretti South) Sub counties. The Sub-Counties administrative areas are illustrated in the table below.

Table 6: Project Area by Sub-County

Sub-County	Wards	Area Km ²	Locations	Sub-Locations
Dagoretti South	Mutuini	5.00	1	2
	Ngando	3.20	1	1
	Riruta	4.20	1	1
	Waithaka	5.00	1	2
Kajiado North	Ngong	71.1	1	1
	Oloolua	14.9	1	4
	Olkeri	20.9	1	7
	Ongata Rongai	39.5	1	2
	Nkaimurunya	3.3	1	4
Langata	Karen	48.0	1	4
	Nairobi West	6.90	1	1
	Mugumoini	126.40	1	2
	South C	15.10	1	1
	Nyayo Highrise	0.40	1	1
3	14	363.9	14	33

Source: Nairobi and Kajiado County Integrated Development Plans 2018 – 2022

5.2.2 Population and Demographics

According to 2019 Kenya Population Census, Nairobi County has a total population of 4,397,073 of which 2,192,452 are Males and 2,204,376 are Females, with a population growth rate of 3.8%, the population is projected to increase to 6,067,961 by 2034. The population of males is lower than that of females due to high mortality rate for males and high life expectancy for females which is 61 years for women and 58 years for men. The average household size is 2.5 persons and a population density of 6,247 persons per Km². Dagoretti South covers an area of 29.1 Km² and has a total population of 434,208 persons and with a population density of 14,908 people per Km². Langata sub-county covers an area of 217 Km² and has a total population of 197,489 persons and with a population density of 911 people per Km².

Kajiado County has a total population of 1,117,840 people of which 557,098 are males and 560,704 are Females, and with a population growth rate of 5.5%, the population is projected to increase to 1,732,652 by 2034. The population of males is also lower than that of females due to high mortality rate for males and high life expectancy for females which is 61 years and 58 years' males. The population density is 351 persons per Km². Kajiado North Constituency covers an area of 110.6 Km² and has a total population of 306,596 people with a population density of 2,777 persons per Km².

Construction of new infrastructure project naturally attracts new settlements, businesses and investments due to improved infrastructural facilities, security, business and employment opportunities, among other. It is as well expected that new immigrants will gradually move in and

contribute to population density increase due to the improved transport system. The table below summarizes the population of administrative locations and sub-locations traversed by the project.

Table 7: Population Trends and Projections by Administrative Locations

Sub – County	Location	Sub-Location	Total		
			2009	2019	2033 projections
Dagoretti South	Riruta	Riruta	32,370	40,465	55,841
Langata	Karen	Karen	4,768	8,126	10,888
		Langata	6,019	5,429	7,213
		Lenana	2,682	13,216	17,709
Kajiado	Oloolua	Bulbul	6,815	19,303	25,866
		Kerarapon	1,561	9,062	12,143
		Oloolua	4,275	14,836	19,880
TOTAL					
3	3	7	58,490	110,437	148,540

Source: Kenya Population and Housing Census 2019

Table 8: Population Densities by Administrative Areas

Locations	Sub-Locations	Area (Km ²)	Population Density
Dagoretti South	Riruta	2.1	19,408
Langata	Karen	23.1	352
	Langata	17.5	756
	Lenana	16.6	327
Kajiado	Bulbul	2.7	7,087
	Kerarapon	4.6	1,333
	Ooloolua	12.0	1,231

Source: Kenya Population and Housing Census 2019

There has been a steady population increase in the project area from 2009 to 2019, due to various reasons including the sub-division of land and coming up of new settlements and housing development. High Population densities are found in Riruta area, Bulbul, Kerarapon and Ooloolua which are the major settlements in the project area with various economic activities taking place. Therefore, with the construction of the commuter Railway line, its anticipated that the population will increase even further due to availability of cheap and convenient transport, access to services, connectivity to various markets and shopping centers, estates and the Nairobi capital city for traders and service providers in the area.

Because of the expansion of Ngong town and the ever increasing population within areas of Riruta, Bulbul and Ooloolua due to affordable and cheap housing justifies the construction of the MGR, in order to cater for the people living within the said areas and its environs, high population within the said areas has resulted to increased traffic within Ngong Road, which has resulted to

the locals using alternative routes to avoid the traffic within the Karen – Dagoretti Roundabout and Kerarapon and Bulbul that normally witness traffic gridlocks due to heavy traffic.

5.2.2.1 Migration Patterns

Due to the growth and expansion of Ngong and Karen towns and environs in the recent years, the project area has seen a rapid population growth that has attracted many developments, therefore leading to major urban expansion. The high number of upcoming and newly constructed residential building along the project area proves the above phenomena. This population increase has led to the increased demand for transport facilities since majority of the population works in Nairobi, Dagoretti, Karen and Langata areas. Migration patterns in the project area are influenced by transport systems, including Ngong road, southern bypass, among other routes which use both public and private transport. Key determinants of the migration patterns are as follows;

- (i) Cheap and affordable housing along the project area;
- (ii) Employment opportunities within the project area;
- (iii) Business opportunities within and around the project area;
- (iv) Accessibility to public and other institutions, more so schools and colleges, offices, major universities, markets, among others
- (v) Availability of land within Ngong and Karen neighbourhoods,
- (vi) Availability of good road network, electricity and water and proximity to Nairobi city CBD.

The migration patterns within the said project areas have resulted to increased traffic within Ngong Road with travelers using Ngong Road being locked in traffic jams for up to 2-4 hours due to congestion hence a justification for the construction of the MGR line.

5.2.3 Observed Social Categories

The Following were observed as the various social categories in the project area:

- (i) General traders and Car washing services
- (ii) Shops, food vendors, restaurants and hotel,
- (iii) Institutions including Churches, Schools, and colleges,
- (iv) Service stations,
- (v) Hardware stores among other supply chain outlets,
- (vi) Flower vendors
- (vii) Residential houses, and Apartments
- (viii) Public and private transporters and road users

Majority of the observed social categories interact directly or indirectly with the project corridor, hence, some of them will be affected once the project commences.

5.2.4 Land Tenure and Land Use

Land is a key asset that provides foundation for economic and social development. The optimal utilization of the land is however influenced by the prevailing pattern of land ownership, control and usage. Land within the project area is both public, government (which includes parts of the forest, public institutions and offices) and privately owned (which includes residential homes and apartment). Mixed land use trends were observed within the project area, which includes residential, commercial (represented by retail businesses, shops, supermarkets, Service stations, hardware's, restaurants, fast food and cafes among others) that serve the surrounding neighborhood. Others include small scale subsistence farming (within individual homes) and large-scale farming for fodder within Vet farm, which as well houses animal husbandry for National Rabbit breeding and training center. Majority of the people who own land in the project area have title deeds.

Land use types include;

- (i) Commercial activities which involve real estate,
- (ii) Individual houses where people live and some carry out subsistence farming (kitchen farming),
- (iii) Social amenities and institutions including schools, health facilities, places of worship and market etc.
- (iv) Business such as restaurants, shopping malls, grocery stores, entertainment centers among others,
- (v) Forested areas (Ngong forest)
- (vi) Road side economic activities such as flower vendors eateries, Mpesa shops and general grocery.

Figure 7: Sample Land Use Features



Farming



Open Grazing



Multi-dwelling Units



Commercial Activities

With the coming up of the new MGR line that is anticipated to ease transportation within the project areas, it's projected that the value of land will increase due to improved interurban connectivity and the increased accessibility. The land value adjacent or within the project hinterland will be positively impacted, hence appreciation in value and asset base. Hence, the demand for housing and other amenities will increase due to population increase.

5.2.5 Housing and Settlement Patterns

Settlement patterns in the project area are influenced by ecological and climatic factors, rainfall patterns, geology, socioeconomic activities as well as access to services (administrative, health and education, water, electricity, road network). The project area has three types of settlement namely liner, clustered and scattered settlements as described below;

- (i) Linear and Clustered settlements patterns were observed along the project corridor where people are attracted due to by the availability of transport system, trade, employment opportunities, recreational facilities and access to basic amenities and services such as schools and dispensaries, administrative offices, etc. This can be seen in areas such as Ngong, Embulbul, Riruta and Karen centers which are the major town centers along the project corridor, where a majority of the people live and undertake their businesses.
- (ii) Scattered settlements patterns were observed in the hinterland where residents have built their individual homesteads.

Housing characteristics is an indicator of quality of life and economic well-being of the people depicted by the materials used in the construction of floor, roof and wall of a dwelling unit. The project area has a mixture of high-rise buildings, bungalows, mansion, single dwelling houses, gated communities and semi-permanent houses. The permanent buildings have either iron sheet roof or tiled roofs, stoned walled and cemented floors or tilled floors. Majority of the residents who live within the project area own their individual homes, while others have rented.

Figure 8: Sample Housing Conditions



Stoned Walled Houses



Iron sheet Houses



Commercial House



Commercial House

5.2.6 Infrastructure and Social Services

The immediate neighborhood has several social amenities and facilities that are spread across the project corridor, including religious facilities, educational facilities, administration offices and police stations, hospitals, financial institutions, communication, entertainment and hospitality services. Some of the social facilities include Deliverance Church Ngong, Eagles Christian Church, Shade Prime Hotel, Asmara Restaurant and Talisman, Karen Police Station, Nairobi Montessori Preparatory School, Serare Academy and St Christopher International School among others.

In terms of road infrastructures, the project area is well connected with tarmac roads such as Ngong road, Langata-Dagoretti Road and other roads connecting to estates such as Tree Lane access, KEPHIS access road, Karen View Estate access road, Kerarapon drive, Kerarapon road among others. Public utilities are spread out along the project corridor including power lines, internet cables, Sewer lines and water pipes (connecting to homes from the main distribution lines). These utilities actively interact with the project corridor and will likely be affected as some are located within the proposed project corridor. There will be need for the contractor to identify some of these utilities for proper relocation.

5.2.6.1 Communication Service Lines

The project area is well covered and connected by the three main local mobile phone service providers, including Safaricom, Orange and Airtel. Mobile phones are used as the means of communication for both social and businesses and for financial transactions, bringing about socioeconomic conveniences and efficiency. There are also a number of cyber cafes and a lot of local money transfer/transaction shops that provide convenient services to the residents in the

area. These are expected to grow exponentially with possibly provision of employment opportunities to more people including locals.

5.2.7 Economic Activities

5.2.7.1 Employment and Livelihood

Trade and commerce activities are carried out within the main urban centers including Ngong, Embulbul, Riruta and Karen. The main economic activities carried out in the area, that brings income to the residents include through employment opportunities as well as market outlet for goods and services such as flowers shops, saloon/barbers shops, Mpesa shops, groceries, hardware and building materials outlets, petrol stations, furniture workshops among others. Agricultural reach activities are carried out within the VET farm where crops such as fodder, maize, bean and animal feed research activities are carried out. The main financial institutions in the project towns are Kenya Commercial Bank, Cooperative Bank, Equity Bank, Absa Bank; which provide services directly or through Agents. In addition, there are numerous microfinance institutions including KWFT among others. However, the most common money transfer service is through M-pesa and bank agencies (KCB's Mtaani and Cooperatives' Jirani).

The residents in the project area are mixed classes composed of low, middle and high-income earners. Majority of the residents are engaged in gainful employment within the area and around Nairobi and Ngong towns as well as neighboring suburbs such as Dagoretti, Langata and as far as Kiambu town within the public and private sectors. The most predominant sources of livelihoods to the residents are businesses support activities including, artisan, hawking along the busy Ngong road, shops, eateries along the road reserve (Karen Roundabout), transport sector (including matatu, bodaboda, taxi, handcart), small- and large-scale shops and grocery stores offering goods and services, hardware, car wash, medical services and high-end restaurants and hotels.

Trees seedlings and flowers vendors were observed to be along the road corridor with a majority of them selling flowers and tree seedlings to the neighborhood and road users. Majority of them were observed to be located within and along the roadside corridor which the MGR project will be sharing. Some of the tree seedling sellers have organized themselves into groups and have registered themselves, such Komboni Self-help group.

Figure 9: Sample Economic Activities



Transport Industry



Hardware



Flower Pot Vendors



Roadside shanty eatery and Grocery



Service Stations



Restaurant's

The construction of the MGR will create numerous employment opportunities within the project area, for the local community ranging from skilled and unskilled labour and through selling of commodities such as food and drinks to workers and construction materials. Hence the community will be able to earn a living from the employment and other livelihood opportunities created by the proposed, thus in return boosting the economy of the project area.

5.2.8 Salient Features along the Proposed Project Corridor

Observation made during the filed exercise noted some areas of potential conflict, which may arise during construction phase and also operation phase, most of these areas are driveways/access roads to estates/service stations which will require safety measures to be undertaken for motorist using the access roads in and out of the estates or from the service stations, other areas that were observed that need to be considered are the high voltage power lines. Other areas that were observed that need to be considered are the high voltage power lines that are located along Km 7+160 – Km 7+200 where the railway line interacts directly with the power lines and will require extensive consultation with KLPC for other alternatives or relocation of the power lines. There will be also need to have a sitting with the flower vendors that are located

along the road reserve, there will be need for prior consultation with them so that they may be prepared for eventualities such as relocation from the corridor.

Table 9: Areas with Potential Conflict

Item	Intervention
Tree Line	Tree count
Kerarapon Drive	Grade separation
Kerarapon Road	Grade separation
Karen View Estate Road	Grade separation
KEPHIS Access Road	Grade separation
Karen Surgery Access Road	Provision of service lane
Tree seedlings and Flower Vendors	Engagement and relocation to new site
Ngong View Road	Access road

Figure 10: Sample Potential Conflicts



Interactions at Karen Junction



Interactions with Flower Vendors



Kerarapon Road



Shell Petrol Station



Kererapon Drive

5.2.9 Social Welfare

5.2.9.1 Education and Literacy

In Kajiado County the Pre-primary population stands at 52,091 for both boys and girls while the total enrolment stood at 42,565 which imply that only 76.7% of ECDE population has been enrolled in schools. Currently, there are 925 ECD centers with 2,211 teachers. The teacher to pupil ratio stands at 1:19. There were 514 primary schools both public and private as at 2023, with an enrolment of 155,955 pupils, where 48% of the enrolled are girls and 52% are boys. The net enrolment rate is 86.19%, while the teacher/pupil ratio is currently at 1:60. The county has several universities with Maasai Mara University campus being the only public university. There are also numerous middle level colleges, both public and private. The literacy rate in the county stands at 65.2% compared to the national literacy rate of 71.4%. This can be attributed to a combination of factors which include high school drop outs rate, low transition rate and socio-cultural practices among others. (*Kajiado County CIDP 2018-2022*)

In Nairobi County there are a total of 2,906 ECD centers with a total of 8,470 EDC teachers. The teacher pupil ratio in the pre-primary school is 1:34. The total enrolment in the ECD is 292,126. The pre-primary retention rate is 99.8% with a drop-out rate of 0.2% while the transition rate is 98%. There are 1,235 primary schools with 7,741 teachers. The teacher pupil ratio in the primary schools is 1:55.5. The total enrolment is 429,280 learners with a population of 207,056 boys while that of girls is 222,224. Dropout rate stands at 3.6%. In terms of secondary schools there are 319 secondary schools with 2,359 teachers. The teacher pupil ratio is 1:22. The total enrolment is 49,728 with 26,755 boys and 22,973 girls. The dropout rate is 5.5% completion rate is 91.8% while the retention rate is 94.6%. The County has a total of 5,015 adult literacy centers where enrolment for male learners is 2,627 and 2,388 female learners. On literacy level, 96.1 per cent of the population can read and write while 2.8 per cent of the population cannot read and write. (*Nairobi CIDP 2018-2022*)

The project area interacts directly and indirectly with schools and other institutions, with a majority being private institutions and one government institution that are located along the project corridor such schools include Serare Academy, Joint Command Staff Base, St Christopher International Academy and Nairobi Montessori School. It is anticipated that during construction these institutions share the same project corridor, especially Ngong Road. Hence, there is need for

proper collaborations with the immediate neighborhood and also institutions. The main mode of transport used by the learners to and from school is by private means and school buses.

Figure 11: Sample Education Institution



St Christopher's Secondary School



Nairobi Montessori Preparatory School

5.2.9.2 Health

Nairobi County is served by Kenyatta National Hospital, which is the major referral hospital in the Country. There are 16 sub- County hospitals, 9 mission, 32 privates, 15 nursing homes, 38 public health centers as well as 45 private health facilities. The County has 30 public dispensaries, 84 private clinics and 22 public clinics. The most prevalent disease is malaria at 39% of all the cases; while diarrhea follows with 16.3%. The prevalence of both flu and respiratory diseases is 15.5 per cent, while intestinal worm prevalence is 14 per cent. (Nairobi CIDP 2018-2022)

In Kajiado County there are 4No. Sub-county hospitals, 16No. Health centers and 60No. dispensaries run by the county government. There are also 6No. private hospitals, 13No. nursing homes, 7No. health centers, 27No. dispensaries and one hundred and one (101) clinics which are either run by private, faith based, community based or non-government organizations. Together with these, the county has sixty-two (62) community health units initiated out of which only 37 are active. The doctor population ratio is 1:26,094 and the nurse population ratio is 1:1,068. (Kajiado County CIDP 2018-2022)

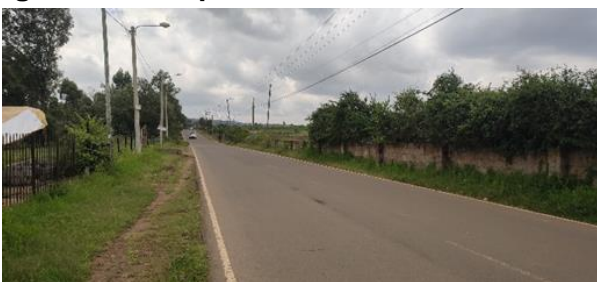
The residents of the project area are served by both public and private health facilities. The main facilities include, Ngong Sub-County Hospital, Embulbul Catholic Dispensary and Karen Hospital, that serve the residents in the project area and its environs. The common diseases in the project area are common cold, respiratory tract infection, Malaria and water borne infections Diabetes and hypertension.

5.2.10 Public Utilities

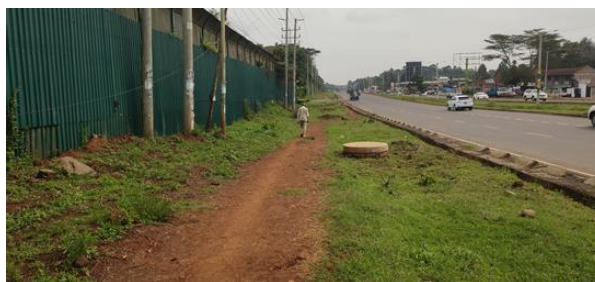
Public utilities are spread out along the project corridor including power lines, water tanks and water pipes. These utilities interact with the project railway line corridor and will likely be affected as some are crossing the median where the railway line will be constructed especially water pipes,

powerlines and underground internet cables. There will be need for the contractor to identify some of these utilities for proper relocation.

Figure 12: Sample Public Utilities



Access Roads



Sewer Lines



Power Lines



Water Pipes

5.2.10.1 Water Supply

Nairobi County has no main water tower; most of the supply is from the Tana Basin and is pumped to the City from distances of around 50 Km. This bulk water-supply is not reliable during periods of drought, and is also endangered by siltation of the reservoirs due to deforestation in the catchment areas. The supply problem is further aggravated by the poor state of the distribution network, which results in about 50 per cent losses due to leakage, illegal connection and inefficient and wasteful use of water by some consumers. Nairobi Water and Sewerage Company is the main water company in the County. Most of the water wells are operated by large private consumers (industrial enterprises, hotel complexes) or by individual residential owners in parts of the City that receive only intermittent supply (for example, Langata and Karen). Water wells are often shared with neighbors or water is sold for distribution by tankers. Many private well owners are also connected to the mains water-supply network (which provides cheaper water) but use groundwater as a back-up. (Nairobi CIDP 2018-2022)

There are various sources of water in Kajiado County, namely, rivers, shallow wells, protected/unprotected springs, dams, water pans, and boreholes. The water is used for domestic, livestock and commercial uses. Most of the in the rivers in the county are seasonal hence not reliable and ground water is available although it contains high salt levels in some parts of the county. Tanathi Water Services Board is charged with the responsibility of developing water resources and maintaining infrastructure. Water Services Providers are in charge of direct provision of water and sewerage services to customers and ensuring efficient and economical

provision of water and sewerage services in the county. The average distance people travel in search of water is approximately 10Km from their dwellings. Water access in urban centers is better than in rural areas because of high water connectivity by the service providers. (Kajiado County CIDP 2018-2022)

Due to water shortage challenges, leading to water rationing the residents have resulted into digging private wells in order to supplement the existing water supply. Areas that have no water wells use private water boozers to supplement water supply.

5.2.10.2 Sanitation and Solid Waste

About 61.5% of the Nairobi County population use flush toilets as the main waste disposal method, while 32.1% use pit latrines. The remaining 4.8% of the population have no means of waste disposal. On garbage collection, 36.1% of the communities have their garbage collected by private firms and similar percentage is collected by neighborhood community groups. (*Nairobi CIDP 2018-2022*)

In Kajiado County Sanitation in the county is inadequate. Only 2,407 out of 87,120 urban households are connected to the main sewer while 17,157 use septic tanks and cesspools. In the rural areas, 44,203 out of 86,344 households practice open defecation representing 50% of the total households in the county. (*Kajiado County CIDP 2018-2022*)

Majority of the people along the project area rely on onsite sanitation facilities which involves septic tanks and pit latrines. Most of the septic tanks get filled easily due to the water table hence have to be exhausted on a regular basis.

5.2.10.3 Transport and Communication

In terms of transport the project area is served by Ngong Road that connects Karen, Ngong town, parts of Southern Bypass, Langata and Dagoretti areas, the project area is also well connected with feeder roads that connects to estates, entertainment/recreation facilities, schools and individual homes. Some of the road network will be disrupted during the project construction period including Tree Lane access road, Kerarapon drive, Kerarapon Road, Langata-Dagoretti road, KEPHIS access road, Karen View Estate access road, Ngando – Satellite access road. It is anticipated that once the project commences there will be increased traffic along the project corridor due to interruption of traffic flow in some of the roads during construction period. The main modes of transportation along the project area include Public Service Vehicles (PSV) which include matatus, buses, and mini vans, bodaboda; trucks ferrying building materials and other commodities, individual/private vehicles and school vans.

The construction of the MGR will ease transportation cost and also ease the traffic congestion and accidents, therefore deal with overall transportation challenges and insecurity. In addition, the well-planned railway system will improve access to education, healthcare facilities and other essential services, thus benefiting the communities across the project area. Locals will be able to use the commuter railway line to reach Nairobi city and various areas with ease and on time and also spend less on transport cost. The line will act as link between Ngong town, Karen and Nairobi in general thus facilitating the movement of people, goods and service, hence improving the economy.

5.2.10.4 Power Connection and Energy

Electricity is one of the key factors to economic growth and social development. Within the project area majority of the houses and businesses are connected to electricity which is evident by a number of power lines running along the project corridor and a majority are also connected to solar panels to supplement the existing energy. Parts of the project corridor are also provided with street lights that are evident across the project corridor. Some of the power lines and street lights post will need to be relocated to enable the construction works. Other sources of energy in the area include firewood, charcoal, and LPG for cooking.

5.2.11 Cross-Cutting Issues

5.2.11.1 Gender

Gender Inequality index (GII) reflects gender-based disadvantage in three dimensions, including reproductive health, empowerment and the labour market. Kenya had an overall GII of 0.71 in 2023, an improvement from 0.73 in 2022 (Human Development Report 2023). This is however, not equal everywhere as there are regional disparities with counties located in Arid and Semi-Arid Lands (ASALs) having high Gender Inequality Indices.

Measures are being put in place to reduce gender disparity in the country through establishment of a gender mainstreaming policy guidelines which is a framework for gender mainstreaming in order to provide an enabling environment to strengthen gender sensitivity. The government also through UWEZO Fund enables women and the Youth Fund for youths to access finances to promote businesses and enterprises. The government also directed that, 30% of the public procurement to be reserved for youth, women and people with disability.

5.2.11.2 People Living with Disability

Persons with Disability Act (2003) of Kenya defines persons with disability as persons with physical, sensory, mental or other impairment, including any visual, hearing, learning or physical incapability, which impacts adversely on social, economic or environmental participation. The

World Report on Disability estimates that 15% of the world population are people with disabilities. 10% of the population in Kenya are living with disability. The gender ratio of disabled population is 50.4% female and 49.6% male. 19% of the disabled population is receiving a secondary education, 33.3% is employed and 67% lives in poverty.

People living with disabilities are mostly disadvantaged and discrimination in employment opportunities, lack of access to user friendly facilities, access to education, transport and mobility among others. The main challenges facing People living with disabilities include high levels of poverty, high rates of abandonment, high rates of unemployment, inadequate health services and stigmatization.

5.2.11.3 HIV/AIDS

Not only is HIV/AIDS a health problem but also development challenges as it has economic, social and cultural implications. The overall HIV prevalence in Nairobi County stood at 3.8%, which is lower than the national prevalence of 4.9% (Kenya HIV Estimates 2022) The HIV prevalence rate among women is higher at 7.5% than that of men at 4.7% indicating that women are more vulnerable to HIV infections than men. By the end of 2022 a total of 182,856 people were living with HIV in the county, with 24,918 being young adults aged between 15-24 years and 7,611 being children under the age of 15 years. The Nairobi County contributed a total of 6,499 new infections in the year 2022.

The overall HIV prevalence rate in Kajiado County stood at 4.6% which is also lower than the national prevalence of 4.9% (Kenya HIV Estimates 2022) The HIV prevalence among women is higher at 5.5% than that of men at 3.3% indicating that women are more vulnerable to HIV infections than men in the county. By the end of 2022 a total of 22,850 people were living with HIV in the County, out of those infected 2,020 are young adults between ages 15 - 24 years and 845 being children under the age of 15 years and below. The Kajiado County contributed a total of 482 new infections in the year 2022.

The common mode of HIV/AIDS transmission include;

- (i) Sexual intercourse especially due to early sexual activities,
- (ii) Cultural practices including FGM and polygamy (more so in Kajiado County),
- (iii) Lack of the ability to make decision on having safer sex
- (iv) Multiple (concurrent sexual partners)
- (v) Peer influence and misinformation, among the youth and adolescent,
- (vi) Alcohol and substance abuse,
- (vii) Poverty.

There are several interventions by the government to reduce HIV/AIDS infection and increase access to treatment and care. These include Option B+ which is accomplished through Bring

Back the mothers' campaign, free maternity and Beyond Zero Campaign, PMTCT and provision of free ARV as well as revamped HIV/AIDS awareness campaigns, and the supply of free condoms which have had significant success.

Chapter 6: Stakeholders and Public Consultations

6.1 Introduction

It is a Kenyan Government policy in line with the 2010 constitution that stakeholders including beneficiaries and members of the public living within a proposed project area are engaged and consulted to seek their views and opinions regarding the projects before implementation. Consultative Public Participation is therefore an important process in ESIA studies and review process. Through the consultation processes, the stakeholders have an opportunity to contribute to the overall project design by making recommendations and raising concerns on any aspect that may be of interest to them. In addition, the process creates a sense of responsibility, commitment, and local ownership of the project, hence contributing to smooth implementation and management. The stakeholders and general public were engaged to give their views and opinions regarding the proposed construction of Riruta – Ngong MGR Commuter Project.

In the view of the above, various approaches were used during the stakeholder consultation including; rapid interviews with members of the public within the project area, public meetings and target expert interactions, as well as key informant interviews (KII) and self-administered questionnaire. To achieve this, the stakeholders were mapped, identified, and thereafter consulted.

6.2 Stakeholder Mapping and Identification

The identified project stakeholder comprised of stakeholders with direct interests and those with indirect interest with project, as well as government and non-state actors within the project area. The stakeholders with direct interests included those whose day-to-day operations, assets and livelihoods and general wellbeing were directly interacting with or been impacted by the project components as well as targeted beneficiaries of the project, while stakeholders with indirect interests included general members of the public, government agencies within the project area. Stakeholders with interests included institutional and services providers, Government officers (both national and county government), government agencies, key essential service providers and parastatals. Therefore, those identified and or consulted during the ESIA study exercise included: -

- (i) Stakeholders with direct interests in the project
- (ii) Stakeholders impacted directly by the project in terms of land and income
- (iii) Stakeholders whose day-to-day operations or interests will be disrupted by the project implementation
- (iv) Stakeholders to be involved in ESIA implementation process,
- (v) Vulnerable groups within the project corridor

Thereafter, the stakeholders were analysed and categorized in the following classifications

Table 10: Stakeholder classification

Stakeholder grouping	Level of impact	Level of influence & interaction with the project	Engagement approach employed
Affected land owners	High	They are part of the primary PAPs and highly influential. The number of private land parcels affected are minimal	One on one during RAP study and group during meeting as part of community and project stakeholders
Roadside traders	medium in sections of the corridor	They are part of secondary PAPs whose livelihoods will be impacted. Not influential since they are using public space	Group meeting during ESIA and RAP studies as well as one on one during socioeconomic study
Residents	Medium impact	High influence, they are part of the project beneficiaries. Disruptions expected for some of them during the project implementation phase	Townhall meeting and one on one during the ESIA and RAP studies
Leaders and political elites	low	Highly influential, continuous	One on one and town hall meetings
Administrators	Low	Highly influential and continuous interaction	One on one and town hall meetings. Were key in mobilizing and facilitating stakeholder meetings
County governments	Medium	Highly influential and continuous interaction with the project	One on one and town hall meetings approach
Road users	Medium	Medium influence and continuous interaction with the project components.	One on one and town hall meeting approach
Services and utility services providers	Low	Low influence and continuous, but limited interaction with project components	One on one and town hall meeting approach, official communication through letters
Road authorities	Medium	Medium influence since the project is interacting actively with their corridor	Direct official communication by the client
Government agencies	medium	Low influence and continuous limited interactions since the project is affecting some of their assets (land)	One on one and town hall meeting approach, official communication through letters
Vulnerable groups	Low	Low influence, limited interactions with the project	Town hall meeting approach and one on one where applicable
Institutions	Low	Low and limited interactions	One on one and town hall meetings approach
Non-state actors	Low	Medium influence and continuous engagement with the project	One on one and town hall meetings approach
Regulators	Medium	Medium influence and continuous interaction with the project	

6.3 Project stakeholders Consultation

The key stakeholders as per the proposed project railway corridor were mapped and identified during the project scoping. Later they were contacted and mobilized for meetings or consulted individually during the ESIA study phase. Some of the stakeholders including KLDA, Vet farm, some institutions along the railway corridor were engaged formally and informally by the client before the commencement of the ESIA study for purposes of concurrency with the alignment design.

- (i) Stakeholders identified include but not limited to the following: -
- (ii) Kenya Railway – the project proponent
- (iii) Ministry of roads and transport
- (iv) The county Governments of Nairobi City and Kajiado,
- (v) Ministry of Interior and National Administration - the DCCs for Langata, Dagoretti South and Kajiado North sub-counties
- (vi) KURA – the project is utilizing Ngong Road corridor which is managed by the authority
- (vii) KeNHA
- (viii) Kenya Forest Services (KFS)
- (ix) Utility Services providers
- (x) KeRRA
- (xi) KBC
- (xii) Kenya Police Service
- (xiii) Karengata Residents association (KLDA)
- (xiv) Veterinary service (KARLO)
- (xv) Business communities – Karen and Ngong towns
- (xvi) Local leadership
- (xvii) Institutions – churches, schools, mosques,
- (xviii) Transporters – PSV, boda-bodas,
- (xix) Roadside traders
- (xx) Members of the public

6.4 Objectives of Stakeholder Consultation

Stakeholder consultation in this Project was carried out with the following objectives:

- (i) To inform the local people, leaders and other stakeholders about the proposed Project and its objectives,
- (ii) To seek views, concerns, and opinions of all people in the area concerning the Project,
- (iii) To establish if the local people foresee any positive or negative environmental and social effects from the Project and if so, how they wish the perceived impacts to be addressed.

6.5 Stakeholders Meetings Schedule

Consultations for the proposed commuter MGR project were carried out in an interactive manner with the various stakeholders including rapid consultations with the residents and key informants. The meetings were organized through the client in collaboration with the DCCs and the chiefs within the project area. Various stakeholders were mobilized including government officers, key institutional heads, local administrators, village elders, institutions representatives, PAPs and business community representative. The meeting was chaired by the office of the DCC, and the client was represented.

The project details were disclosed as well as the anticipated impacts, proposed mitigation measures and involved parties and or stakeholders. The roles of the residents were as well stated. The views and opinions of the stakeholders were captured and documented in the meeting minutes and an attendance list was signed by the meeting attendees. The meetings took place between November 2023 and April 2024 with a total of 614No. participants as shown in the table hereunder.

Table 11: Meeting schedules and attendance

Date	Stakeholder's targeted	Venue	Male	Female	Total attendance
29 th Nov. 2023	Ngong Stakeholders (KR)	Ngong CDF Social Hall	32	16	48
17 th Jan. 2024	Vet-Farm (Vet Farm Offices)	Vet Farm Offices	9	2	11
2 nd Feb. 2024	Ngong Town Stakeholders	Ministry of Education Hall - Ngong	103	25	128
27 th Feb. 2024	Lenana School	Lenana Primary School	10	1	11
28 th Feb. 2024	Lenana/Riruta Stakeholders	New Lenana Primary School	32	16	48
12 th April 2024	Karen Residents (KLDA)	St. Christopher International school			155
15 th April 2024	Embulbul Residents	Deliverance Church - Embulbul	80	83	123
26 th April 2024	Karen areas business owners and residents	Chief office Karen	50	45	90

6.6 Project Benefits

The following were highlighted as some of the project benefits

- (i) Creation of employment opportunities for the local community during construction phase both directly and indirectly by provision of services to the workers,
- (ii) Enhancement of the economy of the areas bordering the alignment, due to the opening up of the project area by enhanced transportation systems

- (iii) Easing of transportation in the project area and the neighbourhood which will save the residents a lot of time spend traveling,
- (iv) Reduction of carbon foot print by reduction of time spent on the road and the number of public and private vehicles operating within the project area,
- (v) Provision of a safer transport alternative to the residents of the project area,
- (vi) Appreciation of property value within the project area,
- (vii) Achievement of some of the government Vision 2030 objectives of provision of seamless and integrated transport system for Nairobi metropolis area,
- (viii) Capacity building of the locals through knowledge transfer and training during the project construction phase,
- (ix) Attraction of new capital and social investments into the project area, hence creating new income and livelihood opportunities necessary to expand the local and national economy.

6.7 Stakeholder Concerns, Issues and Opinions

The opinions of the stakeholders were captured and categorized, and are presented in the following section. Generally, the stakeholders were receptive to the project. In Karen, some of the residents were not accommodative to the project due to individual reasons which were generally devoid of environmental, social and economic effects.

6.7.1 Socioeconomic Concerns

- (i) Employment criteria for all workers, who would wish to be employed should be laid out and the recruitment be conducted in a fair and transparent manner,
- (ii) The project should also have infrastructure to cater for persons with disabilities,
- (iii) The project railway alignment should avoid private property as much as possible to reduce on socioeconomic disruptions and relocation,
- (iv) Compensation for affected structures and private parcels land that are along the corridor should be fairly done and before the commencement of project construction works in such areas,
- (v) The need for continuous and inclusive stakeholder consultation and engagement will be critical to the project implementation, therefore all the stakeholders should be brought on board,
- (vi) The PAPs will need to be involved and consulted throughout the project phases,
- (vii) Any activity which could lead to the cracking of houses should be addressed upfront, e.g. blasting and excessive vibration during project construction period or operation phase,
- (viii) Locals should be given the first priority on available employment opportunities,
- (ix) Possible increase in safety and insecurity incidences during the project construction and operation were noted, hence the need to appropriately address them,
- (x) There was need to ensure all access road to the stations are well lit to address safety and security concerns,

- (xi) The project committees, especially the ones involving local residents and other stakeholders should be constituted in an open and transparent manner,
- (xii) The railway stations should have in place emergency response systems for any eventuality during the project construction and implementation phases
- (xiii) The contractor should avoid unnecessary destruction of grazing lands as much as possible especially with Vet farm,
- (xiv) The railway stations should provide ample parking space for motorists who will wish to use the commuter train,
- (xv) CSR activities done by the project should be done in a consultative manner so as to ensure that the initiatives address the needs of the ordinary residents

6.7.2 Environmental and Ecological

- (i) Minimization on issues such as dust, blasting and noise during construction period should be observed and enforced,
- (ii) Contractor to comply with spoil dumping regulations,
- (iii) The proposed line will interfere with KFS tree nursery, water piping, some houses and trees at the Forest Station which could impact on seedling production and general wellbeing of the workers,
- (iv) There should be a tree count for affected tree within the corridor and a replanting or replacement plan,
- (v) Any activity that may interfere with ground water table, wetlands or river sources should be avoided or elaborate mitigation measures provided for to address any possible impacts,
- (vi) The sources for construction materials especially the ballast and sand should be appropriate and where necessary, licenses to be sought from authorities,
- (vii) Considerations of climate change during the project design in order to ensure that the residents are not adversely affected by negative effects,
- (viii) The railway line should not interfere with free movement of wildlife in areas which they use as crossing corridor.

6.7.3 Design and Safety Issues

- (i) Consider review of the proposed facilities next to Lenana school main gate since there is no public access road,
- (ii) The safety and security of the students at Lenana school and the school community due to disruptions caused by the proximity of the station to the school were raised,
- (iii) The access to the station will conflict with the school gate and entrance, thus there will be conflict with the school programs and activities due to increased human and motorised traffic,

- (iv) Since the railway line will use the exiting road corridor which has some roadside socioeconomic activities, may lead to business and movement disruptions by interfering with access road and roadside parking,
- (v) The need to fence off some specific sections of the railway line since they could be critical contribute to safety and security issue needed to be incorporated in the design. These included the station sites, and sections neighbouring schools,
- (vi) An underpass should be constructed across the existing railway line joining Mama Wahu Road to serve as access to the station,
- (vii) Accesses and level crossings should be provided on minor roads/entrances and grade separation applied to crossings on major roads ensuring minimum disruptions to traffic along the affected routes,
- (viii) Provision of more non-motorized traffic (NMT) facilities within the project area such as walkways, to cater for the pedestrians, during the commuter train operations.
- (ix) Utilities along the proposed railway line should be identified and protection/relocation measures be undertaken,
- (x) Extension of the line to connect with other existing lines to enhance the railways usefulness to the people in Ngong should be fast tracked.

Figure 13: Consultation meeting with Vet Farm manager and Ngong leaders



Figure 14: Consultation meeting with Ngong town residents



Figure 15: Consultation meeting with Lenana and Riruta residents



Figure 16: Consultation meeting with Karen residents – KLDA at St. Christopher School



Figure 17: Consultation meeting with Embulbul residents



Figure 18: Consultation meeting with roadside traders and residents of Karen



Chapter 7: Resettlement Plan Framework

7.1 Overview

Involuntary resettlement is an integral part of the overall project formulation and needs to be dealt with from the earliest stages of the project. This will help the implementing agency or project proponent to explore project alternatives and or minimize any unnecessary displacement of population. In principle, development partners emphasizes that where displacement is unavoidable, the project should assist by all means to improve the PAPs living standards by building their income generating capacities, production levels or at least maintain their previous standards of living. Hence, this requires a thorough understanding of social, economic, and cultural conditions of the project area and its people and the factors which influence the lives of those affected. This is achieved by conducting a detailed socio-economic survey among the project affected persons (PAPs) and proposing ways through which livelihood restorations could be achieved, hence leading to a Resettlement Action Plan (RAP) Report.

The proposed MGR alignment follows the existing Ngong Road alignment as much as possible except in sections between Lenana School and southern bypass and KBC and Ngong station. The design has avoided affecting abutting developments within private land hence minimizing land acquisition as much as feasible through the utilization of the existing road Right of Way (RoW). In this regard, the project will therefore require additional land/space as necessitated by the design and the objective of the project or project components.

7.2 Scope of the Resettlement

The study scope entailed identification of impacts and formulation of mitigation measures for the potential negative impacts. This included the following: -

Identification and registration/documentation of the Project Affected Persons and Properties impacted by the project;

- (i) Asset inventory and valuation;
- (ii) Documentation of Public infrastructures and facilities within the road corridor;
- (iii) Quantification of the impact of involuntary resettlement;
- (iv) Consultation with the project affected persons, among other stakeholders;
- (v) Analysis of the impacts and possible mitigation measures;
- (vi) Preparation of the RAP implementation schedules and monitoring plans;

7.3 Resettlement Planning and the Legal Provisions

The National Land Policy is relevant to infrastructure development as it provides for compulsory acquisition - the power of the State to extinguish or acquire any title or other interest in land for a public purpose, subject to prompt payment of compensation, and is provided for in the current

Constitution. In regard to the project, the National Land Policy is relevant as it appreciates the complexity of the land ownership, land use and overall interest in land for public purposes.

The RAP study was undertaken in accordance with relevant national legislative provisions including the Constitution of Kenya (2010), Lands Act (No. 6 of 2012), National Land Commission Act (2012, Traffic Act, Roads Act, and Water Act (2016), The Power of Eminent Domain, Physical and Land Use Planning Act, 2019, Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities No. 56 of 2012, Land Registration Act, 2012 (No. 3 of 2012), Public Roads and Access Act (Cap. 399), Way Leaves Act (Rev 2010), The Valuers Act Cap 532, Institution of Surveyors of Kenya (ISK) Valuation Standards, Disputes Environment and Land Court Act, 2012, HIV/AIDS Prevention and Control Act (No. 14 of 2006), as well as international status. The Kenyan land laws and the Constitution of Kenya require that there should be compensation for the persons affected by the Project by way of livelihoods restoration, resettlement or monetary. Best Practices and Standards, in particular the AfDB ISS with the Operation Safeguards OS2 providing for Land acquisition as well as Operation Safeguards OS1 on social impacts and stakeholder engagements.

7.4 PAPs Eligibility

The potentially project affected persons by the railway corridor will be entitled to fair and adequate compensation for losses as a result of physical and economical displacement. The compensation package should take cognizance not only of the value of the lost assets, but also the disturbance/disruptions the resettlement is likely to cause. The Kenya Constitution (Article 3) states that where land is compulsorily acquired for a public purpose or in public interest, just compensation should be paid in full and promptly. Compensation does not extend to any property which has been acquired unlawfully.

The specific PAPs who will be affected by the project or project components were documented accordingly. Taking of land by the project will results in relocation or loss of property and assets as well as loss of income sources or means of livelihoods, whether or not the PAPs must move to another location.

The affected persons and their assets at the time of census were identified. The PAPs affected were classified as:

- (i) Those who have formal legal rights to land ownership (including customary and traditional rights recognized under the Kenyan laws);
- (ii) Structure owners who will lose part or whole of their structures on private land;
- (iii) Tenants with business in premises/sites which are earmarked for acquisition;
- (iv) Individuals with plants and trees within private land earmarked for acquisition,

This RAP report sets out that the owners should be provided with compensation for loss of land and 15% disturbance allowance while those with structures and business will receive compensation for lost assets and or livelihoods and 15% disturbance allowance.

7.5 Grievance Redress Mechanism (GRM)

A two-level grievance redress mechanism is proposed for the MGR commuter project. The members of the first level GRM will be drawn from the grassroots and majority of them will be those directly affected by the project. The key function of the Grievance Redress Committees is to provide a platform for the PAPs to air their dissatisfaction arising from project implementation processes, environmental and social impacts, including compensation and livelihood restoration, as well as to fast-track and address all emerging issues that could derail smooth implementation of the project. The GRM is provided for and detailed in the RAP report.

7.5.1 The Objectives of the GRM

GRMs are essentially designed as a conduit for soliciting inquiries, inviting suggestions, and increasing community participation in a project. For a project to be able to achieve success, an effective GRM mechanism can be useful in various ways, including: -

- (i) Sensitizing the public and stakeholder awareness about the project and its objectives
- (ii) Increasing stakeholder involvement in the project processes and more so resolving conflicts
- (iii) Improving the project outcomes: through timely resolution of issues and challenges,
- (iv) Contribute to timely acquisition of land and resettlement of PAPs
- (v) Providing feedback on project performance i.e., providing project staff with practical suggestions/feedback
- (vi) Act as an early warning mechanism by identifying and resolving implementation challenges in a timely and cost-effective manner. It helps the project management to get to know of challenges before they become more serious and widespread, or escalate, therefore saving on project funds and its reputation, and avoiding time-consuming disputes, hence, acting as an effective risk management tool.
- (vii) It builds community-project relationship, by creating and maintaining trust with affected persons and community stakeholders, thus enhancing the project's legitimacy among stakeholders;
- (viii) It enhances the project implementation team's accountability, transparent and responsiveness to PAPs,
- (ix) It deals with rumours and negative publicity related to the project as well as levelling the expectations of the PAPs and other stakeholders.

7.6 Monitoring and Evaluation

The purpose of monitoring and evaluation is to report on the effectiveness of the RAP implementation, as well as the outcomes and impact of the PAPs resettlement in relation to the RAP purpose and goals. The parameters and associated indicators to be monitored, including the persons and/or institutions responsible for carrying out the monitoring activities should be elaborate right from the RAP planning phase. The arrangements for monitoring will fit in the overall monitoring plan of the entire MGR commuter implementation schedule. The monitoring focuses on physical progress and associated costs as spelled out in this RAP report in order to ensure that they are implemented and coordinated so as not to delay the civil works.

In order to evaluate PAPs resettlement and livelihood restoration achievement level, an impact assessment shall be undertaken 6-12 months after the RAP implementation in order to evaluate whether the intended objectives were realized based on the baseline information collected during the RAP study.

The monitoring reports shall: -

- (i) Provide timely information about all resettlement activities;
- (ii) Identify any grievances that have not been resolved;
- (iii) Document the project resettlement obligations for all permanent and temporary losses;
- (iv) Evaluate whether all PAPs have been compensated in accordance with the RAP requirements
- (v) Document to the PAPs status in comparison to their living standards before physical or economic displacement.

7.7 Land Acquisition Process

The land acquisition will be undertaken in line with the national land acquisition laws and international best practices. The client will involve all relevant stakeholders including the County Governments, NLC and the PAPs. The land acquisition processes are elaborated in the project RAP report which was undertaken concurrently with the ESIA study.

Chapter 8: Anticipated Impacts and Mitigation Measures

8.1 Overview

This chapter focuses on the impacts likely to occur as a result of the proposed construction works and operations of the proposed commuter railway line project. Mitigation measures for the various impacts are also described in this chapter, while management and monitoring of impacts is dealt with in Chapter 8. Construction works will be confined to the existing road reserve (Ngong Road) to the extent possible, however, some sections cut across private/public land hence require acquisition. Construction works will include site clearance, earthworks, construction of underpasses, relocation of service utilities, provision of drainage systems, placement of rail track and construction of railway stations.

Impacts emanating from the construction of commuter railway line project are generally anticipated in social and economic, hydrology/drainage, waste management, water resources, geology and soils, land use and settlement patterns. Improved transportation is expected to largely enhance efficiency passenger movements with far reaching benefits to the residents of the area as well as reduced traffic along Ngong Road. In addition, strategic location of stations will address accessibility challenges as they are located within reach by the community. Construction of crossing structures will not only address safety risks but also traffic challenges. The ESIA aims to identify these impacts for the purpose of mitigating the adverse ones while enhancing the benefits of the project. It should be noted that the overall benefits from the proposed project construction and commissioning outweighs the negative implication of the commuter railway operations. Among the broad areas of impacts include;

- (i) Ecological damage resulting from excavation works at material sites, route deviations, clearance of vegetation along project corridor, spills from storage of equipment (fuel, lubricants and machinery);
- (ii) Natural resources (land and soil, water sources, water quality, biodiversity, air quality, etc.),
- (iii) Nuisance from excessive noise and vibrations
- (iv) Sanitation and solid waste disposal at the construction camps and spoil management are issues that could also impact negatively on the environment if not handled well,
- (v) Physical environment (physiography, hydrology, drainage, materials sites, etc.),
- (vi) Social and economic environment (population patterns, settlement trends, land use patterns, urban trends, economic activities, landownership, public utilities, etc.),
- (vii) Public health, safety and security (disease transfer, HIV/AIDS and STDS),
- (viii) Occupational safety, traffic volumes and public safety, etc.

8.2 Positive Impacts

The commuter railway line construction and associated components will not only benefit the residents living within the project area but also reduce traffic congestions along Ngong Road and ultimately Nairobi CBD, improve accessibility and efficient passenger transportation from one place to another as the project links Nairobi, Langata, Lenana, Karen and Ngong. The following positive impacts will be anticipated during construction and upon completion of the railway project;

8.2.1 Employment Opportunities

Youth employment situation remains one of the key challenges in Kenya. The proposed development will create employment opportunities for casual workers. Establishment of construction camps during mobilization phase will create direct and indirect employment to the locals and the neighbourhood. The construction phase will also create indirect employment to different people including food vendors (especially women) and other small businesses within proximity as well suppliers and services providers. During operations, employment opportunity ranging from guards, cleaners and office workers will be realized.

8.2.2 Sourcing of Construction Materials

Land owners in the area with good construction materials and quarries will benefit from leasing the land as source of materials for the project. This will not only lead to lower costs of the project construction, but also enhance income generation for the local landowners. It is important for the implementing agency to ensure that most of the construction materials should be obtained from the project areas as much as is practicable to enhance economic benefits to the local people.

8.2.3 Increased Business Opportunities

During the project construction phase the locals will have an opportunity to do business directly and indirectly with the project. Workers in the project will need goods and services which will be sourced from the project area including housing and accommodation, food, transport services including taxis, boda-bodas, entertainment services, among others. The project will also offer direct business opportunities for both goods and services to the local businesses. The contractor should source for basic services from the locals in order to boost the local economy.

8.2.4 Increased Government Revenue

Movement of passengers from one point to another is the main objective of the projects and therefore will have a significant impact to the government revenue through payment of fares. Approximately 10,000 passengers are anticipated to use the train daily. However, significant increase in Government revenue will start to be realized during operation phase due to passenger movements.

8.2.5 Increased Land Value

The land value within the project area will improve from development of the commuter railway line and operations of the commuter train. Movements from Ngong to Nairobi CBD has been a challenge from hiked fares by public transport, delays due to increased traffic snarl-ups and congestions hence not attracting investors and general public (residential settlements). With the proposed transport intervention, investors will be attracted to the area to do business and build houses for accommodation. As a result, there will be increased demand for land which in turn will increase its value.

8.2.6 Improved Transport Efficiency

The general members of the public living within the project area are faced with transportation challenges ranging from increased fares, congestion and traffic snarl-ups along Ngong Road and long travel time to the Nairobi CBD. With the completion of the railway construction and commissioning, efficient passenger transportation will be realized, reduced fares as the train transport costs are cheaper in addition to reduced time travel.

8.2.7 Improved Local Economy

It is without doubt that, the transport sector plays a pivotal role in the transportation of goods and services from one destination to another and hence boosting the economy. The railway project will stimulate local economy and improve the quality of life for the people living along the proposed railway from cheap fares and efficient transport system in accessing different places. During construction and operation phase, the local people both unskilled and skilled will be employed in different activities. This will generate income to the people who will be capable of buying and paying for their different needs.

8.2.8 Reduced Emissions

The proposed project will lead to reduction of greenhouse gasses emissions attributed to high vehicular traffic experienced along Ngong Road compared to the use of train. Rail transport has significant low emission level compared to road transport hence reliable and efficient rail transport network will attract high number of passengers translating to low traffic volume along Ngong Road. As a result, the number of vehicles will reduce which in turn will lead to reduced emission levels and carbon footprint.

8.2.9 Knowledge Transfer

Through recruitment of labour, the workers will have an opportunity to learn an array of skills that relate to railway construction and maintenance. This is still regarded as an important positive impact since the individual will then be able to work in other similar assignments.

8.2.10 Other Benefits

- (i) Undertaking soil protection and conservation measures along areas prone to erosion,
- (ii) Reduced generation of greenhouse gases from vehicle emissions
- (iii) Improved travelers' safety since commuter railway services are more secure than road transportation,
- (iv) Provision of drainage systems to manage runoff,

8.3 Negative Impacts (Construction Phase)

The negative impacts brought about by the implementation of the proposed project have fewer appealing effects. These aspects affect the existing environmental conditions through engineered environmental modifications and affect the existing community by causing less tolerable impressions upon them. The immediate community becomes first recipient to the effects since they arise from their immediate surroundings. Mitigation measures should be put in place because their persistence could cause more distasteful conditions that could threaten coexistence of the project with the immediate neighbours. Anticipated negative impacts are discussed below:

8.3.1 Vegetation Loss

The proposed project corridor has vegetation and tree cover. Moreover, the project site clearing activities will result to loss of trees, flower and crops along the railway line corridor. Project section between Tree Lane access road to Karen View Estate access road is observed to have trees aligning the corridor in addition to Ngong Road Forest where the railway line is traversing. Flower vendors to be affected include Komboni Self Help Group while crops (beans, maize, pumpkins etc.) and trees (Gravellia croton, Bluegum and indigenous trees) within the VET farm will be affected.

Mitigation Measures

- ✓ Minimize clearing and disruption of vegetation especially where it can be avoided,
- ✓ Minimize clearing of indigenous tree species,
- ✓ Consider replanting of indigenous plant species in disturbed areas,
- ✓ Undertake a tree count for replacement for any trees cut during construction phase.

8.3.2 Involuntary Land Acquisition

While it is appreciated that the road reserve is adequate for the placement of the railway line, however, within some sections the project will compulsorily acquire some land. In addition, the

railway project will have direct interactions with commercial structures and activities including small scale shops, kiosks, open air yards and hotels within Karen shopping centers. Loss of people's land and other properties is one of the significant impacts in this project. The mobilization phase of the proposed railway project will involve acquisition of land for the railway line, camps and stations. RAP study will be required to address the above impacts:

Mitigation Measures

- ✓ A full Resettlement Action Plan should be done prior to commencement of the railway project,
- ✓ Ensure systematic stakeholder and PAPs consultations and engagements are done prior to the commencement of the project
- ✓ Confine the construction activities as well as railway line alignment to the existing corridor as much as possible,
- ✓ All those who have illegally encroached the road reserves should be given advance notices to vacate and this should be done with a human face and consideration of livelihood restoration,
- ✓ Where land is acquired, those affected should be appropriately compensated in advance, assisted to relocate and their means of livelihoods restored.
- ✓ Undertake comprehensive compensation process and ensure compensation before commencement of the project works.
- ✓ Provide detailed information to affected persons about their rights/ options pertaining to land acquisition

8.3.3 Waste Management

Construction activities at the sites as well as at the camps will generate significant amounts of wastes: solid wastes such as plastic containers, used printer cartridges and papers will be generated from office administrative activities. Within the campsite, waste materials will include bottles, cartons and organic waste (food remains). Spoil materials, dry vegetative matter and concrete debris will be generated during site clearing activities and excavation. Other waste materials may include scrap oils from vehicle servicing and repairs, batteries, oil filters and rags, used tyres and obsolete vehicle and equipment parts.

Effluent waste will be generated in form of both grey and black water by the construction crew within work areas and campsite. If the generated effluent waste is not well managed, it will cause a nuisance in the Project area as it can jeopardize the sanitation and the general health of both workers and the public. In addition, hazardous liquid waste will be generated during construction to include used oil.

Associated waste generation impacts include:

- (i) Clogging of the drainage system by construction materials and silt,

- (ii) Pollution of water resources (oil spills & construction material)
- (iii) Aesthetic degradation and public nuisance at spoil disposal sites
- (iv) Land degradation from pollution,
- (v) Hygiene and health risks
- (vi) Potential breeding of vectors and pests from accumulation of solid materials along the construction corridors,
- (vii) Potential risks of contamination and health problems from waste removed along the construction corridors,
- (viii) Risks to workers safety and immediate residents,
- (ix) Risks to health due to solid wastes dumped on open ground,
- (x) Dusty conditions,
- (xi) Potential effluent spillage due to breakdowns and blockages

Mitigation Measures (Solid Waste)

- ✓ All storage and construction sites are to be kept clean, neat and tidy.
- ✓ Develop and implement a Construction Waste Management Plan for the project with the main objective of waste minimization at source, segregation, recycling and safe disposal
- ✓ All construction camp sites shall have waste management plans and provided with appropriate waste handling receptors
- ✓ Engage a NEMA registered waste service provider for management of waste
- ✓ Spoil generated be disposed off on pre-identified and approved locations (EIA should be done for the locations)
- ✓ Involve relevant County Authorities on the removal and disposal of illegally dumped solid wastes along the project corridor to approved dumping areas
- ✓ Construction camp management to provide an inventory of waste and an acceptable waste management plan,
- ✓ Construction wastes (debris, scrap metals, timber and plastics) should be recycled to the extent possible,
- ✓ Construction vehicles and equipment will be serviced off site at designated and approved servicing locations.

Mitigation Measures (Liquid Waste)

- ✓ All storage and construction sites are to be kept clean, neat and tidy.
- ✓ Ensure that Maintenance is carried out in a well-designed and protected area and where oils/grease is completely restrained from reaching the ground. Such areas should be covered to avoid storm from carrying away spilled oils into the soil/water systems.
- ✓ Provide mobile toilets and strategically place them along the project corridor
- ✓ Install an oil water interceptor within the workshop
- ✓ Ensure sustainable management of waste water through connection to existing sewerage systems or construction of a septic tank,
- ✓ Timely repair of damaged sewer pipelines

8.3.4 Air Quality Impacts

During the construction phase, gaseous and dust emissions will mainly be associated with excavations and earth moving activities, construction truck movements, construction machinery and vehicle engines. The main components of gaseous and dust emissions will be hydrocarbons, CO₂, NO_x, SO_x and Particulate Matter, including Total Suspended Particulates (TSP) and the respirable fraction, namely PM₁₀. Other sources of air emissions include: -

- (i) Dust emissions may also be generated at material borrow areas and quarry sites and the concrete processing plants
- (ii) Exhaust emissions from the contractor's machinery and vehicles
- (iii) Particulate matter could be produced from the shattering and mobilization of the soil surface.
- (iv) Emissions from burning of waste generated during construction

This impact will be manifested within a small stretch along the Project corridor. However, if the emissions exceed the maximum permitted levels in the National Environmental Management and Coordination Act (Air Quality) Regulations, 2014 at source, the scale of air quality impacts could be felt wider than the immediate project area.

Mitigation Measures

- ✓ Ensuring construction equipment are maintained at high working conditions to reduce associated emissions
- ✓ Dust control mechanisms at the gravel borrow sites through extraction in wet conditions and transport in covered trucks
- ✓ Dust control within spoil dumping locations
- ✓ Ensure constant watering of construction surfaces and dry materials to keep dust low throughout the project areas and the deviation routes.
- ✓ Maintain construction machinery and vehicles at reasonable state of service to minimize unnecessary exhaust emission into the atmosphere.
- ✓ Ensure regular watering of the excavation and earth moving areas to control dust,
- ✓ Carry out construction in the shortest time possible to minimize prolonged effects,
- ✓ Ensure all workers are issued with necessary PPEs and enforcement of their use.
- ✓ Drivers to observe speed limits to control dust generation

8.3.5 Noise and Vibration

Currently the level of noise and vibrations within the project area is influenced by vehicular traffic along Ngong Road and commercial related activities within Lenana, Karen, Ngong and Embulbul centers. However, during construction, there will be short-term noise and vibration impacts in the immediate vicinity of the project resulting from: increased traffic volume and movement of construction trucks, rock blasting, operation of heavy construction equipment (graders,

excavators, etc.), generator sets, compactors, vibrators, concreting and mixing. The main sensitive receptors along the Project Road are the residential homes, schools, churches and business premises located along the project corridor. The noise impact associated with construction work will be short term and will end after construction activities. However, increased noise and vibration will have the following impacts: -

- (i) Potential disturbance to residential, commercial and institution premises along the corridor,
- (ii) Potential damage to building structures by vibrations,
- (iii) Potential risks to occupational health and safety of the construction workers.

Mitigation Measures

- ✓ Inform the neighboring communities of any un-usual construction activities with extraordinary noise levels such as to include time, expected duration and any safety precautions,
- ✓ Undertake structural integrity assessment of existing structures along the project corridor so as to control damages due to vibrations,
- ✓ Utilize low noise machinery for the construction to the extent possible (Noise levels be below 35dBA to the nearest receptors by days),
- ✓ Limited blasting for hard stone quarries shall only be done after approval by the relevant authorities and also effective public information,
- ✓ Ensure minimal noise and vibrations along sensitive areas: schools, health facilities and religious institutions,
- ✓ Acquire Noise and Excessive Vibration Pollution Control Permits and notify the public on any event of excessive noise and vibration during the construction,
- ✓ Where alternatives exist, avoid acquisition of burrow/quarry sites within or close to human settlements
- ✓ Provide all construction workers with relevant safety gear including ear muffs at all times while at work and enforce application.
- ✓ The Project to operationalize a grievance procedure in the event of any noise and vibration impact complaints being received.
- ✓ Installation of silencers or acoustic enclosures on machinery, where applicable, such as installation of suitable mufflers on engine exhausts and compressor components as well as the use of portable sound barriers around equipment like generators.
- ✓ Limiting hours of operation for specific equipment or operations (e.g. trucks or machines operating in or passing through community areas).
- ✓ Avoid idling of Project vehicles and equipment when not in use.

8.3.6 Water Pollution

Construction across river systems is likely to pollute the resources due to possible contamination from construction materials (concrete, fill material etc.) and hazardous materials (motor oil).

Sedimentation of the river systems is likely to occur from spoil dumping close to river beds. In addition, erosion from cutting bank slopes has potential to transport silt downstream into water resources causing pollution. The project sections with river crossings (Mutuini, Mbagathi and Isilanke) are likely to experience water pollution.

Mitigation Measures

- ✓ Isolate concrete works near water courses,
- ✓ Avoid washing concrete handling equipment near water courses,
- ✓ Spoil dump should not be established close to water courses,
- ✓ Ensure no leakage from equipment working near water courses
- ✓ Works across water courses should be done during dry season and take shortest time possible.

Water Quality

Construction activities will demand water for the sub-grade formation, dust control and other uses. This requirement is to be met through abstraction from natural sources (river or groundwater). Abstraction of construction water from rivers and streams may create conflict with the community downstream who rely on the resource. In addition, earthwork activities including excavations have a potential of damaging the domestic water supply and sewer network thus contaminating the water supply system. Spoil material if not well managed; will be eroded during rainy seasons into drainage systems with linkage to outfalls (streams and rivers) causing siltation and sedimentation, which will further increase the concentration of suspended solids and turbidity. Leaks and spills of petroleum products from project machines and equipment due to maintenance issues will have potential for surface and ground water resource contamination. The main sensitive receptors of any potential water quality impact are the nearby Mbagathi River and Isilanke stream into which storm water may flow to water intakes and supply network.

Mitigation Measures

- ✓ No water should be abstracted from the public water supply unless it is for drinking and domestic requirements by the workers,
- ✓ The Contractor must adhere to water quality regulations described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006 and Water Act 2016
- ✓ Ensure all water abstractions are permitted by the relevant authority namely WRA.
- ✓ Consider sinking of boreholes for project water provision
- ✓ No discharge of pollutants from any construction activity into surface water bodies.
- ✓ Contain excavated soil materials within the construction areas and away from water resources
- ✓ The contractor to ensure minimal disruptions of water supply network,
- ✓ Immediate response to address any damaged water supply systems
- ✓ Regularly maintain the Project equipment as per the manufacturer's instruction to avoid the possibility of any oil leaks and spills.

- ✓ Method Statements detailing spill emergency response and clean-up procedures for spills should be developed.

8.3.7 Drainage Management

The construction may be faced with challenges of local flooding arising from surface run off from the land topography, outfall linkages and absence of efficient drainage systems. These may affect the quality of work done and slowdown progress if not properly addressed. Future integrity of the railway track in regard to drainage is also dependent on the settings of the drainage channels and outfall linkage, an aspect that has to be addressed during the design and construction phases.

The impacts anticipated on drainage include the following;

- (i) Localized flooding arising from temporary or blockage of surface drainage, especially with respect to the spoil management,
- (ii) Potential soil erosion,
- (iii) Channelized storm water into roadside drains, cross culverts and associated drainage outfalls may cause siltation and outfall damage downstream.

Mitigation Measures

- ✓ Ensure the existing drainage systems across the project corridor are not disrupted during the construction. Where necessary, alternative channels should be identified to channel storm water during construction,
- ✓ Drainage channels and cross culvert structures should be undertaken based on the hydrology of the area, orientation of incoming drainage channels and the flow levels (to determine the invert levels),
- ✓ Split the drainage into short distances between cross culverts to ensure low discharges at the outfalls and check the erosion and damages in the long term,
- ✓ Identify surface water ways, consider acquiring them for drainage provision and ensure linkage to the outfall. In addition, maintain them clear of any growth and or debris to avoid flooding or damage by storm water runoff.
- ✓ Ensure protection of soil adjacent to the side drains and the constructed drainage facilities.
- ✓ The drainage outfalls should be properly constructed to reduce the erosion from surface runoff and storm water.
- ✓ As far as reasonably possible, drainage outfalls should not be directed into private land or premises.

8.3.8 Impacts on Soils

Potential environmental impacts associated with construction activities on soil include soil erosion and soil contamination. Soils along the project corridor are moderately to highly erodible (specifically Ngong area). Clearing of vegetation, excavation works and soil stripping may expose

the soils to wind and water erosion. The nature of the land terrain within the project area (gentle slopes) and loose soils makes it prone to agents of soil erosion especially during the rainy season. In addition, soil erosion from spoil used to cut and fill will lead to siltation of the rivers if not well protected. Hazardous material spills will cause contamination of the soils with substances such as oil, solvents, petroleum products and battery acid.

Mitigation Measures

- ✓ Avoid spoiling close to river beds
- ✓ Exposed slopes to be re-vegetated as soon as possible.
- ✓ Run-off to be diverted away from erosion susceptible slopes to prevent further site degradation.
- ✓ Install soil erosion control measures e.g., scour checks, gabions and plant ground cover vegetation
- ✓ Side drains to be lined with concrete or stone pitched.
- ✓ Embankment of cut and fill sections to avoid erosion.
- ✓ All applicable laws, regulations and standards for the safe use, handling, storage and disposal of hazardous waste to be followed.
- ✓ Areas dedicated for hazardous material storage shall provide spill containment and facilitate clean up.

8.3.9 Construction Material Sites

Railway line construction will require large volumes of aggregate and marram for construction. These materials could be sourced from outside the project area on identified borrow pits and quarry sites by the contractor. Quarrying and excavation activities have significant damage to land (loss of vegetation, visual impacts, loose of top soil, air pollution, noise and vibration as well as the need to reinstate or landscape the borrow sites when the contractors have completed excavation works (which is often overlooked or not enforced). If the sites and pits are exhausted and left open, stagnant water can become breeding sites for mosquitoes; in addition to health risks when the water is consumed by human. The steep sides also pose safety risks such as potential falling and drowning especially of children and livestock.

Mitigation Measures

- ✓ Environmental impact assessments (EIA) to be undertaken prior to extraction of materials from identified sites and approved by NEMA,
- ✓ Ensure provisions of personal protective equipment (PPEs) from dust and noise (dust masks and earmuffs)
- ✓ Operations of the materials sites to be guided by respective management plans established and approved under the ESIA,
- ✓ Material extractions and delivery should only be done during the day,
- ✓ Prepare rehabilitation plan for material sites upon exhaustion or project completion,
- ✓ If borrow pits and quarries are operated, they be fenced off,

- ✓ Rehabilitation of materials sites to take place upon exhaustion (Contractors will provide appropriate rehabilitation plans for each material site),
- ✓ ***If commercial material sources are adopted, the Contractor(s) should ensure due diligence process is followed by the suppliers at all times,***
- ✓ Material extraction and haulage should be done in dump conditions to keep dust low, especially if it is located within settled areas,
- ✓ Consider establishment of boreholes to provide construction water as opposed to abstraction from the constraint public sources.
- ✓ Oil storage areas should be slabbed and provided with oil interceptors and clean exit drains from the camp sites and oil storage yards.
- ✓ Obtain water permit for the identified abstraction point for the construction water.

8.3.10 Construction Camp Sites

At the camp site there will be loss of vegetation due to clearing of land which will resort to soil erosion. Potential land degradation will arise from spills of hazardous liquids, oil and other lubricants from material handling storage leading to ground and surface water pollution. Also waste management will be an issue arising from food remnants and inorganic waste. Waste from the sanitary facility may pose a challenge to the water resources and open grounds if not handled well.

Mitigation Measures:

- ✓ Comply with all laws and by-laws relating to public health and sanitation
- ✓ Ensure proper solid waste management mechanism are applied using the 3Rs reduce, reuse, and recycle.
- ✓ Undertake Environmental impact assessment for all construction sites.
- ✓ The campsite should have a rehabilitation plan after project completion.
- ✓ Re-vegetate the campsite with trees and flowers to ensure aesthetic appearance is improved.
- ✓ Ensure no spillage of oil, lubricants and detergent in the storage area and it so ensure proper deposal methods (oil water interceptors)

8.3.11 Change in Surface Drainage

Clearance of railway corridor during mobilization phase) and construction of public access roads would directly expose bare soil to surface run-off and erosion (particularly if done during the rains). The impact would largely be residual and could contribute to flush floods with potential siltation of receiving water bodies down stream

Mitigation Measures:

- ✓ Unnecessary removal of natural vegetation should not be avoided and should be confined to designated areas

- ✓ Undertake soil protection intervention measures,
- ✓ Drainage systems should be regularly maintained and cleaned free from silt and sediments
- ✓ Ensure re-vegetation of affected areas after construction using native/ indigenous species

8.3.12 Loss of Biodiversity (Flora and Fauna)

Loss of biodiversity will result from cumulative impacts of site clearing, habitat fragmentation, habitat loss and /or alterations and spread of invasive species. Loss of biodiversity is anticipated along the alignment crossing along Ngong Road Forest with potential loss of tree species. The forests are also habitats for monkeys and different bird species. Bee keeping is also practiced within Ngong Road Forest.

Mitigation Measures:

- ✓ Confine construction work within the proposed alignment,
- ✓ Prepare and implement a Biodiversity Action Plan (BAP)
- ✓ Undertake tree count and vegetation specifications along the project corridor set for clearance
- ✓ Screen sources of construction materials by identifying all organism on identified sources
- ✓ Ensure habitat restoration throughout the project footprint,
- ✓ Vegetation clearance should be confined only to necessarily designated sites

8.3.13 Blasting and Rock Excavation

Blasting is used to loosen or breaking rocks for removal. It is used during excavation of bedrock. Potential environmental impacts include dust (air quality), contaminant spills, sedimentation, safety (workers), flying rocks and debris, noise and explosive detonation effects on people and structures. Blasting impacts will be felt around areas close to the quarry.

Mitigation Measures:

- ✓ The blasting contractor to be in possession of all required permits/certificates.
- ✓ Notification to be given to affected parties including the Engineer, site employees and the public prior to each blasting event,
- ✓ Blasting plans to comply with blasting regulations.
- ✓ Transportation, Storage facilities and personnel handling explosives to be in accordance with regulations.
- ✓ The contractor to undertake baseline study to record and ascertain building structures conditions prior to blasting

8.3.14 Greenhouse Gas Emissions

The proposed project related activities such as transportation of materials, energy consumption and construction equipment operations can generate greenhouse gas emissions contributing to climate change

Mitigation Measures

- ✓ Installation of renewable energy systems such as solar to generate on site renewable energy
- ✓ Use of serviceable and efficient transport systems (consolidation of deliveries) for transportation and logistics of construction material, equipment and personnel. Use of rail transport where feasible to transport construction material
- ✓ Retrofitting diesel engines with particulate filters
- ✓ Tracking fuel consumption and Use of low sulphur fuels
- ✓ Conducting emission inventories
- ✓ Pursuit of green building certification standards-LEED (Leadership in Energy and Environmental Design)/ BREEAM (Building Research Establishment Environmental Assessment Method)
- ✓ Implementation of vegetation management and landscaping practices

8.3.15 Climate change adaptation and Resilience

Climate change issues linkages to the project may be viewed at 2No. Levels, namely impacts of climate change to the project and potential contribution of the project to climate change.

Impacts to the Project

Climate change effects could be possible drought and/or extraordinary heavy rains. Heavy rains have potential for possible flash floods and runoff that may exceed drainage structural designs. This may lead to damages of the drainage structures and other facilities. Increased rainfall and absence of vegetation cover exposes land to high erosion especially steep slopes leading to excessive silt transportation, blockage of drainage culverts. Additionally, silt transfer and increased flows downstream may lead to water quality impacts and water resources catchment and intake damages and hence effects to settlements, water supply and habitats.

Impacts from the Project

The project implementation has potential need to limited vegetation removal along the construction corridor. This implies limited reduction of carbon storage. Emissions from construction equipment will contribute carbon into the atmosphere adding to climate change effects. The project implementation will attract immigrants and socio-economic activities into the area, which will lead to increased organic waste generation, wastewater generation and possibilities of open burning for various materials. These are potential source of carbon into the atmosphere.

Mitigation Measures

- ✓ Consider tree planting to replace the lost vegetation and perhaps exceed towards enhanced contribution to climate change mitigation
- ✓ Construction equipment and vehicles should be maintained at high operations levels to ensure minimal carbon emissions,
- ✓ Structural designs for drainage and the bridges should take into consideration climate change effects. In this regard, appropriate projections would be necessary in terms of sizing, locations and orientation, structural strength and numbers.
- ✓ Anticipated population shall be sensitized and made aware of their roles and responsibilities towards climate change mitigation.

8.4 Social Impacts (Construction Phase)

8.4.1 Economic Displacement

The proposed project has the potential to cause economic displacement of wide range of roadside businesses along the project corridor. The businesses include tree seedlings and flower vendors, within a section of the road corridor proposed to be used by the project.

Mitigation Measures

- ✓ Notices should be issued before construction commences to pave way for relocation
- ✓ Resettlement action plan (RAP) to consider livelihood restoration interventions for the PAPs,
- ✓ In case of damages, the contractor should be liable
- ✓ Engage the affected business owners to peacefully relocate to avoid damages
- ✓ Consider allocating them new trading sites

8.4.2 Occupational Health and Safety

During the construction of the proposed project, it is expected that construction workers will be exposed to risks of accidents and injuries as a result of engineering and construction activities including use of machines, use of scaffolding for above ground works, metal grinding and cutting, concrete work, steel erection and welding among others. Among OHS impacts include: -

- (i) Exposure to dust and other emissions that may lead to bronchial and eye infections,
- (ii) Safety risks to the construction workers and public posed by falling and slips,
- (iii) Project drivers' and road user's safety risks associated with materials transportation and equipment operations,
- (iv) Potential health risks from contacts with contaminated runoff and waste materials during construction,
- (v) Potential health risks associated with waste transportation from work areas to disposal sites.

Mitigation Measures:

- ✓ Provide training on relevant safety measures, first aid procedures and emergency response to workers.
- ✓ Provide full package of first aid kits at work places and workers' camps
- ✓ Put warning signs in dangerous corners/sites/sections and other risk areas
- ✓ All workers should be provided with appropriate safety gear and ensure application at all times
- ✓ The contractor should ensure "driver safety" measures at all times e.g. speed limits, good driving practices and routine trucks maintenance,
- ✓ Provide safe and clean drinking water for the construction workers, acceptable and gender sensitive sanitation and hygiene facilities and eating sheds,
- ✓ Ensure safe and health work environment for the construction workers including bearable noise level, dust level, safe movement corridors and access to medical services
- ✓ Ensure supervised removal of waste dumps where necessary for safe handling and disposal,
- ✓ Create awareness and sensitization of the workers and public on the project impacts
- ✓ Ensuring compliance with the Occupational Safety and Health Act 2007 Practice and guidelines
- ✓ Provision of adequate sanitation and shower and clean eating facilities
- ✓ Put in place an occurrence documentation and reporting register at all work sites.

8.4.3 Public Health and Safety

The local public will be exposed to safety risks within the construction areas through traffic accidents, interactions of the construction equipment and environmental pollution, e.g. water and air. Access to high-risk areas by the public including contractors' camp sites, active construction locations and materials sites should therefore be avoided by unauthorized persons. The health impacts will include dust, noise, and vibration from transit construction vehicle, and communicable disease associated with the influx of construction labor. Significant community health and safety issues associated with the proposed project will include pedestrians and traffic safety.

Mitigation Measures:

- ✓ Put barriers and warning signs around open excavations to prevent people from falling into them
- ✓ Sensitize and educate the public on project impacts
- ✓ Undertake visual inspections to confirm that nobody has entered risky sites and hazardous locations, e.g. people sleeping under equipment
- ✓ Put warning signs in dangerous or risky sections, animal crossings and other risk areas
- ✓ Secure all construction sites (camp sites, material sites and construction areas) from the public to ensure security measures are put in place to control access.

8.4.4 Traffic Movement and Safety Interactions

During the construction phase, it is expected that there will be increased vehicle movements in the Project area as trucks will be required to transport materials and equipment. Residents will be disrupted and inconvenienced by detours, local road closures, safety hazards such as deep excavations, especially at the junctions of access roads to homes and business premises, and by increased road traffic along Ngong Road, which will be exacerbated by heavy Project equipment and vehicles.

Mitigation Measures:

- ✓ Traffic signage and information should be placed strategically to warn road users of potential obstructions and safety risks,
- ✓ Provide and maintain appropriate temporary diversions where required
- ✓ Develop a Traffic Management Plan covering the routes to be used by the Project vehicles, vehicle safety, speed limits on roads, driver and passenger behaviour, use of drugs and alcohol, hours of operation, rest periods and location of rest stops, and accident reporting and investigations.
- ✓ Speed limits for construction vehicles should be adhered to along the access roads.
- ✓ Undertake consultations with communities along key transport routes to inform them about the potential for increased traffic movements prior to any changes. Put up road signs such as “Heavy Trucks Turning Ahead” to warn road users of danger/ risk of accidents occurrence ahead especially during the construction phase.
- ✓ If deemed necessary, conduct traffic safety and construction awareness programmes with the public to inform of the potential dangers of vehicles and the construction activities.
- ✓ Prepare and implement an appropriate community Grievance Redress Mechanism (GRM). The GRM should be communicated to all the local community members.
- ✓ Institute an accident incidence documentation and reporting system

8.4.5 Loss of Grazing Land

As indicated in the project baseline, the proposed Ngong Station within VET farm offers grazing land for the local community. Livestock keeping is an economic activity within the project area. During the public meetings, livestock keepers raised concerns on how grazing will be impacted by the proposed project.

Mitigation Measures:

- ✓ KRC to ensure that full information is disclosed about project activities and potential impacts on people’s rights and livelihood in an appropriate way.
- ✓ Clearance of grass to be limited to the construction area to avoid unnecessary destruction and damage
- ✓ The contractor to notify the farmers in advance to enable them harvest their grass in order to avoid unnecessary destruction,

- ✓ Consider compensation for the destroyed grasslands,

8.4.6 HIV/AIDS

Infrastructure construction projects are associated with an increase in sexually transmitted diseases such as STDs and HIV/AIDS due to the influx of immigrant workers interacting with the local people. Among the potential impact areas include;

- (i) Campsite and residential areas with interactions with construction workers
- (ii) Entertainment centers within the project area
- (iii) Institutions of learning and among the youths in the project area

Mitigation Measures

- ✓ Initiatives for awareness creation, training and prevention programmes through construction phase,
- ✓ Establishment of a VCT programmes and or linkages with existing facilities within the project area,
- ✓ Provide appropriate awareness programs including banners, stickers and poster on vehicles, equipment and buildings,
- ✓ Target school going children and colleges with HIV/AIDS awareness messages
- ✓ Protect children from sexual exploitation, especially from the construction workers
- ✓ Network with the public health facilities for support in management and treatment of both HIV/AIDs and STIs
- ✓ Provide prevention and control materials including information, condoms and VCT services.

8.4.7 Disruption of Public Utilities

In order to pave way for the construction activities, the community service infrastructure within the railway line corridor (domestic water supply, sewerage and electricity transmission, optic cable and distribution network) will be relocated as part of the easement process. During this process, the customers supplied by the affected utility may suffer short term temporary disruptions to the provided services. Relocation of utilities is anticipated to be undertaken prior to the commencement of the construction activities. Sewerage infrastructure may not be relocated since its alignment is based on the natural topography/gradient. According to the current railway design there are several level crossing areas and under pass crossing with potential disruption on access roads.

Mitigation Measures:

- ✓ The contractor to facilitated accessibility into residential, institutional and commercial premises,

- ✓ Provide prior and adequate notification to roadside traders and other encroachments to give way for the construction works,
- ✓ Identify possible relocation of services and amenities to be affected by the construction works through involvement of the relevant services providers,
- ✓ Notifications for unavoidable disruptions should be done prior to the service and amenity users for preparedness,
- ✓ Consider having overpasses as opposed to level crossing for busy access roads
- ✓ Communicate the easement plans including implementation schedule to all the affected people in advance
- ✓ Relocate the affected infrastructure in the most efficient manner to minimize the duration of the impact as much as possible.

8.4.8 Impacts on Employment and Procurement

As identified during stakeholder engagement, employment and business opportunities are key concern to the local communities of Lenana and Ngong. They anticipate a number of personnel will be employed by the Project both directly and indirectly across different skills levels, from unskilled, semi-skilled to skilled labour while others will be involved in procurement of project goods and services. However, if the above issues are not properly addressed, they result to conflicts and stalling of the project implementation.

Mitigation Measures:

- ✓ The Project should prioritize the employment of unskilled labour from the local community and all gender and PwD should be as well given equal opportunities as per the national legal provisions.
- ✓ The Project should develop a fair and transparent employment and procurement policy and process that prevent any form of nepotism and favoritism. The policy should be shared with the local community members.
- ✓ The Project should prioritize the procurement of goods and services from the affected Counties as much as possible. In the event that construction materials, goods and services cannot be procured from within the affected Counties, then preference should be given to national (Kenyan) companies.
- ✓ The Contractor in liaison with the Contracting Authority (KRC) should develop and implement an appropriate workers recruitment plan.
- ✓ Recruitment of all the Project workers (including casual workers) must be done through formal processes such as through the office of the Chief and County administrators,
- ✓ Knowledge and technology transfer of the local through capacity building and skills enhancement during the project construction phase.

8.4.9 Gender-Based Violence, Harassment and Vulnerable Segments

The likely forms of gender-related issues that can happen includes discrimination and violence

against women, children and vulnerable/marginalized groups (e.g., elderly, PWDs, etc.), workplace sexual harassment, sexual abuse, unequal opportunities, etc. The sensitive receptors of this impact are mainly the women and girls (including adolescents) seeking employment or working in construction activities because generally they bear the greatest and most direct costs of gender inequalities. Women involved in supporting services to the project workforce are subject to the risk of sexual harassment and rape, especially marginalized women groupings, such as sex workers, immigrants, orphaned adolescent girls and women living in extreme poverty.

There is likelihood of sexual harassment especially from the male workers on the female workers or young girls and women staying in the vicinity of the construction sites or engaged directly in site works. Acts of sexual assault harassment may include unwelcome sexual touching, sexually suggestive or degrading remarks and sexually explicit or abusive language, rape or defilement among others; which may lead to early pregnancies for young girls, increased school dropouts and exposure to sexually transmitted diseases.

Vulnerable groups including PWDs may also be exploited due to their vulnerable nature and the lack of proper means to protect themselves. In some cases, children who are supposed to be at school may be used by the contractor as cheap labour. In addition, there is likely to be developments of relationships between workers and the women of the area that are either engaged or already married, which can result into marriage break-ups and disintegration of families.

Mitigation Measures:

- ✓ Mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 gender rule.
- ✓ Protecting human risk areas associated with, Disadvantaged Groups, interfering with Participation Rights, and interfering with Labour Rights.
- ✓ Proactively and deliberately include women and PWDs in supervisory and management positions.
- ✓ Ensure equitable distribution of employment opportunities between men and women. Employment records disaggregated by sex will be kept by contractor and easily accessed by the monitoring and supervising team,
- ✓ Provide toilets and bathrooms/change rooms with privacy for both male and female workers on camp sites,
- ✓ The contractor should consider skilled and unskilled people living with disability and other disadvantageous groups during employment and hire of service provision,
- ✓ Establishing Gender Help Desk at the construction yard/site/camps and ensuring adequate and transparent referral mechanisms are in place for reported cases at the community level related to project implementation,
- ✓ Effective, on-going and culturally appropriate dialogue and continuous engagement with the communities and different vulnerable groups such as women, girls, and students,

- ✓ Review of specific project components and activities that are known to heighten sexual abuse/harassment/ GBV risks at the community level, e.g. compensation schemes, employment opportunities, women food vendors, influx of sex workers, etc.,
- ✓ Developing and implementing Code of Ethical Conduct for the construction workers and ensuring it is signed by all staff cadres,
- ✓ Sensitization of employees and supervisors about sexual harassment will be undertaken at the beginning of the construction to minimize any possible sexual harassment cases. In addition, continuous reminders and inductions will be made from time to time,
- ✓ Promote women involvement in all stages of project activities and ensure that vulnerable people are involved in taking decisions on matters that affect them directly,

8.4.10 Increased Level of Crime and Insecurity

Crimes and insecurity at construction sites is a common problem. During construction phase, more people from different parts of the country will be recruited by the project to work at different stage of railway construction. As more people migrate into the area social vices such as crime involving (theft of construction materials, mugging etc.) are likely to occur, as they are associated with labour influx.

Mitigation Measures:

- ✓ Contract services of Security Company to guard the campsites and construction materials
- ✓ Involve the local community on matters involving the project to foster sense of ownership
- ✓ Work with relevant security agencies and administrators to foster security
- ✓ Employees to be required to acquire good conduct recommendation letters from their local chiefs

8.4.11 Labour and Welfare Issues

During construction school children around the project area may be lured to engage in petty business and drop out of school. The desire to make quick money coupled by low-income levels at household levels, may pull students into petty trading and/or attempt to engage in construction activities. Further, influx of job seekers into the project area is likely to trigger issues related to forced labour, migrant labour and/or unsatisfactory workers' welfare. This is an indirect, local, and short-term negative impact of low magnitude.

Mitigation Measures

- ✓ The contractor will ensure no under-age children/students are employed in project activities in compliance with the national legislations and ILO conventions requirements. All concerned parties shall collaboratively enforce strict policies and recruitment screening

mechanism prohibiting child labour and any other forms of forced labour throughout construction period,

- ✓ Recruitment protocol for project labor to necessitate the presentation of identification documentation for confirmation of candidates' age (use of national IDs, voter's registration cards, driving licenses, passport, introduction letter from local authority etc.),
- ✓ Due diligence, monitoring and audit of the suppliers and service providers to ensure child labor is absent within the project's supply chains,
- ✓ There will be no forced labour or child labour at the project site. All employees will be aged 18 years and above. Furthermore, employment records will be disaggregated by age and sex,
- ✓ The Contractor, adjacent schools, parents and local governments shall be engaged in raising awareness on issues pertinent to child labour, monitor school attendance to prohibit business trading by children around the construction campsites and works areas,
- ✓ Enforcement of the Child Abuse Protection Plan (CAPP) for the protection of minors against undesirable impacts of the project activities; and,
- ✓ All staff of the contractor, sub-contractors, supply chain must sign Codes of Conduct with clauses committing themselves towards protecting children, which clearly defines what is and is not acceptable behavior.

8.5 Environmental Impacts (Operations Phase)

8.5.1 Solid Waste Management

Railway operations can produce various types of waste, such as maintenance materials, discarded parts, and hazardous waste (e.g., oils, chemicals), requiring proper management and disposal. Solid waste mainly papers, plastic bottles and food remains will be generated at the station office as well as the general public. Improper management may lead to soil and water contamination, and community health safety issues.

Mitigation Measures:

- ✓ Provision of Public waste bins inside the stations' facilities and the train
- ✓ Contract services of a registered NEMA Waste service provider for management of solid and Hazardous waste,
- ✓ Keep records of the annual amount of waste collected by types;
- ✓ Ensure segregation of waste at source before disposal
- ✓ Strict adherence to the laid down guidelines for waste management in the Sustainable Solid Waste Management Act 2022
- ✓ Avoid open burning of solid waste
- ✓ Regular maintenance of train engine

8.5.2 Liquid Waste Management

Liquid waste will be generated at the station from the sanitation facilities. Train stations not served by a convectional sewerage system will construct a septic tank/soak away pit for the management of waste water.

Mitigation Measures:

- ✓ Timely exhaustion of the septic tank once full,
- ✓ Timey repair of broken sewer pipes

8.5.3 Water Ponding Effects

The construction of railway embankment particularly on low lying and flood prone areas will create a ponding effect as the embankment will create a barrier to otherwise free flowing water. Creation of barrier for free moving water will cause damming effect and flooding on the water receiving side of the embankment which may erode the rail embankment causing damages.

Mitigation Measures:

- ✓ Establish series of well-designed culverts to allow free movement of water across rail embankment
- ✓ Ensure that design of bridges and overpasses is based on detailed studies and understanding of catchment characteristics and dynamics
- ✓ Ensure the design incorporates drainage intervention along the railway line to manage storm water
- ✓ Suitable drainage measures will be adopted to drain off the area suitably in the nearby water body.

8.5.4 Pollution Risks

Oil spillage during change of lubricants, cleaning and repair processes, in the maintenance Depot cum workshop for maintenance of rolling stock, is very common. These spills have the potential to contaminate soil and during rainy seasons the spills are washed into water resources causing pollution.

Mitigation Measures:

- ✓ The spilled oil should be trapped in oil and grease trap
- ✓ Contract services of hazardous waste service provider for collection and disposal,
- ✓ Timely repair and maintenance of the locomotive engines

8.5.5 Climate change issues

Climate change linkages include potential contribution of the project to climate change during the operation phase. Emissions from train engine and station equipment will contribute carbon into the atmosphere adding to climate change effects. The project will lead to increased socio-

economic activities within the project neighbourhood, which will lead to increased organic waste generation, wastewater generation and possibilities of open burning for various materials and clearance of vegetation for settlements among other socioeconomic infrastructures and amenities. These aspects have potential climate change impacts.

Mitigation Measures

- ✓ Consider replacing the diesel engines with electrical systems in the long term
- ✓ Engage the local communities to plant more tree in the project neighbourhood as a mitigation measure of climate change,
- ✓ Consider installation of solar power backup systems in the commuter stations,
- ✓ Ensure periodic and scheduled maintenance of the train engines and other machineries in the railway stations including generators and vehicles,
- ✓ Work with all stakeholders so as to ensure coordinated climate change mitigation measures and programs,
- ✓ Initiate and support carbon credit projects within the project area

8.6 Social Impacts (Operational Phase)

8.6.1 Noise and Vibration

The noise impact associated with construction work is short term and will end after construction activities. However, long term impact of noise will be felt during **operation phase** associated with movement of train engines particularly to public residing along the railway corridor. Sources for noise pollution will include rolling noise generated by the contact between wheel and rail during movement and braking and traction noise generated by the engine and cooling fans. Within the stations, potential noise emitters are the power backup generators. Train movement will generate vibration. Although perceptible, ground vibration is generally limited to areas adjacent to the railway track.

Mitigation Measures:

- ✓ Provide workers exposed to elevated noise with PPEs and enforce application of the same
- ✓ Adherence to the provisions of Noise Prevention and Control Rules 2021, legal notice no. 24 regarding noise limits at the work place and NEMA noise and excessive vibration pollution control regulation 2000,
- ✓ Undertake periodic noise measurements so as to ascertain level of noise exposure to the environment
- ✓ Regular inspection and maintenance of the locomotives and cars
- ✓ Regular inspection of the railway tracks
- ✓ Optimizing the average speed of trains to 50km/hour

8.6.2 Air Quality Impacts

The train will operate on diesel hence emission production. The emission will only be limited to the daily number of trips.

Mitigation Measures:

- ✓ Undertake periodic air quality measurements to assess level of exposure to air quality impacts to the environment by the project
- ✓ Use of diesel with low sulphur content,
- ✓ Maintain and service machines and engines

8.6.3 Traffic Impacts

Traffic impacts are anticipated along the level crossings as vehicles will have to wait for the train to pass so as to drive through. The anticipated traffic will have impact to vehicles using Ngong Road as well as access roads

Mitigation Measures:

- ✓ Providing trainings about not entering the level crossing without permission, especially drivers
- ✓ Ensuring that the specified routes are safe, clearly determined and easy to use,
- ✓ Provision of traffic marshals to manage traffic resulting from train movement

8.6.4 Safety Risks

The significant safety issues associated with train operations are derailment and collisions with vehicles and the general public at the level crossing. In addition, falls and slips at the railway stations while boarding the train are other safety risks.

Mitigation Measures:

- ✓ Sensitizing the public on not alighting or boarding a moving train to avoid accidents and injuries
- ✓ Mark the areas with warning signs and barriers at various level crossings,
- ✓ Provision of safety signage along the stations to caution the passengers,
- ✓ The fencing off busy sections of the railway corridor to limit public access
- ✓ Security personnel should regularly patrol the corridor,
- ✓ Appropriate road signage should be provided on approaches to the junctions, at the junctions and along the access road sections,
- ✓ The train should observe minimal speed while approaching stations and level crossings.

8.6.5 Impacts on Labour and Working Conditions

During operations, labour force will comprise of skilled and unskilled. There is need to ensure fair recruitment exercise and the workers' rights are not violated in their day-to-day operations.

Mitigation Measures:

- ✓ Equitable treatment of employees, non-discrimination and equal opportunity
- ✓ To maintain and improve the employee-management relationship
- ✓ To provide safe and healthy working conditions
- ✓ Provision of necessary health requirements
- ✓ Preventing forced labor

Chapter 9: Environmental and Social Management Plan

9.1 General View

While appreciating the benefits on the social and economic front, it will be necessary to recognize the negative implications on the biological diversity and habitats along the project corridor with specific focus on the sensitive ecosystems. The foregoing chapters of this report shows that the commuter railway project poses issues of concern related to social and economic development as well as environmental conservation and for this reason, a comprehensive management plan outline would be necessary on the project implementation. The plan would provide the key environmental and social concerns, appropriate preventive actions and responsibilities, targets to be achieved and where possible estimate of the respective costs. The plan will also provide basic success indicators for monitoring purposes.

This management plan presents the key management principles that then defines a scope of the plan implementation. Broad indications of the responsibilities have also been discussed along with the possible implementation constraints anticipated while detailed actions are tabulated in a

matrix for ease of reference and review. It should also be noted that the matrix is not complete in itself and continuous reviews would be necessary throughout the project implementation period.

9.2 ESMP Objective

Precautions to ensure that damages to the environment are minimized calls for a concerted effort from the project management team, the Contractor(s) and all stakeholders. Upon appointment, the Resident Engineer will be expected to discuss and convey the contents of this management plan, recommended mitigation/interventions outlined under the ESMP and Monitoring plan, instructions from NEMA (as outline in the EIA license) as well as the wishes of the affected members of community to the Contractor and construction workers for integration into the construction process. The County Environmental Offices in the affected counties will also be involved since they have up-to-date valuable information about the environmental and social trends in the area.

In order to implement the management plan, it is recommended that a supervisor is identified to oversee environment and management aspects. The supervisor would also be expected to coordinate and monitor environmental management during construction and provide monitoring schedules during operations;

- (i) Contractor to adopt the ESMP and prepare the C-ESMP followed by integration of the same through the construction work. In addition, the contractor will engage an environmentalist/social expert to monitor the implementation of the management plan on a pre-agreed schedule,
- (ii) The project implementation shall uphold national policies and legal requirements on environment at all times during the project implementation,
- (iii) Ensure the proposed environmental protection measures stipulated in the impact – mitigation matrix is integrated in the project implementation plan to the extent possible, resolve problems and complaints arising from damages and property losses within reasonable timeframes to ensure a smooth flow of construction operations and reduce social conflicts,
- (iv) Implement and continuously review this Environment and Social Management Plan for the benefit of acceptability of the project to all stakeholders,
- (v) Stakeholders will play a role by participating through the Stakeholders Engagement Plan on matters directly affecting them associated with the project implementation.

9.3 Management Principles

The ESMP has been developed to provide a schedule of key environmental and social issues, necessary intervention actions, defining roles and responsibilities, timelines, monitoring indicators and the estimated cost. The project Contractor(s) will be required to prepare separate and specific Construction ESMP (C-ESMP) reflecting the realities of the project implementation for their works

in order to control construction impacts and ensure compliance with applicable environmental and health and safety legislation and standards and recommended actions in the ESMP. Kenya Railways Corporation (KRC) and the respective Construction Supervision team will ultimately be responsible for ensuring that the ESMP is implemented by reviewing the C-ESMP and ensuring its implementation on site via audits.

On the basis of the policy guidelines and the ESMP/C-ESMP among other actions recommended under the ESIA Report, the following will be achieved;

- (i) Preservation to the extent possible the natural environmental and social setting of the project area and surroundings as was before the project commencement,
- (ii) Enhanced integration of environmental, social and economic functions through all aspects of the project implementation,
- (iii) Incorporation of safety health provisions in the project areas including easy accessibility, adequate signage and information systems, OHS provisions and public safety among others,
- (iv) Enhancing the contractor's performance through appropriate supervision and approvals of the ESMP elements and particular regard to the C-ESMP,
- (v) Realization of cordial relations among various community, economic, social and cultural groups as well as between the public systems interacting with the project areas,
- (vi) Enhancing equity and maximizing social and economic benefits for the local community through income generation from employment and other social good practices such as CSR.

9.4 Management Aspects

9.4.1 Responsibilities

The services of an environmental expert may be required to co-ordinate and monitor environmental management during construction and subsequently post monitoring audits.

The responsibility relationship is as follows;

- (i) The Project Supervision will be responsible for all coordination activities and liaisons, particularly in regard to issues of environment, social and safety issues,
- (ii) The Project Manager (Contractor) will be the link with the Supervision on matters of environmental and social nature and is responsible for implementing the Environmental and Social Management Plan established under this report,
- (iii) Due to the nature and magnitude of the project, it would be recommended that a Public Relations Office (PRO) be created on the basis of the ability to directly interact with the local community for social sustainability,
- (iv) NEMA shall be responsible for surveillance of environmental and social aspects of the project implementation. It will be expected that their concerns be communicated to the Project Implementation Agency.

9.4.2 Code of Conduct

A Code of Conduct shall be established by the Contractor taking into consideration the issues, impacts, and mitigation measures identified in relevant documents. The types of issues under the Code of Conduct will include the following among others labour influx, sexual harassment, gender-based violence and maintaining a safe environment.

A Code of Conduct will contain obligations on all project staff and the Contractor should ensure that the workers are sensitized and familiarized with the code of conduct before they append their signatures. Additional obligations may be added to respond to particular concerns of the project location and the sector requirements. The Codes of Conduct will include the Company Code of Conduct, Managers Code of Conduct and Individual Code of Conduct.

It will call for obligatory commitments on all project staff that are suitable to address the following issues among others;

- (i) Commitment to implementation of ESMP,
- (ii) Compliance with applicable national laws, rules and regulations,
- (iii) Compliance with applicable occupational safety and health (OSH) requirements,
- (iv) Non-Discrimination,
- (v) Sexual harassment,
- (vi) Gender Based Violence and/or exploitation,
- (vii) Child Protection,
- (viii) Sanitation requirements,
- (ix) Avoidance of conflicts of interest,
- (x) Duty to report violations of this Code,
- (xi) Non-retaliation against workers who report violations of the Code.

9.4.3 Capacity Building and Training

Continued capacity building and training of the project personnel and contractors is one of the important mechanisms for the enhancement of the project's environmental and social performance throughout the project. A training plan and/or framework should be developed outlining responsibilities with respect to training; identifies (at a high-level) environmental and social training needs; and the process of maintaining a record of training given.

The following are key components of training requirements;

- (i) Environmental and social policy of the project, lenders and World Bank,
- (ii) Environmental and social requirements of the project and how these will be implemented and monitored on site,

- (iii) Contents and relevant requirements of the project actions contained within the ESMP and other applicable sub-management plans,
- (iv) Environmental and social sensitivities in all project components, footprint and surroundings (chapters 2, 4 and 5 above),
- (v) Procedures to be followed in the event of non-compliance with the environmental and social requirements,
- (vi) Process for addressing unforeseen environmental and social incidents; and,
- (vii) Responsibilities with respect to environmental and social issues applicable to their roles.

These requirements should be understood by all project personnel, including all sub-contractors and third parties. Accordingly, training should include;

- (i) Induction training for all staff including modules on health and safety, environmental awareness, accommodation rules, worker code of conduct, stakeholder engagement, grievance mechanisms and cultural heritage awareness,
- (ii) Training on the EHS legal requirements and EHS compliance commitments of the wastewater disposal measures project,
- (iii) Toolbox training for specific topics and tasks,
- (iv) Training for individuals involved in tasks with specific responsibilities.

Refresher training programmes will also need to be implemented to ensure continual improvement in environmental awareness for all project personnel. Training records should be maintained and an assessment of the effectiveness of the training programmes should be included as part of the internal audit procedures.

9.4.4 HIV/AIDS and Gender

The contractor will take the responsibility for providing HIV/AIDS awareness and access to Voluntary Counseling and Testing (VCT) services for the workers and the community members within the project area. It is expected that there will be clauses in the contract binding the Contractor to facilitating these services throughout the contract period. Additionally, in order to safeguard the interest of the girl child and avoid sexual abuse of women in poor households, the Contractor(s) will also be bound to inducting all their workers to the rights of local people especially women and girls to ensure workers' discipline with regard to how they deal with local women.

Equal opportunities to be provided for both men and women, the youth and PwDs in order to reduce conflicts within the community. The contractor to endeavor to achieve the 30% gender rule in employment by adopting pro-women initiatives and by creating a conducive environment which as much as possible will favor women in the project. All gender related conflicts should be addressed conclusively within the shortest time possible by the involvement of local leadership and administrators.

9.5.5 Safeguard Tools and Management Plans

The Environment and Social Management Plan (ESMP) illustrates integration of the construction works issues and for each present practical actions that will be undertaken to realize achievement of the impacts mitigation measures and realizing the Environment, Social, Health and Safety (ESHS) Requirements. The additional supportive management plans/safeguards are applicable during construction and operation, except for the decommissioning, and the Contractor(s) will be required to prepare the same under the C-ESMP in order to reflect the realities of the project implementation. The plans are living documents hence subject to continuous periodic review and updating as required in response to Project evolution, lessons learnt or adaptive management.

The ESMP indicates requirements for development of the following plans among others;

- (i) **Construction ESMP (C-ESMP)** will be a revised version of the ESMP developed under this report reflecting the realities of the project implementation. This will be prepared by the Contractor(s) upon commencement as the basic platform for all other management plans as listed herewith,
- (ii) **Child Protection Plan** is a labour related safeguard that will ensure no under-age are engaged for economic involvement or gainful employment, no abuse by either sexual or exposure to drugs and substances or any other intrusion into the child rights. The plan will entail identification of the labour demands and available workforce in the project area. It will also set appropriate requirements and restrictions that are to be met by the Contractor(s) regarding child rights management,
- (iii) **Code of Conduct** is a code of Conduct will be established by the Contractor taking into consideration the issues, impacts, and mitigation measures identified in relevant documents. The types of issues under the Code of Conduct will include the following among others labour influx, sexual harassment, gender-based violence and maintaining a safe environment. A code of conduct will contain obligations on all project staff and the Contractor should ensure that the workers are sensitized and familiarized with the code of conduct before they append their signatures. Additional obligations may be added to respond to particular concerns of the project location and the sector requirements. The Codes of Conduct will include the Company Code of Conduct, Managers Code of Conduct and Individual Code of Conduct. The Contractor should ensure that the workers are sensitized and familiarized with the code of conduct through preparation and causing all managers and individual workers to append their signatures a Code of Conduct statement singularly or collectively addressing the key issues;
- (iv) **Grievances Redress Mechanism (GRM)** is a tool to be developed as a receptor for complaints arising from the communities and stakeholders regarding one or more aspects of the project implementation. The GRM will constitute participation of the project management (KRC, Contractor(s) and the Supervision Consultant), County Administration (County Commissioner, Deputy County Commissioners, ACCs and the

- Area Chiefs), the community members and relevant government departments. Grievance Redress Committees (GRCs) will be structured to be the management platforms for the complaint's evaluation, processing and resolutions,
- (v) **Community Health and Safety Plan** to provide actions for ensuring the public is not exposed to safety and health risks associated with the project, among them including falls in trenches, exposure to poor water quality, safety risks for construction vehicles and equipment,
 - (vi) **Emergency Preparedness and Response Plans** is a tool for guiding evacuation of workers (and by extension public and/or visitors) in the event of a life-threatening incident such as fire outbreak, infectious disease outbreak, criminal attack and wild animal invasion among others. The preparedness is to clearly mark clear signage/information, exits, fire assembly points and onsite first aid provisions,
 - (vii) **Gender Management Plan** is a safeguard to be established to ensure non-discrimination, gender equity, no sexual violence as well as consideration of people living with disabilities (PWDs),
 - (viii) **Occupational Health and Safety Management Plan** to be guided by the OHS Act in ensuring the welfare of the project construction workers at all times and in all work areas throughout the Construction period,
 - (ix) **Labour Influx Management Plan** it is possible that workers will move into the project areas either permanently, temporal residency or day presence. There are implications to social and economic settings in the project areas including demand on services and amenities, socio-cultural conflicts as well as security issues. The Contractor(s) will prepare the plan to ensure acceptable management of the work force in terms of among other issues housing, transport, access to amenities, etc.
 - (x) **Labour Recruitment Plan** entailing clear documentation of labour requirements, recruitment strategy and management without possible conflicts on distribution, wages' levels and compliance with provisions under the employment and labour legislative laws,
 - (xi) **Compliance Plan** will be prepared to ensure the construction is undertaken within the established laws and regulations in Kenya as well as safeguards under the ESS cited in this report. The most important component of this plan will be a comprehensive Legal Register,
 - (xii) A **Resettlement Action Plan (RAP)** has been developed alongside this ESIA Report. It is a schedule of issues and actions necessary for the identification of affected land or areas of the project, project affected persons, incurred damages/losses, quantification as well as a structured strategy for compensation OR livelihoods restorations, whichever is the case,
 - (xiii) The **Stakeholders and Social Engagement Plan** has been developed but will require review. It is a platform for scheduled involvement and interactions with stakeholders in critical and emergent issues regarding the project,
 - (xiv) **Traffic Management Plan** to be the guide for the vehicular movement related to the project works as well as the management of public vehicles movements within the proximity of the project areas.

- (xv) A **Waste Management Plan** will be prepared to cater for safe collection and acceptable disposal of various waste materials anticipated from the project implementation,
- (xvi) **Site Closure and Restoration Plan** to provide guidance on project termination with instructions on rehabilitation of damaged sites, restoration of disrupted services and access roads, ensuring safety restorations, etc.,

9.5 Environmental and Social Management Plan (ESMP Matrix)

The matrix below provides an outline of the project aspect, associated issues and considered key management actions. Other components include responsibilities, timelines and cost estimates on the implementation of the management actions.

Table 12: ESMP Matrix (Construction Phase)

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
.1.	Vegetation Loss <ul style="list-style-type: none"> ▪ Potential siltation of drainage systems and water resources ▪ Soil erosion, ▪ Loss of habitat Sources <ul style="list-style-type: none"> ○ Entire project corridor ○ Material sites ○ Camp sites 	<ul style="list-style-type: none"> ✓ Trees should be trimmed rather than completely cut wherever possible; ✓ Vegetation clearance should be confined to project construction corridor, ✓ Undertake a tree count throughout the corridor for replacement, ✓ Establish a rehabilitation plan for material and camps site, ✓ Plan for landscaping and beatification programme for the project corridor 	Daily	Contractor	<ul style="list-style-type: none"> ▪ Habitat regeneration ▪ Minimal vegetation clearance, ▪ Improve general aesthetics 	2,000,000
2.	Loss of Land, Assets and Properties <ul style="list-style-type: none"> ▪ Potential conflict with land owners, ▪ Loss of grazing ground, ▪ Potential damage of properties and structures ▪ Disruption of livelihoods and income Sources	<ul style="list-style-type: none"> ✓ Undertake RAP study ✓ Provide detailed information to affected persons about their rights/ options pertaining to land acquisition, ✓ Provide fair, prompt and effective compensation at full replacement cost ✓ Have a livelihood restoration program ✓ Acquire only land necessary for the proposed project (including access roads), 	Daily	KRC	<ul style="list-style-type: none"> ▪ Minimal conflicts with land owners, ▪ Fair compensation process, ▪ Avoidance of project delays ▪ Harmony within the community ▪ Functional GRM systems 	As per the RAP Valuation Report

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<ul style="list-style-type: none"> Sections of project corridor VET, Embulbul, KBC, Ngong road forest, Lenana 	<ul style="list-style-type: none"> ✓ Confine construction and operation activities within designated ROW, ✓ Stakeholder and PAPs engagement plan ✓ Create awareness to herders on potential pasture loss ✓ Operationalize a GRM 				
3.	Solid Waste Management <ul style="list-style-type: none"> ▪ Public nuisance ▪ Poor aesthetic ▪ Public health issues ▪ Pollution (land air and water) ▪ Blockage and clogging of drainage systems Sources <ul style="list-style-type: none"> o Spoil disposal o Material sites o Camp site o Entire construction corridor o Specific Wastes (oil, grease) 	<ul style="list-style-type: none"> ✓ The Contractor(s) to develop waste management plans and provide appropriate facilities for their operations, ✓ Contract a waste handler service provider for waste management, ✓ Provision of waste receptors within the campsite, ✓ Composting of organic waste to use as soil additive, ✓ The spoil disposal sites should be approved by RE before commencement of dumping, ✓ Sustainable handling, transportation and disposal of Hazardous waste, ✓ Recycling of construction materials to extent possible, 	weekly	Contractor	<ul style="list-style-type: none"> ▪ Minimized waste generation, ▪ Sustainable waste disposal, ▪ Nil dumping of waste on open environment, ▪ Avoidance of pollution impacts to the environment, ▪ Improved aesthetic value, ▪ Minimal public complains. 	1,500,000
4.	Liquid Waste Management	<ul style="list-style-type: none"> ✓ Repair and maintenance of sewer pipes in the camp site, 		Contractor	<ul style="list-style-type: none"> ▪ Nil water and soil pollution, 	

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<ul style="list-style-type: none"> Soil contamination from oil spills Water pollution from sewerage overflow and spills Siltation from surface run off <p>Sources</p> <ul style="list-style-type: none"> Camp and material sites Drainage channels Sewer lines Batching plant Vehicle repair garages or workshops 	<ul style="list-style-type: none"> ✓ Timely exhausting of septic tank, ✓ Provision of appropriate sanitary facilities for the workers, ✓ Notify the RE of any pollution incidents on site, ✓ Prevent runoff loaded with silt and sediments from site to water resources, ✓ Dispose waste water containing pollutants (cement concrete and lime) into conservancy tank for safe removal, ✓ Provide an oil-water interceptor at the workshop and fueling points 	Monthly		<ul style="list-style-type: none"> Effective liquid waste management Acceptable aesthetics Minimal public complains. 	500,000
5.	<p>Air Quality Impacts</p> <ul style="list-style-type: none"> Public health Issues Visual intrusion Dust deposition on buildings and plants Reduced visibility <p>Sources</p> <ul style="list-style-type: none"> Earth works activities Materials sites (crusher) 	<ul style="list-style-type: none"> ✓ Materials extraction under damp conditions, ✓ Undertake a baseline for air quality status, ✓ Clear vegetation only from those areas necessary for construction work to occur; ✓ Maintenance and repair of construction machinery, ✓ Sprinkle stock piles with water and keep them covered in dry Weather, 	Daily	Contractor	<ul style="list-style-type: none"> Improved public and workers health, Limited visible particulate matter in the air, Minimal complaints from the public, Reduced air quality impacts, Minimal public complains. 	1,000,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<ul style="list-style-type: none"> Open burning of waste Vehicles and construction equipment 	<ul style="list-style-type: none"> ✓ Comply with all the provisions of EMCA Air Quality Regulations (2014), ✓ Regulate vehicular speed to check on dust generation, ✓ Provide workers with appropriate PPEs. 				
6.	Noise and Vibration Impacts <ul style="list-style-type: none"> Public health Issues Potential structure damage Worker's health issues Disturbance to neighbouring residents Sources <ul style="list-style-type: none"> Operations by heavy machinery and trucks Compaction of railway track Material sites (quarry blasting) 	<ul style="list-style-type: none"> ✓ Confine the works to day time to the extent possible to avoid conflicts with settlements, ✓ Provision of PPEs to the workers, ✓ Maintenance of construction vehicles and machineries, ✓ Blasting to be done away from developments, ✓ Comply with all provisions of the EMCA (Noise and Excessive Vibrations) Regulations 2009, ✓ Undertake noise measurements ✓ Avoid unnecessary hooting by project vehicles within 200m from noise sensitive receptors, ✓ Notify the public of any unusual noise or vibrations, ✓ Prepare baseline conditions for building structures likely to be affected by construction vibrations. 	Daily	Contractor	<ul style="list-style-type: none"> Safe working and living environment, Low noise levels, Public awareness on noise and vibration, Minimum disturbance to general public, Minimal public complains. 	1,000,000
7.	Drainage Management <ul style="list-style-type: none"> Potential blockage of surface drains 	<ul style="list-style-type: none"> ✓ Review drainage design for effective functionality upon railway completion, ✓ Prevent siltation of streams to the extent possible, 	Monthly	Contractor	<ul style="list-style-type: none"> Uninterrupted flow of runoff into natural drains, No conflicts with downstream users, 	

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<ul style="list-style-type: none"> ▪ Potential for local flooding ▪ Soil erosion and damages on drainage outfalls ▪ Potential siltation of water resources Sources <ul style="list-style-type: none"> ○ Earthworks, ○ Structures construction works ○ Spoil dumping ○ Material sites ○ Solid waste 	<ul style="list-style-type: none"> ✓ Undertake soil protection works, ✓ Ensure drainage channels do not discharge into private land to avoid conflicts, ✓ Regular maintenance and cleaning of drainage systems ✓ Use existing natural outfalls 			<ul style="list-style-type: none"> ▪ Nil local flooding ▪ Minimal public complaints, ▪ Functional drainage systems 	2,000,000
8.	Water pollution <ul style="list-style-type: none"> ▪ Siltation of water resources ▪ Water contamination from oil spills ▪ Water quality degradation, ▪ Effects on downstream dependants, ▪ Potential public health risks Sources <ul style="list-style-type: none"> ○ Earthworks, 	<ul style="list-style-type: none"> ✓ Adhere to water quality regulations – Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006; ✓ Regular maintenance of machinery, ✓ Pave maintenance workshops with concrete and install oil interceptors along drainage channels, ✓ Ensure proper disposal of scrap oil and grease, ✓ Ensure community complaints related to water abstraction activities are promptly mitigated; 	Monthly	Contractor	<ul style="list-style-type: none"> ▪ Adherence to WRA Standards, ▪ Nil pollution on water resources, ▪ Minimal public complaints 	1,500,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<ul style="list-style-type: none"> ○ Silt from earth moving, ○ Oil and grease from construction machinery, ○ Wastes emanating from construction site camps and workshops, ○ Abstraction points for construction water 	<ul style="list-style-type: none"> ✓ Spoil disposal should not be close to water resource, ✓ Ensure valid permits on construction water abstraction ✓ Prepare and review Effluent Discharge Control Plan (EDCP) for all camp sites 				
9.	Material and camp sites <ul style="list-style-type: none"> ▪ Land degradation ▪ Loss of vegetation cover ▪ Surface hydrology changes ▪ Access roads damages ▪ Health and safety risks, ▪ Poor aesthetic, ▪ Conflict with land use 	<ul style="list-style-type: none"> ✓ Undertake environmental and social assessments on all camp and material sites with comprehensive management plans (including restoration strategies), ✓ Obtain relevant approvals and licenses from (NEMA) for all material and construction camp sites. ✓ Obtain appropriate abstraction permits for construction water from WRA, ✓ Landowners entering into lease agreements on materials extraction should reflect the responsibility for rehabilitation of the material sites; ✓ Prepare comprehensive material abstraction and/or procurement agreements for the materials sites 	Project Planning Stage	Contractor	<ul style="list-style-type: none"> ▪ To ensure compliance ▪ Environmental protection ▪ Site restoration ▪ No public complaints 	500,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
		with landowners to maintain land usability thereafter; ✓ Identify materials haulage routes and ensure maintenance of the roads, dust control and safety precautions.				
10.	Soil Erosion <ul style="list-style-type: none"> ▪ Water resource Catchment damages ▪ Silt transfer downstream ▪ Blockage of culvert crossings ▪ Landslides along steep sections ▪ Erosion from spoil pile up Sources <ul style="list-style-type: none"> ○ Earth works activities ○ Drainage channels ○ Cut and fill activities 	<ul style="list-style-type: none"> ✓ Monitor regularly areas susceptible to erosion, ✓ Undertake soil conservation/protection interventions, ✓ Vegetation clearance to be confined to the project corridor, ✓ Avoid earthworks during wet seasons that increase susceptibility of soil erosion and collapse of embankments, ✓ Cut areas susceptible to erosion should be protected immediately after the works, and works should not be prolonged at such sites unnecessarily, ✓ Maintenance and regular cleaning of culvert crossings, ✓ Adhere to specified cut and fill gradients and consider revegetating embankments, ✓ Spoil dumps not to be located close to water resources 	Daily	Contractor	<ul style="list-style-type: none"> ▪ Minimal soil erosion, ▪ Reduced siltation of water resources, ▪ Minimal conflict with general public, ▪ Controlled silt transfer to the water resources, ▪ Clean and clear drainage systems ▪ Nil land slides 	1,500,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
11.	Traffic Interactions <ul style="list-style-type: none"> ▪ Road safety risks from construction works, ▪ Planning and maintenance of traffic deviation sections, ▪ Health risk from dust generation Sources <ul style="list-style-type: none"> ○ Diversions ○ Construction sites ○ Material haulage access roads 	<ul style="list-style-type: none"> ✓ Prepare a collaborative Traffic Management Plan, especially at the level crossing with existing main roads, ✓ Watering all active road works areas including diversions as necessary, ✓ Partnership with road agencies to manage traffic ✓ Works not to block access to properties, if unavoidable provide alternative access, ✓ Construction vehicles to observe minimal speed limit in high population areas, ✓ Install effective signage and information along the works areas including diversions ✓ If deemed necessary, conduct traffic safety and construction awareness programmes with the schools to inform learners of the potential dangers of vehicles and the construction activities. ✓ Prepare and implement an appropriate community Grievance Redress Mechanism (GRM). The GRM should be communicated to 	Daily	Contractor	<ul style="list-style-type: none"> ▪ Improved workers and public health, ▪ Efficient traffic movement, ▪ Minimal conflict between road users, ▪ Reduced accidents, ▪ Uninterrupted traffic flow 	2,000,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
		all local community members and stakeholders.				
12.	Oil leaks and spills management Common at the camp sites, equipment maintenance grounds and fuel stations Sources <ul style="list-style-type: none"> o Lack of regular servicing of machinery o Poor storage of oil in maintenance areas 	<ul style="list-style-type: none"> ✓ Regular maintenance of machinery, ✓ Ensure proper disposal of scrap oil and grease, ✓ Pave maintenance workshops with concrete and install oil water interceptors along drainage channels, ✓ Provide drip/oil trays in the workshop 	Weekly	Contractor	<ul style="list-style-type: none"> ▪ Reduced leaks and spills to the ground ▪ Protection of soil and water from oil and grease leaks ▪ Prevent water pollution from drainage discharge 	800,000
13.	Blasting Impacts <ul style="list-style-type: none"> ▪ Public health risks (hearing challenges, shocks) ▪ Potential structure damage ▪ Dust generation ▪ Land degradation Sources <ul style="list-style-type: none"> o Quarry site 	<ul style="list-style-type: none"> ✓ In case blasting is required, the Contractor will seek authorization from the Department of Mines and Geology; ✓ The Contractor should engage a licensed blaster for all blasting and rock splitting operations; ✓ The Contractor shall notify neighbors before blasting; 	During Blasting Activities	Contractor	<ul style="list-style-type: none"> ▪ Minimal structure damage ▪ Minimal public complaints 	250,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
14.	Climate change <ul style="list-style-type: none"> Construction activities Project drainage structures and infrastructures 	<ul style="list-style-type: none"> ✓ Initiate tree planting to replace the lost vegetation ✓ Maintenance of construction equipment and vehicles, ✓ Climate change sensitive designed and constructed drainage structures and infrastructures ✓ Collaboration with other stakeholders in climate change mitigation measure or actions 	Throughout project construction phase		<ul style="list-style-type: none"> Environmental tree compensation Minimal carbon emissions Climate change sensitive structure and infrastructure 	500,000
15.	Safety and Health Risk to Workers <ul style="list-style-type: none"> Potential personal accidents and injuries, Potential health risks (OHS related diseases), Fire outbreaks, Occupational hazards (emissions, sanitation), Sources <ul style="list-style-type: none"> Sanitation facilities Construction equipment and vehicles 	<ul style="list-style-type: none"> ✓ Prepare a safety and health plan including an incident register, ✓ Provision of insurance cover to the workers, ✓ All workers to be provided with appropriate PPEs and enforce application of the same at all times while at work, ✓ Provide signage and safety information in all work areas, ✓ Provision of firefighting appliances within campsite, ✓ Provide temporary toilets and bathrooms for the construction workers at the work sites, ✓ Provision of safe and portable drinking water, 	Daily	Contractor	<ul style="list-style-type: none"> Safety awareness, Minimal accidents and injuries, Recording and addressing of incidents, Fire emergency preparedness, 	2,000,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<ul style="list-style-type: none"> Material sites Camp sites 	<ul style="list-style-type: none"> ✓ Ensure at least 1No. worker is familiar with First Aid procedures at every work area, ✓ Undertake fire safety, first aid training and safety procedures awareness. 				
	<p>Safety and Health Risk to the public</p> <ul style="list-style-type: none"> ▪ Potential personal accidents from fall and slips ▪ Potential health risks (dust and emissions) ▪ Potential death from drowning <p>Sources</p> <ul style="list-style-type: none"> Sanitation facilities Construction equipment and vehicles Material sites Camp sites 	<ul style="list-style-type: none"> ✓ Provide appropriate safety signage and information in all work areas ✓ Create public safety and health awareness campaigns ✓ Restrict through barriers and/or scaffolding ✓ Provide alternative public accesses where disrupted ✓ Disruptions be kept short ✓ Rehabilitation of material sites ✓ Isolate the site for access by the local communities during the construction for their safety and health protection ✓ Deploy traffic marshals in all active construction sites 	Daily	Contractor	<ul style="list-style-type: none"> ▪ Safety awareness, ▪ Minimal accidents and injuries, ▪ Minimal public complaints ▪ Minimal traffic conflicts and snarl ups. 	300,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
16.	Labour and Employment <ul style="list-style-type: none"> Discrimination on employment opportunities Public complaints, infringement of workers right Unfavorable working conditions Potential conflicts on wage levels, Gender equity challenges Child labour challenges Indiscrimination of PWDs Sources <ul style="list-style-type: none"> Skilled worker Professional labour Non-skilled labour Local community Stakeholders 	<ul style="list-style-type: none"> ✓ At least 60% of the labour force to be locally sourced to the extent possible, ✓ Preparation of a Labour Influx Management Plan, ✓ Preparation of a Labour Recruitment Plan with a staff requirement schedule, ✓ Provision of engagement contracts to all worker ✓ There should be measures in place on dismissals of workers when necessary ✓ Ensure compliance with Gender balance requirements ✓ Preparation of Gender Management Plan ✓ Equity and no discrimination ✓ Involvement of the community in combating and addressing gender conflicts ✓ Allow opportunities for PWDs ✓ Provide appropriate amenities infrastructure suitable for PWDs ✓ Adopt the established wage guidelines by the Government ✓ Ensure strictly no child labour 	Daily	Contractor	<ul style="list-style-type: none"> Fair recruitment of labour in the project, Adhering to the labour laws, Avoid conflicts during recruitment, Create project sense of ownership Minimal workers complaints Zero tolerance to GBV, Harassment and sexual crimes 	600,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
		<ul style="list-style-type: none"> ✓ Code of Conduct on avoidance of GBV and child labour signed at all levels of workers, ✓ Have a gender reporting desk ✓ Workers to be free to join any workers union or form a workers welfare group ✓ Capacity built the locals through knowledge transfer and skills enhancement 				
17.	Social and Economic <ul style="list-style-type: none"> ▪ Potential livelihoods and road side activities disruptions ▪ Social relationships and contacts during construction; ▪ Temporary disruption to accesses into and out of adjacent premises and settlements; 	<ul style="list-style-type: none"> ✓ Affected persons may be requested to give way for the construction works ✓ Emergent losses of income as a result to be addressed through the RAP recommendations ✓ Enhance collaboration with communities on construction activities affecting them through established Community Liaison Committees ✓ Follow up on RAP Implementation ✓ Stakeholder engagement and project awareness creation 	Daily	Contractor	<ul style="list-style-type: none"> ▪ Minimal conflict with the public ▪ Full implementation of RAP ▪ Collaborative environment between the project and stakeholders 	No direct cost
18.	HIV/AIDS and STI Prevalence risks following emergent	<ul style="list-style-type: none"> ✓ Contractors to prepare and rollout HIV/AIDS awareness programmes including awareness/sensitization, prevention, VCT services, etc. 	Daily	Contractor	<ul style="list-style-type: none"> ▪ Zero transmission of social related diseases; 	2,000,000

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<p>interactions of workers and residents</p> <p>Prevalence levels with influx of workers into the project area</p> <p>Sources</p> <ul style="list-style-type: none"> ○ Labour influx in the project ○ Lack of awareness ○ Lack of HIV/AIDS related Services 	<ul style="list-style-type: none"> ✓ Liaise with relevant agencies for testing and training ✓ Provision of preventive measures to include condoms 			<ul style="list-style-type: none"> ▪ Awareness Creation of HIV/AIDS and STIs program ▪ Collaborative working relationship with all stakeholders 	
19.	<p>Public Utilities Disruptions</p> <ul style="list-style-type: none"> ▪ Complaints from the public due to loss of income (businesses) in relation to: - ○ Water supply ○ Electricity ○ Sewerage system ○ Internet Network <p>Sources</p> <p>Construction works and transport/haulage corridors</p>	<ul style="list-style-type: none"> ✓ Undertake inventory of existing utilities in the project area before the beginning of construction; ✓ Relocation of services, if needed, should be provided for in the Bill of Quantities (BoQ); ✓ Notices should be given to the utility users prior to any interruption in supply, ✓ Collaboration with the services providers in mapping and relocation of services 	Throughout project construction phase	Contractor	<ul style="list-style-type: none"> ▪ Minimize public complaints ▪ Avoid delays ▪ Good working relationship with utility providers 	No direct cost

Item No.	Anticipated Impacts	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
20.	Stakeholder Engagement <ul style="list-style-type: none"> Public concerns and conflicts Communication challenges Public acceptability of the project Project implementation delays 	<ul style="list-style-type: none"> ✓ Prepare and implement a Stakeholders Engagement Plan, ✓ Establish a Grievance Redress Desk, ✓ Constitute a Grievance Redress Mechanism (GRM) 	Throughout project construction phase	Contractor	<ul style="list-style-type: none"> Stakeholder involvement during and after project implementation, Conflict resolution mechanism, Functional GRM Stakeholder involvement in the project cycle 	1,000,000
Estimated Cost for ESMP Implementation						20,950,000

NOTE: *The ESMP costs are raw estimates based on scenario predictions for planning and budgetary purposes. Actual costs will be established through the C-ESMP prepared by the Contractor upon appreciating the realities of the project*

Table 13: ESMP Matrix (Operation Phase)

Item No.	Issues and Causes	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
1.	Waste Management <ul style="list-style-type: none"> ▪ Potential blockage of drainage systems ▪ Poor aesthetics ▪ Illegal waste dumping Sources <ul style="list-style-type: none"> ○ Railway stations 	<ul style="list-style-type: none"> ✓ Provision of appropriate solid waste collection and disposal systems ✓ Contract services of registered NEMA solid waste service provider ✓ Encourage and sensitize passengers on importance of waste management ✓ Comply with the sustainable solid waste management ACT 2022 	Daily	KRC	<ul style="list-style-type: none"> ▪ Sustainable solid waste management systems ▪ Clean environment ▪ Compliance to solid waste laws and regulations ▪ Acceptable aesthetics 	150,000 pm
2.	Liquid waste management <ul style="list-style-type: none"> ▪ Potential ground and service water pollution ▪ Poor aesthetics ▪ Public health risk Sources <ul style="list-style-type: none"> ○ Sewerage systems ○ Railway Stations ○ Storm water ○ Drains 	<ul style="list-style-type: none"> ✓ Timely exhausting of septic tank ✓ Repair and maintenance of damaged sewer systems ✓ Maintenance of open drains ✓ Storm water management 	Weekly	KRC	<ul style="list-style-type: none"> ▪ Nil waste water spills 	100,000 pm
3.	Pollution risks (oil spills and leaks) <ul style="list-style-type: none"> ▪ Ground and surface water contamination 	<ul style="list-style-type: none"> ✓ Maintain drainage channels free of pollutants ✓ Maintenance of train engines and generators 	Daily	KRC	<ul style="list-style-type: none"> ▪ Minimal pollution ▪ Safe environment 	100,000pm

Item No.	Issues and Causes	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<ul style="list-style-type: none"> Potential public health risks <p>Sources</p> <ul style="list-style-type: none"> Workshops Railway station Railway track Generators 	<ul style="list-style-type: none"> ✓ Provision of oil drip trays for oil collection at the workshop ✓ Develop a spill prevention and response plan ✓ Reporting of spill incidents to relevant authority ✓ Have adequate spill kits equipment to handle large amount of oil spill ✓ All spills to be cleaned up as soon as possible ✓ Contract services of hazardous materials disposal provider 				
4.	<p>Noise and Vibration</p> <ul style="list-style-type: none"> Potential structure damages Public nuisance (disturbance) public health risk <p>Sources</p> <ul style="list-style-type: none"> Generator Train movement 	<ul style="list-style-type: none"> ✓ Avoid idling of engines ✓ Provide staff with appropriate PPEs ✓ Maintenance of engines and generators ✓ Undertake noise measurement annually along the railway corridor 	Annual	KRC	<ul style="list-style-type: none"> Compliance to noise regulation Minimal public complains Favorable working conditions No structure damages 	400,000
5.	<p>Air quality Impacts</p> <ul style="list-style-type: none"> Environmental pollution public health risk <p>Sources</p>	<ul style="list-style-type: none"> ✓ Maintenance of engines and generators ✓ Avoid solid waste burning ✓ Undertake air quality measurements bi- annually 	Bi-annual	KRC	<ul style="list-style-type: none"> Clean environment Compliance of air quality regulation 	300,000

Item No.	Issues and Causes	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
	<ul style="list-style-type: none"> Generator Train engine Open burning of waste 					
	Climate change <ul style="list-style-type: none"> Train Operation activities Commuter stations Neighbourhood socioeconomic activities 	<ul style="list-style-type: none"> ✓ Servicing of the train engines on schedule ✓ Install solar power backup systems ✓ Work with other stakeholders to plant trees ✓ Transit the train engines to electric power systems in future ✓ Initiate carbon credit projects ✓ Work with relevant government ministries to enforce physical planning measures 	Monthly		<ul style="list-style-type: none"> ▪ Clean environment ▪ Minimal climate change elements ▪ Involvement of local stakeholders in climate change mitigation measures ▪ No. Carbon credit initiatives 	1,500,000
6.	Traffic Impacts <ul style="list-style-type: none"> ▪ Potential accidents ▪ Traffic jams ▪ Loss of travel time ▪ Potential air quality impacts (emissions) Sources Level crossings Along main and access roads	<ul style="list-style-type: none"> ✓ Installation of visible St. Andrews level crossing signage for road users ✓ Speed restriction near level crossing ✓ Installation of traffic calming measures (rumble strips) on access roads near level crossings 	Daily	KRC	<ul style="list-style-type: none"> ▪ Minimal accidents ▪ Limited traffic ▪ Safe passage for road users 	200,000

Item No.	Issues and Causes	Management Actions	Frequency of Monitoring	Responsibility	Monitoring Targets to Achieve	Cost Estimates (KShs.)
7.	Safety <ul style="list-style-type: none"> ▪ OHS risks ▪ Potential accidents and injuries ▪ public health risk Sources <ul style="list-style-type: none"> ○ entire project corridor ○ railway stations ○ level crossings ○ encroachments 	<ul style="list-style-type: none"> ✓ provide workers with appropriate PPEs ✓ OHS trainings for workers to include First Aid, Fire safety ✓ Prepare an emergency response and preparedness plan ✓ Provision of warning and information signage ✓ Provide workers with clean and safe drinking water ✓ Installation of firefighting equipment ✓ Display of emergency numbers within the stations ✓ Secure areas vulnerable to encroachments 		KRC	<ul style="list-style-type: none"> ▪ Ensure workers safety ▪ Minimal cases of accidents ▪ Compliance with OHS Act 2007 ▪ Zero tolerance to railway corridor encroachments 	600,000
8.	Security <ul style="list-style-type: none"> ▪ Vandalism of Railway Infrastructure ▪ Access to sensitive areas ▪ Safety of commuters and services ▪ Encroachments 	<ul style="list-style-type: none"> ✓ Contract security services from reputable firms to guard the infrastructure ✓ Regular patrols around the facility by security personnel ✓ Sensitize the workers and public on security matter ✓ Collaborate with the security personnel (police) in case of theft 	Daily	KRC	<ul style="list-style-type: none"> ▪ No theft ▪ Foster infrastructure ownership by the public 	120,000pm

Chapter 10: Conclusions and Recommendations

10.1 Conclusions

The implementation of the proposed Riruta – Ngong MGR commuter railway including associated components represent a significant infrastructure linking the targeted towns (Riruta, Karen, Embulbul and Ngong) to the Nairobi Central Business District. The proposed project is anticipated to decongest Ngong Road hence reducing traffic snarl-ups by providing efficient and faster means of transport as well as improving the livelihood of residents through provision of alternative and affordable means of transport. Environmentally, the proposed project will reduce generation of greenhouse gases into the atmosphere brought by emissions from vehicles as a result of fossil fuel combustion. Though the train will run on diesel fuel, the emissions will not be significant compared to the number of vehicles operating within the project area, since the train is anticipated to ferry about 10,000 passengers every day. Socially and economically the proposed project will contribute to growth and development of the area as the land values will appreciate as more people and socioeconomic activities will be attracted to the project area. Other social benefits will include increased businesses opportunities, growth of construction industry, increased revenue by the government etc. The proposed project has addressed safety challenges by providing separation of crossing gradient through under passes to facilitate safe vehicle and train movements.

The proposed project will have significant positive impacts such as ease of transportation and decongestion of the roads. However, the ESIA Study has identified negative impacts likely to occur due to the implementation of various project activities. Such impacts include loss of land (grazing land) and other public and private properties, utilities disruptions, and forest habitat loss. It is for this reason that an Environmental and Social Management Plan (ESMP) has been developed to provide a policy direction on compliance by mitigating the project impacts. This ESMP is to be adopted with necessary amendments throughout the project cycle. The costs for implementing mitigation and monitoring plan have also been prepared together with responsible institutions and the timeframe for implementing various corrective measures. The ultimate goal is to enhance the foreseen benefits that the proposed project will produce including environmentally, socially and economically.

The proposed development will have a social linkage due to the nature of its locality. The project will be expected to interact and co-exist with the neighbouring communities, especially considering the anticipated growth in population density upon operations commencement. As a result, influencing on the land use practices and patterns around the corridor as well as the nearby areas of Ngong, Dagoretti and Lenana, which could potentially contribute to unplanned development and land use patterns. Unless appropriate interventions are considered as part of the long-term railway line development, potential encroachments will arise causing safety and operational challenges.

The ESIA Report therefore ***recommends that the proposed development should be considered for implementation.*** However, the proposed mitigation and enhancement measures recommended in this ESIA Report must be implemented to ensure that project benefits are realized or optimized.

10.2 Recommendations

- (i) The Contractor should adopt the Environment and Social Management Plan (ESMP) in this ESIA Report and prepare a Construction Environment and Social Management Plan (C-ESMP) reflecting realities of the project implementation to form the main compliance reference document. The document will be shared with and supervised by the Supervision Consultant and as well as the Client,
- (ii) The contractor should undertake relocation of public utilities (water, sewer, drainage, power, internet and street lights) before construction begins to avoid disruption of the services which might be a potential source of conflict with the project area residents,
- (iii) All material sites should have an EIA undertaken and approved by NEMA and the resultant management plans integrated. The material sites must be cordoned off or fenced during use, and rehabilitated after use.
- (iv) Limited vegetation clearance and felling of trees should be observed and confined only along the railway line corridor. Appropriate tree count and records should be done in order to undertake tree planting in identified locations as replacement initiatives,
- (v) Workers must be provided with complete protective and safety gear. They must have working boots, complete overalls, helmets, gloves, earmuffs, nose-masks, goggles etc.
- (vi) Fully equipped first aid kit must also be provided at the camp sites and near the working areas,
- (vii) The project should promote HIV/AIDs awareness along the entire project corridor during the project implementation phase. Awareness, prevention and training programmes should be integrated into the project implementation,
- (viii) Undertake annual environmental audits for the project components so as to assess level of compliance to the International and National laws, guidelines and standards governing the environmental sector,
- (ix) To ensure full integration of the ESMP and other environmental, social and safety aspects to the project construction works, both the contractor and the Resident Engineer should have environment and social safeguard teams. The teams from both sides should work together in ensuring OHS aspects are adhered to for project sustainability,
- (x) Sensitize and create awareness to the neighbouring communities on the coexistence with the railway infrastructure with special focus on security and safety aspects,
- (xi) The project should operationalize a grievance redress mechanism to deal with all complaints arising due to project conflicts.

References

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15. Republic of Kenya, (2012). Land Act (No. 6). National Council for Law Reporting.
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19. Republic of Kenya, 2007, Work Injury Compensation Benefit Act. National Council for Law Reporting

Annexes

Annex 1: Project ESIA Study Terms of Reference



REQUEST FOR PROPOSAL (RfP)

FOR

**CONSULTANCY SERVICES FOR UNDERTAKING RELOCATION ACTION PLAN
(RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
STUDY FOR THE CONSTRUCTION OF THE RIRUTA - NGONG MGR
COMMUTER**

TENDER No: KRC/SCM/DPR/014/2023-2024

DATE OF ISSUE: 14th SEPTEMBER 2023

CLOSING DATE: 29th SEPTEMBER 2023

CLOSING TIME: 10:00hrs East African Time

**The Managing Director
Kenya Railways
P.O. Box 30121-00100
NAIROBI, KENYA.**

APPENDIX TO INFORMATION TO CONSULTANTS (APPENDIX “ITC”)

The following information for procurement of consultancy services and selection of Consultants; shall complement or amend the provisions of the information to Consultants, wherever there is a conflict between the provisions of the information and to Consultants and the provisions of the appendix, the provisions of the appendix herein shall prevail over those of the information to consultants.

CLAUSE REF	INSTRUCTION TO TENDERERS REFERENCE	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERERS
2.1	Name of the Client	KENYA RAILWAYS
2.1a	Add the following NEW Clause	<p>“Similar Project”: means a project or Studies or Assignments undertaken for a new railway infrastructure project of magnitude of not less 300 kilometres.</p> <p>“Related Projects”: means assignments or projects or studies that are not necessarily of railway nature but of transport projects, related to the required specialization and experience indicated.</p> <p>“Lead Firm” If in consortium, is a firm that will assume leadership of the consortium for and on behalf of consortium and submit the RfP on their behalf.</p>
2.1.1	The method of selection	DIRECT PROCUREMENT METHOD
2.1.2	Technical and Financial Proposal are requested:	Yes

**TENDER No. KRC/SCM/DPR/014/2023-2024 CONSULTANCY SERVICES FOR UNDERTAKING
RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
STUDY FOR THE CONSTRUCTION OF THE RIRUTA - NGONG MGR COMMUTER**

	Name of the assignment is:	Consultancy Services for undertaking Relocation Action Plan (RAP) and Environmental and Social Impact Assessment (ESIA) Study for the proposed Construction of the Riruta - Ngong MGR Commuter.
2.1.2	Objective of the Assignment	The objective of the assignment is to: To undertake Relocation Action Plan (RAP) and Environmental and Social Impact Assessment (ESIA) study and subsequent follow up with National Environment Management Authority (NEMA) for the issuance of EIA license.
	Description of the Assignment	<p>The scope of the assignment includes:</p> <p>1. For Relocation Action Plan (RAP)</p> <ul style="list-style-type: none"> i. Review of various secondary data and collection of primary data, which include the County Integrated Development Plans (CIPDs) project design concepts, survey/cadastral maps; land acquisition and resettlement legal and regulatory frameworks, among other relevant literature including the project Feasibility reports (if any) ii. Field assessments, including transect walks, community mapping as well as mobilization of the PAPs; iii. Establishment of the socio-economic status of the project area; iv. Conducting census of the would-be Project affected persons and asset inventory using data collection tools and guides will be conducted; v. Engagement of the PAPs and other stakeholders along the entire MGR corridor in pre-identified locations; vi. Identification of institutions and facilities impacted by the Project, interaction with their management and collection of relevant data; and vii. Preparation of a RAP report. <p>2. Environmental and Social Impact Assessment (ESIA) study</p> <ul style="list-style-type: none"> i. Review of the existing data on the proposed railway line and social economic activities

		<p>in the project study area (data that will also be used for monitoring and evaluation of how well the mitigation measures are implemented during the project cycle;</p> <p>ii. Review and collection of additional environmental, social, economic and physical data that may be necessary to support conclusions about the feasibility and viability of the project;</p> <p>iii. Review and study of main environmental and social features within the Project area;</p> <p>iv. Carrying out an environmental assessment of the Project area in relation to the proposed railway leading to preparation of an ESIA Report;</p> <p>v. Carrying out social impact assessment of the railway line;</p> <p>vi. Verification of compliance with the national environmental and social regulations and industry's standards and environmental and social assessment procedures;</p> <p>vii. Recommending cost effective measures to be implemented to mitigate against the expected impacts; Terms of Reference for the proposed construction of the Riruta-Ngong commuter Metre Gauge Railway Nairobi and Kajiado County;</p> <p>viii. Consultation with all stakeholders, including communities to be affected by the Project as well as other stakeholders in order to obtain their input during the ESIA process; and</p> <p>ix. Preparation of an ESIA report and accompanying Environmental and Social Management Plan (ESMP)</p>
2.1.3	A pre-proposal conference (site visit) will be held:	Yes, TBD

**TENDER No. KRC/SCM/DPR/014/2023-2024 CONSULTANCY SERVICES FOR UNDERTAKING
RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
STUDY FOR THE CONSTRUCTION OF THE RIRUTA - NGONG MGR COMMUTER**

2.1.4	KR will provide the following key inputs:	<ul style="list-style-type: none"> i. Requisite data and any other information available within KR required by the Consultant to facilitate smooth execution of the works; ii. Assist the Consultant to access information from other organizations needed; iii. Provide an Environmentalist as the Liaison Officer for Client-Consultant communication.
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CLAUSE REF	INSTRUCTION TO TENDERERS REFERENCE	PARTICULARS OF APPENDIX TO INSTRUCTIONS TO TENDERERS
2.1.7	Purchase Price for RfP	<p>1. RfP may be downloaded from Kenya Railways website, www.krc.co.ke.</p> <p>2. Consultants willing to submit RfP will be required to pay a sum of Kshs. 1,000/= or the equivalent in USD in one of the following ways BY THE DATE & TIME OF CLOSURE:</p> <ul style="list-style-type: none"> i. Pay cash at Kenya Railways Headquarters Cash Office; ii. By Bankers cheque payable to Kenya Railways; iii. By Electronic Cash Transfer (ECT) to; <p>Account name : Kenya Railways Corporation Bank : Kenya Commercial</p> <p>Bank Branch : Moi Avenue, Nairobi.</p> <p>Account no. : 1101706872</p> <p>Swift : KCBLKENX</p> <p>In both (ii) and (iii) evidence of payment shall be given by the date and time of closure.</p>

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SECTION V: - TERMS OF REFERENCE

PREPARATION OF ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY AND RAP REPORT FOR THE CONSTRUCTION OF COMMUTER TRAIN FROM RITRUTA TO NGONG TOWN BY KENYA RAILWAYS

1. ESIA TORs

A. Introduction

In accordance with the EMCA, 1999 (Amendments 2015), The Environmental (Impact Assessment and Audit) Regulations, 2003 and the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2016, the proposed interventions fall under the High-Risk Projects (4 b). This calls for an Integrated Environmental Impact Assessment Study taking into account environmental, social, cultural, economic, legal, climatic, safety and health considerations.

B. Terms of Reference

Terms of reference for an ESIA Project report according to the EMC (Impact Assessment and Audit) Regulations, 2003 (Amendment) 2016 and guidelines for the preparation of Integrated Environmental Studies ESIA reports should include the following:

- (i) Stating the objective and scope and nature of the project
- (ii) Description of project location and site and including, proof of land ownership where applicable, the Global Positioning System (GPS) coordinates and the physical area that may be affected by the project's activities;
- (iii) Description of the project including the following:

- Identification of project activities that shall be undertaken during the project construction, operation and decommissioning phases; project design; and
- The materials to be used, products and by-products, including waste to be generated by the project and the methods of their disposal

These three (3) activities may will impact on the environment and social aspects

- (i) Description of the county and national policy, legal and institutional framework on the environment and socio-economic matters.
- (ii) Identification of baseline environmental (physical and biological aspects) and socio-cultural (human aspects) parameters and existing pressures. The information will be used as monitoring benchmarks of project impacts. Some parameters like water and soil may need to be analyzed.
- (iii) Undertaking stakeholder engagement and public consultation and participation. This must be all inclusive to include the affected parties and communities including the youth, persons with disability and other vulnerable groups to explain the project, its social, economic and environmental impacts and also to get their views on the project
- (iv) Evaluation of project alternative in terms of technology, location, design among others.
- (v) Laboratory analysis of water and soil to enable project impacts on the same
- (vi) Identification of project impacts (positive and negative) and mitigation measures for the negative impacts at all stages of project development. Impacts emanating from the road project generally impacts the social and physical environment as well as economic aspects.
- (vii) Preparation of a comprehensive environment and social management and monitoring plan for integration to the project implementation. The plan will outline impacts and sources; action plans for mitigation; responsibilities and costs involved; targets to be achieved and monitoring indicators.
- (viii) Conclusions and recommendations

Annex 2: Stakeholder meeting minutes and Attendance registers



MINUTES OF THE PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT FOR KAREN AREA ON RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE CONSTRUCTION OF THE RIRUTA-NGONG MGR COMMUTER PROJECT HELD ON 12TH APRIL, 2024.

ATTENDANCE:

VENUE: St. Christopher's International School, Nairobi.

DATE: Friday, 12th April 2024.

TIME: 1024hrs.

ATTENDANCE: Regrettably, the official attendance list for the stakeholder meeting was damaged and rendered unavailable. As a result, we are unable to provide a comprehensive record of attendees for that session.

AGENDA:

1. Introduction.
2. Project overview
3. Presentations of project route
4. project Environmental and Social effects
5. Question-and-answer (Q&A) session
6. Additional comments
7. Adjournment

Min	Item	Action
1.	<u>INTRODUCTION</u> The public participation and stakeholder engagement kicked off at 1024 hrs. with prayers from one of the stakeholders. The meeting was chaired by Langata Subcounty Deputy County Commissioner Mr. Adan Kerow. He introduced the meeting stakeholders including KRC representative Eng. Tobias Otieno - the General Manager Infrastructure Development; the consultant undertaking ESIA and RAP studies - APEC/CRDC consortium, and Karen & Langata District Residents Association (KLDA). He thereafter invited KLDA secretary and chairman Mr. Mburu Ngugi and Sikalieh Samora (consecutively) to officially give their remarks. Samora noted that the stakeholders' engagement was not an approval from the residents but an informative space for Karen Residents to understand the project and later share comprehensive feedback.	
2.	<u>PROJECT INTRODUCTION AND STAKEHOLDERS BRIEFING</u> After final introductions by the main stakeholders, Eng. Tobias Otieno introduced the Riruta-Ngong Meter Gauge Commuter Project, highlighting the following key aspects: -	Info

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	<ul style="list-style-type: none"> Eng. Tobias highlighted that the proposed Riruta-Ngong project (line 8) is the first phase of the larger Riruta-Ngong-Kiserian-Ongata Rongai commuter line connection, necessitated after the Nairobi Metropolitan commuter Railway Master Plan study conducted in 2017-2019. Kenya Railways explained that the proposed line is a Meter Gauge Railway (1000mm gauge) and will utilize Diesel Electric Multiple Unit locomotives initially, with plans for future adaptation to Battery Electric Multiple Units, aligning with the Government's commitment to sustainable energy initiatives. The length of the proposed line - 12.5Km. KR proceeded to explain the alignment and noted that the proposed railway would use the existing Ngong Road Corridor. The project cost was approximately Kshs. 8billion Starting and finishing locations of the proposed alignment is Lenana/Riruta, terminating at Ngong town. There are four stations including: - <ul style="list-style-type: none"> Lenana Station, located in the Lenana/Riruta area after Wambiri Road after branching from the main existing Nairobi-Kikuyu Meter Gauge line. Karen station - located after Karen town toward Ngong town Embulbul station - located next to the police training college Ngong Station, located in Ngong area. The various parties involved in the project include the following: - <ul style="list-style-type: none"> Kenya Railways: Client; under the Government of Kenya. APEC-CRDC: Construction Consultant. China Road and Bridge Corporation (CRBC): Contractor. <p>He also indicated that the project contract was an Engineering, procurement and construction (EPC), hence necessitating parallel and simultaneous processes including the project ESIA and RAP studies. He said the stakeholder meeting were informed by the project design and were part of the ESIA study report formulation, hence the views of the stakeholders are expected to inform the project environmental and social impacts and mitigation measures as well as the project design.</p> <p>Following the project briefing, a stakeholder noted that the Consultant's attendance list should not be regarded as confirmation or endorsement of the proposed project after which the stakeholders collectively refused to further sign the provided Consultant's attendance list but rather strike it out. Subsequently, it was decided that KLDA would distribute blank foolscaps for stakeholders to sign, thereby serving as the official attendance record for the meeting.</p>	Info
3.	<p><u>PRESENTATION OF PROJECT ROUTE</u></p> <p>The Consultant started by reiterating that the Proposed line is an MGR line commencing at Lenana/Riruta area where it branches off the main Nairobi-Kikuyu MGR Line, right after Wambiri Road.</p>	Info

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	<p>The line then extends through Ngong Road Forest spanning the Southern Bypass over a bridge onto the Ngong Road median, then the alignment proceeds within Ngong Road's median to the Karen Shopping Center, similarly, over a bridge and lands a few meters on the left-hand side of the road corridor from the shopping Centre.</p> <p>The line continues along the left-hand side of the road reserve towards the Proposed Karen Station after Karen Surgery area, with a subsequent bridge at DK 6+229. The line crosses back to the right before Kerarapon Road on another rail over road crossing. The proposed MGR line would then proceed to KBC, then to Embulbul Station and through VET Farm to finally the proposed Ngong Station.</p> <p>The stakeholders expressed the need for additional clarification regarding the project route, necessitating a reiterated explanation of the above by the trunk Engineer.</p>	
4.	<p><u>ENVIRONMENTAL AND SOCIAL EFFECTS OF THE PROJECT</u></p> <p>The proposed project positive and negative impacts were highlighted as well as the proposed mitigation measures. The key project benefits included local employment opportunities, cheaper and convenient means of transport, reduced carbon emissions, reduced traffic congestion, organized transport systems, among other.</p> <p>The negative impacts were noted as follows</p> <ul style="list-style-type: none"> • <u>Disruptions to people's livelihoods, properties and movements</u> The project was likely to affect the residents in various ways including livelihood disruptions, accesses to residential and commercial areas, encroachment of private properties including land and roadside businesses. The Consultant noted that safety and minimal disruption of movements were a priority during construction and operation phases. This being the case, the alignment would traverse the Ngong Road median and subsequently, use the existing road corridor causing minimal disruptions to properties and businesses whilst avoiding built-up areas. The consultant also stated that project affected persons (PAPs) would be enumerated and documented during the project Resettlement Action Plan (RAP) and engaged for further planning on compensation. • <u>Accesses and Level Crossings</u> The consultant noted that accesses and level crossings would be provided on minor roads/entrances and grade separation applied to crossings on major roads ensuring minimal disruptions to traffic along the affected routes. • <u>Dust and noise pollution</u> The consultant explained that measures are in place to ensure the contractor completely minimizes air pollution and reduces dust emissions during project construction. It was also noted that the Consultant has carried out relevant environmental baseline measurement on both the air and noise condition along the 	Info

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	<p>alignment aiding in present conditions in order to inform future air pollution monitoring and control.</p> <ul style="list-style-type: none"> <u>Water and Electricity Disruptions</u> <p>During construction, the contractor is expected to address these disruptions as soon as possible. He is also required to send notices to the communities before any disruption takes effect. Where necessary services relocations are required, he will work together with the various amenities' services providers for effective relocation exercise.</p> <ul style="list-style-type: none"> <u>Grievance redress mechanism</u> <p>The project will establish a grievance redress mechanism to deal with all complaints in regard to the project implementation. The members of the public among other stakeholders will be part of the grievance redress committee membership.</p> <ul style="list-style-type: none"> <u>Clearing of vegetation cover</u> <p>The project corridor passes through a gazetted forest (Ngong road Forest) hence impacting on natural and plantation trees. A long some sections of the road corridor and across Mbagathi river, there were concentrations of tress which included indigenous and exotic trees which will be affected by the project, with effects to conservation. A tree count will be done for all affected trees by type and thereafter an environmental compensation for the same done by the project. The project is expected to work together with various stakeholders including KFS, the community, administrators and well as organized groups and institutions to achieve the environmental compensation agenda.</p> <ul style="list-style-type: none"> <u>Water pollution</u> <p>The project was crossing two rivers within the project areas which were likely to be impacted by the construction works. The anticipated impacts included sedimentation, pollution of the water by contractor's activities, interference with the river ecosystem among others. The contractor is expected to take precautionary measures by preparing necessary methodologies and management plans. He is as well expected to follow the procedures prescribed by WRA and NEMA in order to avoid water pollution. Action should be taken immediately to remedy any advance impacts including training of the river, mobbing up any pollutants, etc.</p> <p>Concluding this space, the Consultant emphasized that upon completion and approval by the National Environment Management Authority (NEMA), the Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) studies will be made accessible to the public. Additionally, stakeholders were encouraged to contribute their insights to the project impacts in a respective and constructive manner to better the proposed project and the overall success of the project.</p>	
5.	<u>QUESTION-AND-ANSWER (Q&A) SESSION</u>	

Min	Item	Action
	<p>DCC Kurow initiated a Question-and-Answer session, emphasizing the importance of stakeholders refraining from repeating previously addressed inquiries and maintaining respect and courtesy throughout the session.</p> <p>Listed below, are the questions asked or suggestions made by the stakeholders and their respective responses.</p> <ul style="list-style-type: none"> Chris Foot: Chris inquired on the width of Ngong Road corridor and sought clarification on whether the road reserve was well marked out in the presented alignment. <p>Consultant's response: The Consultant explained that the Ngong Road reserve is 60 Meters wide also noting that the road reserve is well shown in blue colour in the presentation slides. It was also clarified that all the cadastral maps have been acquired from the Survey of Kenya and any one can procure the survey maps to confirm the extent of the road corridor.</p> George Kimani: George Kimani, inquired on whether the KLDA was furnished with a technical proposal and a 3D visual presentation from KR, which would aid in a comprehensive review of the upcoming project. <p>Consultant's response: Kenya Railways clarified that a 3D modelling of the project is currently unavailable. However, they indicated that such a model could be developed and furnished if need be.</p> Charles Maranga: Charles Maranga raised inquiries regarding the proposed project commissioning date and also sought clarification on the gauge specifications and the reason behind KR's choice of diesel engines over electric engines. Additionally, he expressed interest in understanding the benefits of the project for residents of the Karen area. <p>KR's response: KR noted that the President commissioned the project on 15th of December 2023, and construction only began in areas where Public Participation and engagements had been held and only with Ngong town station.</p> <p>Kenya Railways also explained that the proposed project is a Meter Gauge Railway line (1000mm Gauge) to allow for integration and compatibility with the existing commuter railway system.</p> <p>Kenya Railways noted that the proposed line would run Diesel Electric Multiple Unit (DEMU) locomotives initially, with plans for future adaptation to Battery Electric Multiple Units (BEMU), in line with the Ministry of Roads and Transport E-mobility plan.</p> <p>KR also explained that the proposed Riruta-Ngong MGR line would provide alternative modes of transport in the Karen area, aiding in reducing vehicular traffic on roads by providing a convenient, reliable and cost-effective alternative.</p> Sikalieh Samora: Inquired on which private and commercial properties will be 	<p>Info</p> <p>APEC-CRDC</p> <p>APEC-CRDC</p> <p>KR</p>

Min	Item	Action
	<p>affected by the proposed project and whether they have been consulted.</p> <p>Consultant's response: It was reiterated that the alignment greatly avoids disruptions to properties, businesses and built-up areas and further emphasized that all the Project affected Persons (PAPs), mainly between Kerarapon area and the Proposed Bulbul Station, will be respectively compensated.</p> <p>Njeri (Stakeholder): Njeri inquired about the operational procedures of the proposed commuter line, expressing concern regarding to the current service limitations that primarily cater to users during morning and evening hours. Additionally, she sought clarification regarding the availability of parking facilities at the Proposed Karen Station, inquiring whether commuters would have the option to park their vehicles and utilize the proposed commuter train for transportation to different destinations.</p> <p>KR's response: KR explained that the proposed line is one of the Government's initiatives to reduce traffic congestion along Ngong Road and therefore noted that the proposed commuter line would operate at various times of the day to meet the commuters' demands, as is with the current Diesel Multiple Unit Commuter lines operations in other part of Nairobi metropolis. Kenya Railways also noted that all stations will provide parking services for the commuters.</p> <ul style="list-style-type: none"> Amreek Heya: Amreek raised inquiries regarding the site selection of the proposed Karen Station in the vicinity of the Karen Surgery/Arocha area, and questioned why alternative surrounding locations were not considered. Additionally, she expressed concern that should the proposed station extend beyond the limits of the road reserve, it could potentially impact the biodiversity in the area. Moreover, Amreek sought clarification on the accessibility provisions that would be implemented for roads affected by the alignment, particularly in the vicinity of Arocha, citing Tree Lane as an example. <p>KR's response: KR noted that the current station location is as a result of elevated nature of the railway line after Karen roundabout, which terminating shortly after Karen shopping center making the Karen Surgery/Arocha area the most suitable site for the proposed station. It was reiterated that accesses and level crossings would be provided on minor roads/entrances and grade separation applied to crossings on major roads however a service lane/access route shall be provided under the Bridge granting access to Karen Surgery.</p> <ul style="list-style-type: none"> Ian & Oliver - KLDA: Upon taking over the stage from the KLDA chair, Ian stated that the association had formulated an alternative proposal. He inquired of KR whether they were receptive to considering alternative suggestions. KR's response indicated openness to exploring alternative proposals, provided they were technically viable. Upon this agreement, Oliver, also a KLDA member presented an alternative alignment route starting from Dagoretti area, crossing the Southern Bypass through the Kibiku Forest towards Ngong town. 	<p>APEC-CRDC</p> <p>KR</p> <p>Info</p> <p>KR</p>

Min	Item	Action
	<ul style="list-style-type: none"> Eng. Nduati: He inquired on whether the feasibility study was done and also asked KR to furnish the stakeholders with the feasibility study's findings as well as the respective cross sections and profile drawings to aid in showing the land-use. Eng. Nduati also inquired on the operational schedules/operational frequency of the proposed MGR line. <p>Consultant's response: Upon a quick analysis of the proposed alternative alignment route by LKDA, the Consultant noted that within the alignment was a 100 Meter vertical rise in elevation from 1885.75m to 1985.45 of over a distance of approximately 3.7Km therefore exceeding the standard design gradient of 2.5% and rendering the alternative proposal not feasible. The Consultant also noted that a feasibility study was done from 2017-2019 from which recommendations towards expansion and revamping of commuter railway services within Nairobi metropolis arose. Kenya Railways noted that the design was still in its preliminary stages therefore detailed design drawings could not be presented to the stakeholders. It was also noted that the operational schedules would be determined by the commuter demand and that the line would be operational at various times of the day.</p> <ul style="list-style-type: none"> Ngugi Mburu: He inquired on whom the financiers of the proposed project are, thereafter stating that the government is broke and cannot pay doctors. He further requested clarification on whether proper procurement procedures were adhered to in the selection of Contractors and Consultants. Chris Foot: Chris further inquired on why the alignment doesn't proceed along Ngong Road's median from Karen to Ngong. Chris Foot also noted that Kenya Railways should take into account the dynamic, rolling and engine noise of the proposed trains as well as the swampy land following the Karen Station. Chris concluded by asking how the Project fits into the Nairobi County Integrated Urban Development Plan (2014), the Local Physical Development Plan before asking Kenya Railways to immediately stop construction or face litigation. NJUNG'E: Proposed that Kenya Railways utilize the Ngong SGR station to cater to the needs of residents in Ngong, rather than considering the construction of a new railway line. DAVID OLIVER: David urged Kenya Railways to prioritize the dualling of Ngong Road, starting from Karen Shopping Center, instead of proceeding with the proposed project, noting that Karen all residents have personal cars. AMOS: Amos noted that the consultants should provide a Climate Change Risk Impact Assessment, an inventory of plant species that would be affected and noted that key stakeholders such as the National Land Commission and the Kenya Wildlife Service should be present. He also inquired on whether NEMA had granted the project an EIA license. 	<p>APEC-CRDC</p> <p>Info</p>



Min	Item	Action
	<p>KR's response: Kenya Railways initiated its sequence of responses by explicitly noting that the proposed project is financed by the Government of Kenya, and all procurement services were conducted with transparency and fairness according to the procurement laws.</p> <p>To Chris Foot's inquiries and suggestions, KR explained that Ngong Road being a single carriageway from Karen to Ngong could not accommodate the alignment on the median, as there is none. KR also assured the stakeholders that all technical considerations, including noise and disturbances by trains have been taken into account and a baseline assessment conducted to note and mitigate any excessive noises.</p> <p>To Njung'e's proposal, KR stated that the Ngong SGR station is part of the larger SGR line starting from Mombasa, not the Nairobi Commuter link, hence connecting it to the commuter lines can't be synchronized.</p> <p>To Amos's comments, KR explained that the Climate Change Risk Impact Assessment and plant species inventory would be well documented in the ESIA study. KR also noted that NEMA would grant the EIA License upon submission and review of the ESIA document.</p> <p>Kenya Railways concluded by encouraging stakeholders to embrace the proposed project, assuring them that comprehensive measures will be clearly outlined in the ESIA and RAP studies to address all environmental and social impacts and concerns related to project-affected persons (PAPs) as well as all stakeholders duly engaged. The railway line commuter services were an alternative transport system meant not only for Karen residents but for the neighbourhood including Ngong, Kiserian and Ongata Rongai residents. No one will be forced to utilize the railway commuter services. The project was as well meant to address future commuter transport needs for the Nairobi metropolis, since the city continued to grow in terms of population, hence demanding for feasible and functional transport solutions for all the residents, both now and in the near future.</p>	
6.	<p><u>ADDITIONAL COMMENTS</u></p> <p>Samora noted that KLDA will compile all additional questions from the Karen neighborhood level and subsequently share them with Kenya Railways to aid in planning for possible subsequent meetings. In conclusion, Samora thanked St. Christopher's International School for providing a venue for the stakeholder's engagement as well as KR, the consultant, the DCC and the Government at large for engaging the stakeholders. Before conclusion, Samora noted that Karen residents would compile further questions and concerns and share them with KR.</p>	DCC



Min	Item	Action
7.	<p><u>ADJOURNMENT</u></p> <p>With no additional matters, the DCC thanked the stakeholders for their input and emphasized on the importance of maintaining respect and courtesy when participating in public forums, especially towards the Government and authority figures.</p> <p>Priest Jerry concluded the proceedings by offering a brief prayer and urging the Karen stakeholders to keep their hearts open towards new ideas. Following this, DCC Kurow, presiding Chair officially adjourned the meeting at 1254hrs.</p>	ALL

Minutes Signed by:

Sign: Date:

For: KENYA RAILWAYS (KR)



Sign: Date:

For: APEC/CRDC CONSORTIUM



DCC/ACC

Name: KERUW A. Huns

Date: 16/05/2024

Sign:



MINUTES OF THE PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT FOR KAREN TOWN ON ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE CONSTRUCTION OF THE RIRUTA-NGONG MGR COMMUTER PROJECT HELD ON 26TH APRIL, 2024.

ATTENDANCE:

VENUE: Chief's Office Karen.

DATE: Friday, 26th April 2024.

TIME: 1055 hrs.

ATTENDANCE: As per the attendance list attached.

AGENDA:

1. Opening Remarks and Introductions.
2. Project Introduction and Stakeholder Briefing.
3. Environmental and Social Impacts of the Project
4. Question and Answer Session.
5. Adjournment.

Min	Item	Action
1.	<p><u>OPENING REMARKS AND INTRODUCTION</u></p> <p>The meeting commenced at 10:55 AM with prayers from one of the participants. The assembly was called to order by J. Ayiena, the area chief. The attendees were welcomed, and all present members were encouraged to express their views and concerns by Mr. Ayiena. The Chief highlighted that most of the stakeholder's present were from business along Ngong Road in the Karen town area.</p> <p>It was articulated by him that these stakeholder engagements held significant importance as they aimed to ensure comprehensive participation of all categories of stakeholders. The significance of bringing all stakeholders on board including roadside vendors and residents was further emphasized.</p>	Info
2.	<p><u>PROJECT INTRODUCTION AND STAKEHOLDERS BRIEFING</u></p> <p>The Client introduced the Riruta-Ngong Meter Gauge Commuter Project, highlighting key aspects as listed below:</p> <ul style="list-style-type: none"> Length of the proposed line – 12.5Km. The Client subsequently delineated the alignment from Lenana Station to Ngong Station, emphasizing minimal necessity for land acquisition citing that the road corridor will be largely used for and by the project. 	Info

Min	Item	Action
	<ul style="list-style-type: none"> Project Cost and Time – The Client highlighted that the estimated project cost was Ksh 8 billion and the period of construction was expected to be 12 months only. Operating Speeds – 50km/h maximum. The Consultant explained that the speed of the train will be safe since braking and restarting will not be difficult. Number of the proposed railway stations include: - <ul style="list-style-type: none"> - Ngong Station. - Bulbul Station. - Karen Station. - Lenana Station. <p>Thereafter, the consultant highlighted that the locations of the commuter stations were closer to the anticipated targeted users so as to reduce on the cost of access. They also noted that only Ngong Station will be large in size while all other stations will be lean.</p> <ul style="list-style-type: none"> Functionality – <ul style="list-style-type: none"> - Purpose: The meter gauge railway is designed to enhance accessibility for commuters within the project area. - Schedule: The railway will operate at various intervals throughout the day, not limited to peak hours. - Cargo Exclusion: The commuter trains will exclusively cater for passenger transport and will not facilitate the carriage of cargo. Reasons for the Project <ul style="list-style-type: none"> - Traffic Reduction: The primary objective of the project is to alleviate traffic congestion on Ngong Road. The railway line will act as an alternative means of transport for commuters between Ngong area and Nairobi Central Business District. - Environmental Impact: As a result, there will be a subsequent reduction in carbon emissions, contributing positively to the climate and overall well-being of the residents. <p>The consultant emphasized that a stakeholder engagement holds significance in garnering perspectives from relevant parties before project implementation. The process also serves as a platform for addressing pertinent concerns and answering questions from stakeholder in regard to the proposed project.</p>	
3.	<p><u>ENVIRONMENTAL AND SOCIAL EFFECTS OF THE PROJECT</u></p> <p>The project benefits were highlighted</p> <ul style="list-style-type: none"> <u>Economic growth</u> 	

Min	Item	Action
	<p>In addition to creation of employment opportunities, APEC-CRDC noted that the proposed Riruta-Ngong MGR Commuter project would enhance the economy of areas along the alignment. This would be contributed to by factors such as:</p> <ul style="list-style-type: none"> - Ease in transportation to, from and within the areas along the alignment. - Easy access to housing and businesses along the alignment. - Visual appeal of the area. <p>The negative effects of the project include the following: -</p> <ul style="list-style-type: none"> • <u>Land Acquisition.</u> It was observed that the project designed corridor ensured minimal disruption of private property, hence minimal land acquisition. In light of this, the alignment is primarily traversing the existing railway and Nong Road corridor, with the aim of minimizing disturbances to properties and businesses. In instances where private property is affected, an assessment is being conducted by the Consultant to identify the specific land parcels. Subsequently, a separate meeting will be arranged by the Consultant to engage with the affected individuals and address the land acquisition matters accordingly. • <u>Accesses and Level Crossings.</u> The Consultant noted that accesses and level crossings would be provided on minor roads/entrances and grade separation applied to crossings on major roads ensuring minimum disruptions and conflicts with road traffic along the affected routes. They also noted that the Contractor would provide alternatives for any access disrupted during the project implementation. • <u>Safety.</u> It was emphasized that all borrow pits intended for use by the Contractor during construction will possess NEMA licenses to ensure their safety for use without adverse effects on residents. He will also be expected to fence off the borrow pits and delineate all active construction sites. Additionally, the Contractor will be required to ensure that all his vehicles met roadworthy standards and adhere to appropriate speed limits to mitigate the risks of accidents. He will be expected to develop a traffic management plan during the project implementation phase. • <u>Pollution.</u> Measures to mitigate vibrations, sound, water, and dust pollution had been noted in the ESIA report. Necessary measures including surface and underground water protection, baseline assessment of structures near construction and active sections likely to be affected by vibrations to be done, dust reduction measures to be put in place, among other interventions. • <u>Deforestation</u> 	Info

Min	Item	Action
	<p>It was highlighted by the Consultant that trees may need to be cut to create a corridor for the railway line. They clarified that the project should offset the loss by implementing a tree replanting strategy and planting additional trees along the railway corridor among other areas.</p> <ul style="list-style-type: none"> <u>HIV/AIDS & STDs</u> Due to observed risks of social disease possible impacts as documented in previous projects, it was noted that the Contractor and Client will be expected to conduct public sensitization on this matter during project implementation. Additionally, they will be tasked with ensuring the provision of informational materials regarding social disease prevention and management. <u>Utility Services.</u> The consultant explained that the utility services on the alignment are in the process of being identified and that protection and relocation measures were proposed in the ESIA report. It was emphasized that relocation plans would be executed prior to the commencement of construction in the affected sections in order to mitigate disruptions to the residents and businesses in the vicinity. The likely affected services include power lines, water and sewer pipelines, optic cables and streetlights. <u>Employment opportunities</u> The consultant explained to the stakeholders, that the proposed project is set to provide employment opportunities to the communities along the alignment. Direct employment would however be limited. Nonetheless, it was highlighted that 60% of the available positions would be reserved for local residents. <u>Corporate Social Responsibility</u> The consultant noted that CSR is not within the contract scope and thus it is not a contractual obligation of the contractor. They highlighted that CSR is not an obligation and therefore there is no guarantee of CSR implementation. They advised that the requests of the community on CSR should be directed to Kenya Railways through letters for consideration and resource allocation. <u>Water and Electricity Disruptions</u> During construction, the contractor is expected to address these disruptions as soon as possible. They are also required to send notices to the communities before any disruption takes effect. Any relocation will be done in collaboration with the service providers and with approval of the project client. 	
4.	<u>QUESTION AND ANSWER SESSION</u>	

Min	Item	Action
	<p>1. ALL STAKEHOLDERS</p> <p>The stakeholders expressed their acknowledgment and support for the project, extending gratitude to all involved parties, including fellow stakeholders, the client, and the consultant, for facilitating and participating in the stakeholder engagement.</p> <p>Response: The stakeholders' support and acknowledgment of the project was duly noted. Their participation and commitment to its success was appreciated and acknowledged.</p> <p>2. PARKIRE LEBOSO</p> <p>He inquired whether the proposed alignment disrupts roadside businesses, expressing concern that businesses might close up hence, affecting their income. Additionally, he asked whether employment would be assured for residents of Karen area, considering construction was likely to begin in other areas.</p> <p>Response: The potential impact on roadside businesses would undergo thorough assessment through the Resettlement Action Plan, with efforts focused on minimizing disruptions. Regarding employment opportunities, consideration would be given to the project are residents, hence the residents were expected to be proactive and go to the project active sections to seek for available employment opportunities.</p> <p>3. ZACHARY KIMORI</p> <p>He hoped that flower and seedling businesses along the highway would be involved in compensating for cut trees during construction by providing trees for replanting. He suggested the Consultant propose this idea to KRC, KURA and KFS on their behalf, noting that these businesses are registered under the Community Forest Associations.</p> <p>Response: The suggestion to involve flower and seedling businesses in tree replanting efforts would be explored further. The Consultant promised to propose to Kenya Forest Service (KFS) to engage the Community Forest Associations (CFS) in environmental compensation efforts. Furthermore, this recommendation would be included in the Environmental and Social Impact Assessment (ESIA) report once it is complete.</p> <p>4. BIG SMOKE RESTAURANT</p> <p>They inquired whether access to their restaurant, located on the right-hand side of Ngong Road, before Karen town would be affected. Additionally, they sought clarification on whether the alignment in the Karen area would be subgrade or</p>	client/ consultant

Min	Item	Action
	<p>elevated. Furthermore, they inquired about the commencement date of construction in the Karen area.</p> <p>Response: There would be no potential impact on access to the restaurant since it is located on the right-hand side of Ngong Road and construction would be on the median of the dualled road. Regarding the alignment in the Karen area, it would mostly be elevated according to the latest provided design. As for the commencement date of construction in the Karen area, this information would be provided as soon as it became available. The Contractor would be advised to ensure that stakeholders are informed of project activities and milestones as the project progresses.</p> <p>5. STEPHEN NGUGI</p> <p>He inquired whether businesses on the right-hand side of Ngong Road after Karen town would be affected by the project's construction.</p> <p>Response: Businesses on the right-hand side would not be directly affected by the construction since the alignment is mostly in the left-hand side of the road immediately after Karen town.</p> <p>6. CATHERINE MAINA</p> <p>She wanted to know if the project had made provisions for persons with disabilities (PWDs) to be addressed in the design. She asked whether there were any accesses provided for PWDs and older people in proposed commuter stations, such as ramps and railings, noting existing stations had high stairs/steps hindering smooth movement.</p> <p>Response: Measures ensuring accessibility features, including ramps and railings, had already been incorporated into proposed stations.</p> <p>7. ISAAC NDUNG'U</p> <p>He inquired about the distance from the edge of the railway to the end of the road reserve, expressing interest in knowing if there would be any space reserved for roadside business along the alignment.</p> <p>Response: The distance from the railway to the road reserve edge will be determined based on project requirements. However, within the sections between Karen ton and KBC, the railway line will use the extreme left-hand side of Ngong road, hence no space will be available for roadside traders.</p>	

Min	Item	Action
	<p>8. HALIMA IBRAHIM</p> <p>She inquired whether businesses along the roadside in the Bulbul area would be affected by the railway construction.</p> <p>Response: Businesses along the roadside in the Bulbul area will not be directly affected by construction as the alignment in this area is not along the road corridor.</p> <p>9. GACHERU WYCLIFFE</p> <p>He asked whether there were provisions for public washrooms at proposed stations.</p> <p>Response: Public washrooms would be provided at proposed stations to enhance commuter comfort and convenience.</p> <p>10. SAMUEL MURABA</p> <p>He requested opportunities for creative artists in the project, emphasizing the importance of skill-based jobs in order to provide a warm Kenyan touch and culture to the project.</p> <p>Response: Acknowledgment was made of the importance of incorporating creative artists into the project. Exploration of opportunities for their involvement would be pursued accordingly. However, the project lacked the capacity of incorporating everyone therefore, stakeholders were advised to make do of the limited opportunities as well as take advantage of possible indirect employment opportunities.</p> <p>11. JUDITH WERE</p> <p>She inquired about whom to follow up with regarding employment and supply opportunities provided by locals.</p> <p>Response: For inquiries regarding employment and supply opportunities, stakeholders were encouraged to direct follow-ups with the contractor. Employment opportunities will as well be announced through the chief offices. Additionally, stakeholders were reminded that most materials procured by the Contractor were required in high quantity that they may not have the capacity to supply.</p> <p>12. ZAKARIA KANYINGI</p> <p>He inquired whether there would be a motorbike bodaboda and taxi pick-up and drop-off area at the proposed Karen Station.</p>	

Min	Item	Action
	<p>Response: Affirmative, pick-up and drop-off areas would be designated at the proposed Karen Station to facilitate passenger mobility.</p> <p>13. PETER KANTET</p> <p>He asked about the process of contract selection for procurement of materials by the Contractor and suggested forming a committee through the Chief's Office to address pertinent issues in the Karen area, noting that the community was marginalized since they were as nomads who are often overlooked in projects.</p> <p>Response: The process of contract selection for procurement of materials will be adhered to in accordance to government established guidelines. Consideration will be given to forming a committee to address community concerns in the Karen area and ensure inclusivity in project planning and implementation through the Grievances Redress Committee. The mandate to procure project construction materials was the responsibility of the contract, however, local content was expected during the procurement processes.</p>	
5.	<p><u>ADJOURNMENT</u></p> <p>With no additional matters, Chief Ayienga concluded the meeting by requesting one of the pastors in the meeting to offer closing prayers. Subsequently, he expressed gratitude to all attendees for their cooperation and officially adjourned the meeting at 1300hrs.</p>	ALL

Confirmation of Minutes:

APEC/CRDC Representative

Augustine Muleya
(Environmental and Social Impact Assessment Consultant)



Kenya Railways (KR) Representative

Elias Randiga



DCC Office Representative

Korow A. Huma
(.....)



ATTENDANCE SHEET:





APEC- CRDC CONSORTIUM

中国铁设
CRDC

CONSULTANCY SERVICES FOR UNDERTAKING RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR CONSTRUCTION OF THE RIRUTA - NGONG MGR COMMUTER

3RD FLOOR, BLOCK D
KENYA RAILWAYS HEADQUARTERS
WORKSHOP ROAD-OFF HAILE SELASSIE AVENUE
NAIROBI-KENYA

P.O. BOX 3786 - 00100, NAIROBI
TEL: +254 722 509762
EMAIL: rirutamgrproject@gmail.com
Website: www.apectd.co.ke

Thil
Nairobi
05-5045

KAREN STAKEHOLDERS' ENGAGEMENT ATTENDANCE HELD ON 26TH APRIL 2024, AT CHIEF'S CAMP KAREN.

S/No.	Name	Institution / Location	Designation/Occupation	Phone No.	Signature
1.	Rev Peter Kariuki	KAREN	Religious	0714895834	
2.	Paul Moyo	KAREN	Passion	0738842515 0738833215	
3.	Susanne Parkire	KAREN	Village Elder	074323337	
4.	Esmeray lei	Karen	Trader	0704995111	
5.	Janet shimo	KAREN	Trader	0703933972	
6.	JOB KICHWEN	Slitkagat/KAREN	Auto Workshop	0723722214	
7.	CAPIRENT Njeri Maina	KAREN	Red Pub Karen	0721755740	
8.	Eng. John Nyandiko	APEC	P-E	0718705379	
9.	David Guma	KAREN/MURORI	Traders	0728014432	
10.	ISAAC NJOJWU	KAREN/MURORI	Flower Seller	0727789071	
11.	Harmonice Mwebi	KAREN	ELDER	0772434479	
12.	Beatrice Wachera	Wachera Karen	Farmer	0740825063	
13.	Maggdalene Wathira	Karen	Farmer	0746639757	

14 Anthony Nguu
KAREN

15 Denis Warokira
KAREN

1 Flowers

Flowers





















0727588417

0796950881





















KAREN STAKEHOLDERS' ENGAGEMENT ATTENDANCE HELD ON 26TH APRIL 2024

S/No.	Name	Institution / Location	Designation/Occupation	Phone No.	Signature
14.	Dynga Dorine Modiri	KAREN	Student.	0746911335	
15.	Zamin Rehema Muliti.	KAREN	Student.	074210670	
16.	Jedhet modiri	KAREN		0793298507	
17.	Sitabaw munter	KAREN	DRIVER	0724573590	
18.	Mwajuma Ibrahim	KAREN		0716189425	
19.	Aziza wario	KAREN		0746788645	
20.	Mwanaisha Rashid	KAREN		0723293934	
21.	Sharu abdi	KAREN		0705092858	
22.	Monicah Gitare	KAREN	SA	0710646601	
23.	Abiga Roba	KAREN		0796675559	
24.	Hallima Ibrahim	KAREN		0715846903	
25.	Monicah Wanyoike	KAREN	Florist	0728168713	
26.	DAVID NGISI	KAREN	Florist	0710722674	
27.	WACLIFF GACHAU	KAREN	nyumba kuni	0722296252	
28.	JOAN RHENTIAI	KAREN	Self employed	0797 678 085	
29.	Esther Juma	KAREN	Self employed	0705750942	
30.	VIRGINIA KAGERA	KAREN	APEC	0758668095	
31.	Maria Eliu	KAREN	KPBL	0710843422	
32.	MAULINE AMAGARE	KAREN		0764974345	
33.	BENARD KIMANI	KAREN	Driver	0740939645	














KAREN STAKEHOLDERS' ENGAGEMENT ATTENDANCE HELD ON 26TH APRIL 2024

S/No.	Name	Institution / Location	Designation/Occupation	Phone No.	Signature
34.	SARAH MUNIA	KAREN	Business	0726055634	
35.	MARGARET NJERI	KAREN (WESTERN)	"	0723854169	
36.	David Nyango	KAREN	Business	07014418015	
37.	Paul Odongo	KAREN	Business	0707518087	
38.	Cleophae Odongo	Karen	Transport	0713772703	
39.	TERESIA KINUTHIA	Karen	Business	0708635885	
40.	STEPHEN KARANDA	Karen	Business	0713841935	
41.	MARY ADHOCH	KAREN	Business	0715396050	
42.	ZAKARIYA KANYIKI	KAREN	Driver	0769952721	
43.	Bonitaca Kavanja	KAREN	Driver	0727444391	
44.	PAUL OZOGO	KAREN	Driver	071138237	
45.	ZACHARIAH NJUGUNA	KAREN	Driver	0720940507	
46.	Dennis Wargile	KAREN	Driver	0720029948	
47.	RUTH WAKUHI	KAREN (MIOTOMI)	Business	0722786961	
48.	Eunice Mwakali	KAREN	Business	0729902699	
49.	B. ZACHARY KIMGBI	MIOTOMI KAREN	TREE SEEDLING BUSINESS	0722238898	
50.	FRICK MWANGI	KAREN	TREE SEEDLING	0724439126	
51.	WILSON K. MWANGI	KAREN	TREE SEEDLING	0723-927802	
52.	Stephen N. Kamau	KAREN	Business	0711807082	
53.	GINTHA NELSON	KAREN	Business	0723839167	

KAREN STAKEHOLDERS' ENGAGEMENT ATTENDANCE HELD ON 26TH APRIL 2024

S/No.	Name	Institution / Location	Designation/Occupation	Phone No.	Signature
54.	JEFF AKENIA	BIG SMOKE KAREN	BUSINESS	0701287251	
55.	LUCIAH MWENDURA	AVEC	CONSULTANT	0726262826	
56.	SAMSON KIPKORER	Miotini	BUSINESS	0726756434	
57.	JAMES CHEPKORER RUKIA	KAREN	EMPLOYER	0711676373	
58.	SHEM AFINGAGA	KAREN	BUSINESS	0719345619	
59.	CATHERINE MURATA	KAREN	BUSINESS	0721163856	
60.	SAMSON KAMUKU	KAREN	Driver	0788666438	
61.	Mohamed Gadenes	KAREN	Co-ordinator mp's	office 0728064074	
62.	PINDILEMEUWA	KAREN	Watchman	NIL 0712641739	
63.	Francis Iochibid	KAREN	Watchman	0768211968	
64.	Hois kenaghamo	KAREN	watchman	0741211729	
65.	DUCOR WERA	KAREN	Bussines	0725336175	
66.	MARY KURARU	KAREN	Bussines	0706833342	
67.	DANIEL RIIBA	KAREN	Bussinis	0714218939	
68.	Sabina Abucheri	KAREN	Bussiness	0711170957	
69.	Elud Njogu	KAREN	Driver	015818182	
70.	Beatrice Wanya	"		0724929526	
71.	Civerty Ogaden	KAREN		0799739199	
72.	Selwa Njeto	KAREN	Bussines	0705505798	
73.	Samuel W. Murata.	KAREN	Creative Artisan	0728636439	

KAREN STAKEHOLDERS' ENGAGEMENT ATTENDANCE HELD ON 26TH APRIL 2024

S/No.	Name	Institution / Location	Designation/Occupation	Phone No.	Signature
114.	ENI. S.M. KAHUMUKU	HOE/CRDC	DR	6722702372	
115.	ELIAS RUNDIGA	KR	KR	0700253088	
116.	ANGUSTINE MUGA	APEC/CRDC	Business Development	073773022	
117.	J. AICCO	KGAO-Chief	APEC Chief	0722999267	
118.	GEORGE ROBERTS NASHIRO	NGAO-AAC Chief	AAC Chief Internal Communication	0794088281	
119.	GEORGE KIMENI	APEC - CRDC	ENVIRONMENT / SOCIAL	0724770286	
120.	DAISY MACHANIA	APEC - CRDC	G. Eng.	0794263456	
121.	AGNES MARIPET	ASS/CHIEF KAREN	SHAD - KAREN SUBORDINATE	0724645303	
122.	SAMSON KOSHOR	FLDERS CHIEF	Chief of ICAS	0723955817	
123.	MARBY GIAS	APEC - CRDC	Embankment & Social	0710888422	
124.	VIRGINIA KAGERA	APEC - CRDC	CIVIL ENGINEERING	0758668095	
125.	PATRIC WALABU	KAREN	ARTIST	0714274402	
126.	SYMON CHELAL	KAREN	DRIVER	0720388181	
127.					
128.					
129.					
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131.					
132.					
133.					

KAREN STAKEHOLDERS' ENGAGEMENT ATTENDANCE HELD ON 26TH APRIL 2024

S/No.	Name	Institution / Location	Designation/Occupation	Phone No.	Signature
74.	Patric Walabu	Karen	Artist	0714274462	
75.	Symon Chelel	Karen	Driver	0720388181	
76.					
77.					
78.					
79.					
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DEVELOPMENT OF RIRUTA-NGONG COMMUTER METRE GAUGE RAILWAY LINE

TITLE: Minutes for KENHA, KURA & KERRA stakeholders' engagement.

VENUE: Kenya Railways Boardroom.

DATE: Wednesday, 24th April 2024.

TIME: 1024hrs.

ATTENDANCE: As per the attendance list attached.

AGENDA:

1. Introduction.
2. Project introduction and stakeholders briefing.
3. Presentations of project route.
4. Comments from Stakeholders.
5. Additional comments.
6. Adjournment.

ATTENDANCE: Attendance list attached.

Min	Item	Action
1.	<u>INTRODUCTION</u> The stakeholder engagement meeting kicked off at 1024 hrs with an introduction session, initiated by Kenya Railways.	ALL
2.	<u>PROJECT INTRODUCTION AND STAKEHOLDERS BRIEFING</u> After final introductions, Kenya Railways, introduced the Riruta-Ngong Meter Gauge Commuter Project, highlighting its	



Min	Item	Action
	<p>key aspects as shown below:</p> <ul style="list-style-type: none"> • The proposed Riruta-Ngong project (line 8) is the first phase of the larger Riruta-Ngong- Kiserian-Rongai commuter line connection. • Length of the proposed Phase 1 (Riruta-Ngong) commuter line is 12.5Km. • Starting point for the proposed alignment is at proposed Lenana Station, located in the Lenana/Riruta area after Wambiri Road where the line branches from the mainline Metre Gauge line of Nairobi-Malaba at Km544+200 	KR
3.	<p><u>PRESENTATION OF PROJECT ROUTE</u></p> <p>Following the project briefing, KR invited the Contractor and consultant to provide a detailed presentation of the alignment:-</p> <p>Key Highlight</p> <ul style="list-style-type: none"> i. The Proposed line commences at Lenana/Riruta area where it branches off the Nairobi- Malaba Metre Gauge Railway Line, right after Wambiri Road at Km544+200. ii. Kenya Urban Roads Authority (KURA) should consider upgrading the remaining section of Wambiri Road, taking note of the proposed Lenana Railway Station and it's access route. KURA to consider a road over rail bridge at the level crossing iii. There is a proposed frame Bridge/Culvert just before the entrance to Lenana School at DK 1+650, after 	KURA

Ø



Min	Item	Action
	<p>which the line extends through Ngong Road Forest, crossing Mama Wahu Road via an underpass to be designed with a height clearance of 4.5 meters, in accordance with the specifications outlined for class C, D, and E roads in the Road Design Manual, Part I.</p> <p>iv. The alignment then crosses the Southern Bypass over a bridge with a 6.0 m clearance onto Ngong Road's median. It was also emphasized that all required signage and barriers will be provided at underpasses and level crossings.</p> <p>v. Upon the transition onto Ngong Road's median, it was noted that the median could not sufficiently accommodate the bridge therefore necessitating road widening proposals from DK 2+000 – DK 2+760 by about 0.76m to the right side of Ngong Road as the alignment progressed in the area. This proposal appeared viable given that the 60-meter Ngong Road Corridor would accommodate these measures.</p> <p>vi. Following this path, the proposed alignment proceeds along Ngong Road's median to the Karen Shopping Center, similarly, over a bridge with a 6.0m clearance that terminates on the left hand side of Ngong Road before Zamani Business Park. It was noted that an access to Tree Lane would be provided after the bridge abutment, and will run parallel to the line, connecting Tree Lane to Ngong Road. This access road will also be extended, facilitating access to Karen Surgery and adjacent properties.</p> <p>vii. The line was noted to continue along the left hand side of the road reserve towards the Proposed Karen</p>	

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Min	Item	Action
	<p>Station after Karen Surgery area, with a subsequent bridge at DK 6+229, crossing Mbagathi River, then heading back to the right side over Kerarapon Road on another rail over road crossing with a clearance of 6.0m.</p> <p>viii. The proposed MGR line would then proceed to Embulbul Station after Crossing Kerarapon Drive via a 4.5m high underpass and finally through VET Farm to the proposed Ngong Station. It was also clearly noted that level crossings would be provided at points where the alignment crosses roads as grade.</p>	
4.	<p><u>COMMENTS FROM STAKEHOLDERS</u></p> <ul style="list-style-type: none"> • KURA noted that Kenya Railways should liaise with the KURA Surveyors to better identify affected roads after which follow-up meetings aimed at successfully implementing the alignment, would occur. • KURA also emphasized the importance of aligning the width of proposed underpasses with that of the affected roads. Towards this all the railway bridges/culvert to give a clear height clearance of 5.5 metres and should accommodate two lanes, shoulders and drainage structures. . • KURA additionally emphasized the importance of installing bridge barriers at the proposed Lenana Bridge to address height clearance issues, explaining that implementing these barriers would significantly reduce the likelihood of pedestrian accidents at this location. • The stakeholders sought clarification on whether KR 	<p>KR/CRBC/A PECT- CRDC</p> <p>KR/CRBC/A PEC-CRDC</p>

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Min	Item	Action
	<p>has begun engagements with the Kenya Forest Service, a key stakeholder, and whether the project includes provisions for upgrading affected roads or if this responsibility falls under KURA's jurisdiction.</p> <ul style="list-style-type: none"> • The stakeholders also inquired on whether KR is working with service providers to minimize damage and disruption to activities and services along the alignment. • In response, KR indicated that KFS has been participating in their stakeholder engagements and is cognizant of the project's alignment. However, a more comprehensive engagement is to be scheduled upon finalization of the alignment. This would allow Kenya Railways to formally request a way leave for the specific land use within the forest. KR also explained that they are collaborating with service providers to ensure that all affected services are considered and relevant protection measures carried out. • Finally, the stakeholders expressed an interest on where the proposed Karen Station would be accessed. The Consultant explained that the proposed station would be accessed directly from Ngong Road, to minimize the station's land use, keeping it within the Ngong Road Reserve. • KENHA acknowledged that Southern Bypass is the only road under their jurisdiction that is affected by the project. KENHA further inquired on the height of the Southern Bypass Bridge to which KR noted is 6.0m with the piers spaced 24m apart, allowing for safe and efficient flow of traffic beneath the bridge. 	<p>KR</p> <p>KR/CRBC/A PEC-CRDC</p>

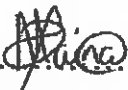


Min	Item	Action
	<ul style="list-style-type: none"> KeRRA indicated they are maintaining some of the roads affected by the proposed alignment on behalf of the County Government of Nairobi. They therefore, requested Kenya Railways to formally communicate to the County Government of Nairobi. 	KR
5.	<p><u>ADDITIONAL COMMENTS</u></p> <ol style="list-style-type: none"> Kenya Railways thanked the stakeholders for attending the meeting and emphasized the importance of an official response from KENHA, KURA and KeRRA regarding the correspondence sent by Kenya Railways. Additionally, KR highlighted that the Environmental and Social Impact Assessment (ESIA) study is nearing completion, with the final public participation scheduled for Friday, April 26th, 2024 and the ESIA draft expected to be submitted to Kenya Railways by the consultants soon afterwards. 	KR
6.	<p><u>ADJOURNMENT</u></p> <p>With no additional matters, the meeting was officially adjourned at 1230hrs.</p>	KR




Minutes Agreed by:

Name: Eng. John Maina

Sign: .....Date: 6/5/2024.....
For: KENYA RAILWAYS (KR)

Name: Eng. Misheck Waititu

Sign: .....Date: 29/04/2024.....
For: APEC-CRDC Consortium

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RE: PRESENTATION MEETING OF THE PROPOSED ALIGNMENT OF THE CONSTRUCTION OF RIRUTA-NGONG
COMMUTER LINE HELD ON KRC HEADQUARTER ON 24TH APRIL 2024.

S/No.	NAME	ORGANISATION	TELEPHONE	SIGNATURE
1.	ENG JOHN MAINA	KRC	0723498340	
2.	Eng. Ndungu Kaititu	APEC - CRAC	0723271169	
3.	JOSIAH WANDURUA	KURA	0721611120	
4.	Eng Kenneth Wagoni	KelRA	0724310808	
5.	WASHINGTON MUKAMBA	KenRA	0722730803	
6.	Eng. P. G. Gitwere	KelRA	0780446126	
7.	Eng M. Mwangi	KR	0729755186	
8.	ARCH TOBIAS OKOTH	APEC - CRDC	0722782110	
9.	DAISY MACHANJA	APEC - CRDC	0794263456	
10.	GEORGE KIMTEU	APEC - CRDC	0724770286	



RE: PRESENTATION MEETING OF THE PROPOSED ALIGNMENT OF THE CONSTRUCTION OF RIRUTA-NGONG
COMMUTER LINE HELD ON KRC HEADQUARTER ON 24TH APRIL 2024.

11.	ESTHER WANJIKU	APEC-CRDC	0725229567	acshukow@gmail.com
12.	GIDEON NDUNDA	APEC-CRDC	0704600152	gideonndunda@gmail.com
13.	Esther Njiru	APEC-CRDC	0725848834	ndunemw@gmail.com
14.	Juma Mwangi	CRBC	0796668211	1475998944@gmail.com
15.	Wang Jingy	CRBC	0769339802	2722816626@gmail.com
16.	Li Xuewen	CRBC	0798963423	570005821@gmail.com
17.	Lin Jian	CRBC	0769997345	113427767@gmail.com
18.	Wang Wangcheng	CRBC	0718324953	2917723487@gmail.com
19.	DMBACH, FRED	KR	0724006874	fombachi@krc.co.ke
20.	EMMA ODERO	KR		emgno@krc.co.ke
21.	Maryanne Irungu	KR	0732543746	mirungu@krc.co.ke
22.	Nathaniel Ochung	KR	0720533644	nochung@krc.co.ke

23 Eng. Clive Nnita
716 17 172.0
KURA
ADDC - CRDC
0723802938
cnnita@kura.go.ke
172.029122



ATTENDANCE REGISTER

DATE: 17/01/2024

SUBJECT: STAKEHOLDER • ENGAGEMENT • FIRST MEETING – VET FARM •

S/No.	Name	Designation	Organization	Email address	Phone number	Signature
1.	Mwachidudu Chimera	Ass. Manager Social Safeguards	KR		0721890643	
2.	Dr. DE KIOU	VET FARM MAN	LIVESTOCK		0222312176	
3.	Augustine Muregi	Security	ALAC/CRDC	autanmuregi@gmail.com		
4.	MARONA MICHAEL	LIAISON	KR	engmaronadoc@gmail.com 0714399523		
5.	LIM JIAN TENG	RZ	CRDC	41563432@22.com 0791599392		
6.	Wang Wangcheng	HSE	CRDC	2917723487@qq.com		
7.	Zhao Yunchuan	RZ	CRDC	0796212145		
8.	George Kimani	Social & Environment	Consultant [APED/CRDC]	0724 770 286		

9. Mr. Elias Mamei Social & Environment Consultant CRDC 0716885422



ATTENDANCE REGISTER

DATE: 17/01/2024

SUBJECT: STAKEHOLDER ENGAGEMENT - FIRST MEETING - VET FARM

S/No.	Name	Designation	Organization	Email address	Phone number	Signature
9.	Esther Wanyika	Engineer	APEC-CRDC	oagwika@gmail.com	0725229867	[Signature]
10.	Susan Emitungo	Social Safeguards OFFICER	KR	semitungo@gmail.com	0722286912	[Signature]
11.						
12.						
13.						
14.						
15.						
16.						
17.						



MINUTES OF THE STAKEHOLDER ENGAGEMENT FOR THE CONSTRUCTION OF THE LENANA STATION RIRUTA-NGONG MGR COMMUTER PROJECT HELD ON 27th FEBRUARY, 2024.

ATTENDANCE:

VENUE: Lenana School (Main Hall)

DATE: Tuesday, February 27th, 2024.

TIME: 1100hrs.

ATTENDANCE: As per the attendance list attached.

AGENDA:

1. Introduction.
2. Review of the Proposed Lenana Station Map
3. Discussions by the Lenana School representatives & ESIA Consultant
4. Adjournment.

Min	Item	Action
1.	<u>INTRODUCTION</u> The stakeholder engagement started at 1105hrs with prayers from the Frank Mutua followed by introductions.	ALL
2.	<u>REVIEW OF THE PROPOSED LENANA STATION MAP</u> After introductions by the stakeholders, the consultant presented the schematic map for the location of the proposed Lenana Station. The map highlighted the following: <ul style="list-style-type: none">• The map provides a public road, however, there is no provision for an access road in the existing physical plan;• The railway reserve is 30m;• The location of the exit route within Lenana School's map has been changed. However, the new location (after the underpass) utilized the private access road;• The plan only provides fencing at the station;• The platform will be on the left side of the station.	Consultant

Min	Item	Action
3.	<p><u>DISCUSSIONS BY THE LENANA SCHOOL REPRESENTATIVES & APEC</u></p> <ul style="list-style-type: none"> <p><u>Concern with the proposed location of the Lenana Station.</u> The representatives noted that the Riruta- Ngong' project would be beneficial to the community and endorsed the project. However, they were concerned about the safety of the students and the disruptions that would be caused due to the close range of the station to the school.</p> <p>The consultant stated that the excavation had been halted and that the specific location of the station was still under review.</p> <p><u>Access to the Platform</u> The representatives were concerned that the platform would be accessible from the right side, however, the Consultant assured them that the access would be restricted.</p> <p><u>Provision of a fence</u> The lack of a provisional fence on the map was noted as a critical safety issue which should be addressed by the Consultant. In addition, the Head Principal stated that Kenya Railways had agreed to provide reinforced concrete posts and chain-link fences at the Primary School. However, the agreement had not been met; it was agreed that the School, in writing, would address Kenya Railways regarding the issue.</p> <p><u>Drainage of stormwater on the underpass</u> The school's representatives suggested that the new drainage can be channeled to the school's dam.</p> <p><u>Access to the station</u> The representatives suggested an underpass across the existing rail joining Mama Wahu Road to serve as access to the station. In addition, the Consultants were encouraged to take note of the additional population of the students that will be admitted to the new primary school.</p> 	Consultant
4.	<p><u>CONCLUSION</u></p> <p>It was noted that there would be public participation was scheduled at the newly constructed primary school on Wednesday, February 28th, 2024 from 1000hrs.</p> <p>The meeting was concluded with the Consultant having listened to the facts regarding the</p>	ALL



Min	Item	Action
	proposed location. The facts would be reviewed according to the station on the ground.	
5.	<u>ADJOURNMENT</u> Dr. Ndegwa serving as the Chair, expressed gratitude to all attendees for their cooperation and officially adjourned the meeting at 1255hrs. With no additional matters, Ms. Kimberly concluded the proceedings with a word of prayer.	ALL

Minutes Signed by:

For: APEC/CRDC CONSORTIUM (CAEC)

Name

Augustine Murega

Date:

16/05/2024



Sign.

[Signature]



APEC- CRDC CONSORTIUM

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CRDC

CONSULTANCY SERVICES FOR UNDERTAKING RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR CONSTRUCTION OF THE RIRUTA - NGONG MGR COMMUTER

3RD FLOOR, BLOCK D
KENYA RAILWAYS HEADQUARTERS
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ATTENDANCE FOR A CONSULTATIVE METTING BETWEEN LENANA SCHOOL AND ESIA CONSULTANT HELD ON 27TH FEBRUARY 2024 AT LENANA SCHOOL

S/No.	Name	Institution	Email	Phone No.	Signature
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S/No.	Name	Institution	Email	Phone No.	Signature
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MINUTES OF THE PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT FOR EMBULBUL AREA ON RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE CONSTRUCTION OF THE RIRUTA-NGONG MGR COMMUTER PROJECT HELD ON 15TH MARCH, 2024.

VENUE: Deliverance Church Embulbul
DATE: Monday, 15th March 2024
TIME: 1030 hrs
ATTENDANCE: As per the attendance list attached

AGENDA:

1. Opening Remarks and Introduction.
2. Project Introduction and Stakeholder Briefing.
3. Project Environmental and Social Impacts
4. Comments from Stakeholders.
5. Comments from Client and Consultant.
6. Adjournment.

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1.	<p><u>OPENING REMARKS AND INTRODUCTION</u></p> <p>The meeting commenced at 10:30 AM with a word of prayers. The meeting was chaired by Metrine Wafula (DCC of Kajiado North). In attendance were Mahmoud Dida (Senior Chief Embulbul), and Sylvia Ochola (ACC Kajiado North), the area MP, MCA and various national and county Governments representatives. The meeting attendees were welcomed, and were encouraged to express their views and concerns in regard to the proposed project.</p> <p>It was articulated by the DCC that the stakeholder engagements were of significant importance since their objective was to ensure comprehensive and inclusive participation by all in order to raise concerns on the proposed project. The significance of bringing all stakeholders from the area on board was further emphasized.</p> <p>The DCC highlighted some of the key stakeholders represented as follows:</p> <ul style="list-style-type: none"> • Kenya Urban Roads Authority, KURA • National Environmental Management Authority, NEMA • National Police Leadership Academy, NPLA • Kenya Power and Lighting Company, KPLC • National Police Service • Ngong Municipality • County Government of Kajiado • Member of Parliament - Kajiado North • Area MCA 	Info

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2.	<p><u>PROJECT INTRODUCTION AND STAKEHOLDERS BRIEFING</u></p> <p>The Client and Consultant introduced the Riruta-Ngong Meter Gauge Commuter Project, highlighting key aspects as listed below:</p> <ul style="list-style-type: none"> Length of the proposed line - 12.5Km. The Consultant subsequently delineated the alignment from Lenana Station to Ngong Station, emphasizing minimal necessity for land acquisition citing that the road corridor will be largely used. Operating Speeds - 50km/h maximum. The Consultant explained that the speed of the train will be safe since braking and starting off will not be a challenge. Number of the proposed railway stations include: - <ul style="list-style-type: none"> Ngong Station. Bulbul Station. Karen Station. Lenana Station. <p>The client highlighted that only Ngong Station will be large in size while all other stations will be lean.</p> <ul style="list-style-type: none"> Functionality - <ul style="list-style-type: none"> Purpose: The meter gauge railway is designed to enhance accessibility for commuters within the project area. Schedule: The railway will operate at various intervals throughout the day, not limited to peak hours. Cargo Exclusion: The rail system will exclusively cater to passenger transport and will not facilitate the carriage of cargo. Reasons for the Project <ul style="list-style-type: none"> Traffic Reduction: The primary objective of the project is to alleviate traffic congestion on Ngong Road by providing alternative means of transport to the residents. Therefore, the commuter railway line will act as an alternative means of transport for residents between Ngong area and Nairobi Central Business District. Environmental Impact: As a result, there will be a subsequent reduction in carbon emissions, contributing positively to the climate and overall well-being of the residents. <p>The Client emphasized that a stakeholder engagement was significant in garnering perspectives from relevant parties before project implementation. This process also serves as a platform for addressing any pertinent questions that may arise.</p>	Info
3.	<p><u>PROJECT ENVIRONMENTAL AND SOCIAL EFFECTS</u></p> <p>The proposed project positive and negative impacts were highlighted as well as the proposed mitigation measures. The key project benefits included local employment opportunities, cheaper and convenient means of transport, reduced carbon emissions, reduced traffic congestion, organized transport systems, among other.</p>	

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	<ul style="list-style-type: none"> <u>Impacts on private and institutional land</u> It was observed that ensuring minimal disruption of private property was prioritized in the design. In light of this, the alignment is primarily traversing the existing road corridor, with the aim of minimizing disturbances to properties and businesses. In instances where private property is affected, an assessment is being conducted by the Consultant to identify the specific land parcels. Subsequently, a separate meeting will be arranged by the Consultant to engage with the affected individuals and address the land acquisition processes and emerging matter accordingly. Several institutional land was affected by the project, meetings between the consultant and the impacted institutions were been planned in the coming few weeks. <u>Accesses and Level Crossings impacts</u> The Consultant noted that accesses and level crossings would be provided on minor roads/entrances and grade separation applied to crossings on major roads ensuring minimum disruptions to traffic along the affected routes. They also noted that the Contractor would provide alternatives for any access disrupted during the project implementation. <u>Safety impacts</u> It was emphasized that all borrow pits intended for use by the Contractor during construction will be expected to have EIA and NEMA licenses to ensure their safety for use without adverse effects on residents. Additionally, the Contractor will be required to ensure that all vehicles utilized on public roads meet roadworthy standards and adhere to appropriate speed limits to mitigate the risks of accidents. The contractor will be expected to formulate a traffic management plan during the project implementation. Necessary measures will be expected to be put in place to address safety concerns within construction sites, camp sites and material site. <u>Vibration and Pollution Effects</u> Measures to mitigate vibrations, sound, water, and dust pollution had been provided for in the ESIA report to implemented by the Contractor. Prevention of pollution will be key, necessary measures will be put in place to mitigate in areas where pollution was unavoidable. <u>Deforestation</u> It was highlighted by the Consultant that trees may need to be cut to create a corridor for the railway line. The report proposes that the loss of trees will be offset by implementing a replanting strategy and planting additional trees along the railway corridor, leading to environmental compensation. <u>HIV/AIDS & STDs</u> Due to observed risks of disease spread as documented in previous projects, it was noted that the project will be expected to conduct public sensitization on this matter during project implementation. Additionally, they will be tasked with ensuring the provision of informational materials regarding disease prevention, supply of condoms and VCT services as well as working with local stakeholders. <u>Utility Services disruptions</u> 	Info

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	<p>The consultant explained that the utility services on the alignment are in the process of being identified and that appropriate protection and relocation measures are proposed in the ESIA report. It was emphasized that relocation plans would be executed prior to the commencement of construction to mitigate disruptions to the residents and businesses in the vicinity. The project will work together with various service providers in order to ensure minimal disruptions and appropriate reconnections</p> <ul style="list-style-type: none"> • <u>Employment opportunities</u> The consultant explained to the stakeholders, that the proposed project is set to provide employment opportunities to the communities along the alignment. Direct employment would however be limited. Nonetheless, it was highlighted that at least 60% of the available positions would be reserved for local residents. • <u>Corporate Social Responsibility</u> The consultant noted that CSR is not within the contract scope and thus it is not a contractual obligation of the contractor. They advised that the requests of the community on CSR should be directed to Kenya Railways not the contractor. • <u>Water and Electricity Disruptions</u> During construction, the contractor is expected to address these disruptions as soon as possible. They are also required to send notices to the communities before any possible disruptions for the purpose of preparedness. • <u>Grievance redress mechanism</u> The project will establish a grievance redress mechanism to deal with all complaints in regard to the project implementation. The members of the public among other stakeholders will be part of the grievance redress committee membership. • <u>Economic growth</u> In addition to creation of employment opportunities, APEC-CRDC noted that the proposed Riruta-Ngong MGR Commuter project would enhance the economy of areas along the alignment. This would be contributed to by factors such as: <ul style="list-style-type: none"> - Ease in transportation to, from and within the areas along the alignment. - Easy access to housing and businesses along the alignment. - Visual appeal of the area - Increased property values - Enhance business opportunities - Skills transfer 	
4.	<p><u>QUESTION AND ANSWER SESSION</u></p> <p>1. WELCOMING OF THE PROJECT</p> <p>The stakeholders expressed their acknowledgment and support for the project. They conveyed gratitude to all involved parties, including fellow stakeholders, the client, and the consultant, for facilitating and participating in the stakeholder engagement. However, concerns were</p>	<p>Info</p> <p>Consultant</p>

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	<p>raised regarding the repeated postponement of stakeholder engagements, seeking clarification on the reasons for these delays.</p> <p>Response: It was noted by both the Client and Consultant that the alignment had not yet been finalized previously. Therefore, they expressed that it was not appropriate to engage the stakeholders at that time, as the impacts would not have been easily identified, thus they had to postpone the engagement to an appropriate time and date. Nonetheless, they apologized for any inconvenience caused.</p> <p>2. RAILWAY ALIGNMENT PRESENTATION</p> <p>They further expressed their disappointment in the presentation of the railway alignment and expressed that a better presentation more so a PowerPoint/visual one would have been better for internalization and understanding of the project line. They further reiterated that the alignment presentation would have answered pertinent questions that were being raised in the engagement such as effect on water table, station location and its access.</p> <p>Mr. Macharia Gaitho further emphasized that he had earlier written to the Client requesting for the alignment and he had not been given a response. He then reiterated that he had been waiting for this alignment to be clearly presented in the engagement considering it had not yet been sent to the public or even revealed to the public. He stated that this action by the Client raised eyebrows.</p> <p>Response: The Consultant highlighted that the venue had been changed earlier that morning due to the ongoing rains, resulting to inadequate preparation of connection systems by the owners of the new venue for the presentation. Nonetheless, it was assured that materials to further examine the route alignment would be provided during and after the engagement for interested parties since the consultant had all the necessary gadgets including the computer available. They emphasized that the alignment had not been confirmed for public sharing and thus could not have been disclosed before. The residents were encouraged to visit the info desk for viewing of the alignment among other project features.</p> <p>3. EMPLOYMENT</p> <ul style="list-style-type: none"> Eli Gor - MCA Oloolua Ward <p>Eli Gor highlighted that 70% of employment positions remain unfilled by local residents despite the project's commencement. He further noted instances where employed individuals had short tenures and were subsequently terminated. Concerns were also raised regarding alleged harassment of the employees by law enforcement authorities. It was emphasized that the local community deserves respect and opportunities for employment.</p> <ul style="list-style-type: none"> Onesmus Ngogoyo - MP. Kajiado North <p>He stated that he understands that matters of employment are to be dealt with between the client and contractor. He then promised to convene a meeting through the DCC together with the client and contractor to address this pertinent issue. He acknowledged that this issue was</p>	Client

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	<p>not within the consultant's mandate. Nevertheless, he stated that all job seekers at the Contractors Camp should ensure that they had letters from their area Chiefs.</p> <ul style="list-style-type: none"> Regina Wambui <p>She conveyed that she would like a committee to be formed to address the employment issues and also to be provided with a clear detailed explanation on how the recruitment process will be conducted once the Contractor begins recruiting workers from Bulbul area.</p> <ul style="list-style-type: none"> Clinton Atuti <p>He made an inquiry regarding the provision of training or employment opportunities for locals during the operational phase of the project.</p> <p>Response: The Consultant explained that direct employment opportunities within the project are limited due to the finite number of available slots hence cannot accommodate everyone seeking for employment in the area. He urged stakeholders to consider indirect employment opportunities, such as providing services such as foodstuff preparation for the laborers, supply of goods and services to the contractor, etc. Additionally, he noted that during the operational phase of the project, the Client's employment policies, as a government parastatal, would be enforced.</p> <p>4. BULBUL STATION</p> <ul style="list-style-type: none"> Eli Gor - MCA Ololua Ward <p>Eli Gor proposed the relocation of the Bulbul Station closer to Bulbul Town, citing concerns over increased transportation expenses associated with its current placement.</p> <ul style="list-style-type: none"> Hamisi Ramadhan <p>He asked about the safety of the commuters at the Bulbul Station during the night and suggested that street lights should be provided at the station and its access roads. He also requested that parking should be availed to allow for park and ride services.</p> <ul style="list-style-type: none"> Godfrey Isenda <p>He raised a query regarding the last-mile transport options from the station to various destinations for commuters. He emphasized that this mode of transport should not be prohibitively expensive, as it could discourage the utilization of the railway.</p> <p>Response: The Consultant explained that all proposed stations have been designed to include sufficient parking facilities to enable park and ride services. Additionally, they stated that street lighting would be installed along the access roads for security purposes. Furthermore, it was clarified that all access roads would be constructed by the Contractor as an integral part of the project. The stakeholders were advised that while the last-mile transport options may not meet everyone's expectations, efforts would be made to enhance active mobility.</p>	

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	<p>The location of the station was confirmed to be the most ideal and accessible to the resident of Embulbul.</p> <p>5. CORPORATE SOCIAL RESPONSIBILITY</p> <ul style="list-style-type: none"> Eli Gor - MCA Ololua Ward <p>Eli Gor advocated for the inclusion of the Bulbul area in corporate social responsibility initiatives. Specifically, he suggested prioritizing improvements of road drainage infrastructure over investments in educational facilities, citing the area's severe drainage issues, particularly during the rainy season.</p> <ul style="list-style-type: none"> Onesmus Ngogoyo - MP. Kajiado North <p>He stated that he had begun the process of addressing the CSR initiatives. He further expressed that fellow stakeholders should acknowledge that particular meeting could not address CSR matters. In addition, he stated that he would convene a meeting with the area MCA on his suggestions before presenting them to the Client.</p> <ul style="list-style-type: none"> Joseph Njunge <p>He stated that all leaders with interest in the CSR initiatives should involve the community and hold engagements in order to benefit all stakeholders.</p> <p>6. SAFETY</p> <ul style="list-style-type: none"> Onesmus Ngogoyo - MP. Kajiado North <p>He stated that there is a high population in the Embulbul area where the railway alignment passes through. He stated that he expected reduced human conflicts with the train activities in this area. Additionally, according to MGR railway design, there is no fence along the alignment like that of the SGR. Therefore, he asked that the consultant advise the contractor to put in place safety measures such as fences.</p> <p>Response: The Consultant explained that due to a larger portion of the railway line being elevated, a fence was deemed unnecessary. However, it was clarified that subgrade areas in high-density areas such as towns would be equipped with fences to ensure safety along the corridor.</p> <p>7. PROPOSED TRAIN FREQUENCY</p> <ul style="list-style-type: none"> Hamisi Ramadhan <p>He asked about the frequency of the commuter train services noting that a low frequency of morning and evening would not be an adequate alternative for the transportation modes in Bulbul area.</p> <p>Response: The Consultant stated that the railway line serves as an alternative means of transport and may not be able to accommodate everyone within its running time. The Client further emphasized that the demand for the train would dictate whether the number of units</p>	

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	<p>will be increased and the frequency of the train. The Client also mentioned an ongoing study to comprehend the demand, aiming to determine an optimal frequency, which will be discussed with the community before the train operations commence.</p> <p>8. DRAINAGE</p> <ul style="list-style-type: none"> Onesmus Ngogoyo - MP. Kajiado North <p>He asked that the drainage of the railway line should be such that it does not impact the existing systems and affect the existing infrastructure.</p> <p>Response: The Consultant noted this and assured that it would be incorporated into the ESIA report.</p> <p>9. IMPACT OF PREVIOUS SGR PROJECT</p> <ul style="list-style-type: none"> Kariuki Mutahi - Kangawa Residents Association <p>He expressed his concerns about the project's impacts considering some sections of SGR had blocked access roads passing through the area which have never been completed to date. He referred to the Kangawa area as a "forgotten area" as it wasn't accessible due to the impacts of the SGR. He therefore urged the Client to guarantee that the project wouldn't have the same impact as that of the SGR as well as explain why there is a holdup on completion of the access roads damaged during SGR implementation.</p> <ul style="list-style-type: none"> Sophia Katampoi <p>She reiterated Kariuki Mutahi's point and explicitly stated that the Kangawa roads are impassable. She further inquired if there are any plans for the Client to rehabilitate the damaged roads.</p> <ul style="list-style-type: none"> Carol Lewett <p>She asked whether the negative environmental and social impacts of the SGR have been mitigated against in the upcoming project. She then suggested that the Client considers some of the aggregate/ballast in Vet Farm to sort out the drainage issues in the roads affected by the Vet Farm project.</p> <ul style="list-style-type: none"> Chris Mburu <p>He expressed his concern of the upcoming project impact on the already dwindling water levels in Kerarapon area. He stated that the SGR project had blasted an aquifer while constructing a tunnel and thus had redirected the water flow for Kerarapon Spring to flow to the opposite direction. He explained that the spring used to serve 3 communities; Oloolua, Kerarapon and Kibiko simultaneously before the interference. He further explained that at the moment, the water cannot be pumped at the same time for the 3 communities and he therefore wanted to know if the meter gauge railway will further affect this water source. He</p>	

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	<p>stated that he expected alternatives to be provided and that the ESIA report should clearly state how deep the contractor will dig to avoid further damage.</p> <ul style="list-style-type: none"> Francis Kamau <p>He raised a concern regarding compensation from the Client for individuals affected by the SGR project, particularly after tunnel blasting. He highlighted those areas such as Kerarapon, Oloolua, and Ngong required compensation due to the impact on their water sources. He urged key stakeholders, including NEMA, to ensure that they hold the Client and Contractor accountable in the upcoming project to prevent unnecessary impacts on the public.</p> <p>Response: The Client stated that ongoing consultations with KeRRA are in progress to address issues concerning hanging bridges and incomplete roads. Additionally, they mentioned unresolved land compensation issues with Kenya Forest Services that still require attention. While acknowledging the slow progress in resolving these matters, they expressed their sincerest apologies. The Consultant advised stakeholders to directly submit their concerns in relation to unresolved SGR issues to the Client through a letter so as to expedite the resolution of such issues.</p> <p>10. TYPE OF TRAINS</p> <ul style="list-style-type: none"> Isaac Memusi <p>He inquired about the type of rains that would be provided by the Client during its operation. He expressed his concerns over noise and emissions by the old train wagons and the length of these trains.</p> <p>Response: The Consultant clarified that the railway was designed to function primarily as a commuter train and thus would not be utilized for cargo transportation. They further explained that Diesel Multiple Units would be employed for this purpose, as these trains produce less noise and emissions compared to their predecessors.</p> <p>11. HIV/AIDS SENSITIZATION</p> <ul style="list-style-type: none"> Isaac Memusi <p>He inquired if this sensitization would be done during the implementation phase of the project only. He argued that consultation measures should be undertaken even during the operation phase.</p> <p>Response: The Consultant explained that the stakeholder engagement and consultation plan will continue as the project progresses, as they are part of the contractual obligations. However, after the project is completed, it would become the responsibility of the stakeholders.</p> <p>12. ESIA PROCESS AND REPORT</p> <ul style="list-style-type: none"> Regina Wambui 	

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	<p>She sought an explanation on why construction had already begun before public participation was completed.</p> <ul style="list-style-type: none"> Sophia Katampoi <p>She asked whether the hydrological water levels that had been affected by previous projects would be noted in the report as well as the expected impact of the new project on the water level in the area. She further inquired on the protection measures put in place to protect Esilange spring - a source of water in Vet Farm from any impact/adverse effects during construction.</p> <ul style="list-style-type: none"> Mapenzi Baya <p>She expressed her disappointment in the lack of proper presentation of the alignment. She then asked if once the alignment is shared, another engagement will be held to address any arising questions that need to be addressed. She further expressed that after the meeting, the alignment should be shared to the general public for internalizing as well as other relevant documents such as the ESIA report. She even asked if another subsequent engagement will be held and shared that public participation ought to be meaningful and conclusive.</p> <ul style="list-style-type: none"> Ibrahim Mohammed <p>He stated that no public participation had been conducted for Oloolua Ward. He stated that the representation of Oloolua in Ngong Stakeholder Engagement was not enough.</p> <ul style="list-style-type: none"> Honorable Ngata <p>An inquiry was made regarding the commencement of the project before the submission of the ESIA (Environmental and Social Impact Assessment) report. It was expressed that there was a perception that the due process had not been diligently adhered to in comparison to other projects in the country.</p> <p>Response: The Consultant explained that the design review process of the alignment needed to be completed before finalizing the route alignment for public presentation in stakeholder engagements. They emphasized the importance of presenting an alignment that had addressed most of the issues concern and had minimal impact on the community. It was mentioned that construction had only commenced at the Ngong Station area since that particular design had been confirmed with no major changes.</p> <p>Furthermore, the Consultant clarified that this stakeholder engagement was an integral part of the process of developing the ESIA report. They noted that the document could not be shared beforehand as it was still incomplete, but once finished, it would be presented to the public. Stakeholders were encouraged to share their views and concerns for incorporation into the report, including written memorandums.</p> <p>Additionally, it was stated that NEMA was responsible for monitoring and ensuring that the Contractor adhered to the required limits and the ESIA report. Moreover, stakeholders and</p>	

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	<p>the local community were to be involved in all phases of the project through a designated liaison officer.</p> <p>13. PERSONS WITH DISABILITIES</p> <ul style="list-style-type: none"> • Sophia Katampoi <p>She called out the Consultant for not engaging a sign language interpreter provision in the engagement as some of the stakeholders had hearing impairments.</p> <p>Response: The Consultant apologized for this oversight and promised that in upcoming engagements, the provision would be considered, however, the said participants could as well notify the consultant of any gaps, since he had a personal interpreter in the meeting.</p> <p>14. PROJECT COST</p> <ul style="list-style-type: none"> • Sophia Katampoi <p>She inquired about the project cost.</p> <ul style="list-style-type: none"> • Ibrahim Mohammed <p>He asked that the total project funds allocated to the project should be disclosed as well as the Bill of Quantities to be provided to the stakeholders.</p> <p>Response: The Consultant explained that the summary of the Bill of Quantities (BoQ) would be provided in the ESIA report, as it is not a public document but a private contract between the Client and Contractor. Additionally, the Consultant clarified that the project cost does not influence Corporate Social Responsibility (CSR) initiatives, as suggested by some members. The estimated project cost was 8 billion Kenyan Shillings.</p> <p>15. WILDLIFE</p> <ul style="list-style-type: none"> • Sophia Katampoi <p>She explained that Vet farm is a migratory corridor for wildlife and construction of the railway in this area might block the animals from migration. She then urged the Consultant to liaise and engage with the local Community Forest Association in order to avoid cutting off the lifeline of the community.</p> <p>Response: The Consultant explicitly stated that animals would still be able to cross the area and that no adverse impacts were anticipated on the animal migration routes. Furthermore, they mentioned that close collaboration with KFS and possibly with local community forest associations will be cultivated to ensure that all potential impacts are effectively mitigated.</p> <p>16. BLASTING</p> <ul style="list-style-type: none"> • Chris Mburu <p>He stated that some previous projects undertaken had cracked an aquifer in Vet Farm causing its water level to drop when they were sourcing for ballast in the land. He thus sought to</p>	

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	<p>know whether the project planned to also source for its ballast from Vet Farm and how would the effects of blasting on the neighboring households be mitigated as well as any effect on the water levels and aquifers had to be avoided.</p> <p>Response: The source of the ballast would be at Athi Stone which is the same as that of SGR Phase 2. The Consultant would advise the Contractor on conducting baseline survey of areas around where blasting activities are likely to occur.</p> <p>17. TRAFFIC DISRUPTIONS</p> <ul style="list-style-type: none"> Chris Mburu <p>He inquired whether there were any alternative routes that the Contractor would provide during project implementation for ease of traffic movement.</p> <p>Response: The Consultant stated that before the Contractor begins work, they would have to prepare a programme of works that will be reviewed by the Consultant which would provide alternative routes/diversions for any affected routes as well as traffic management plans.</p> <p>18. NOISE</p> <ul style="list-style-type: none"> Joseph Njunge <p>He inquired whether the noise levels of the MGR train will be the same as that of the SGR train. And if so, will there be any measures of mitigation against the same.</p> <p>Response: The MGR train is expected to have lower noise levels.</p> <p>19. GRIEVANCE REDRESS COMMITTEES</p> <ul style="list-style-type: none"> Mwajuma Yusuf <p>She emphasized the importance of accountability and transparency in the formation of the grievance redress committee, urging fellow stakeholders to ensure their involvement. Furthermore, she inquired about the actions that would be taken if the issues outlined in the ESIA report are not effectively implemented or mitigated as stated.</p> <p>Response: The Consultant explained that members of these committees are typically elected by the public. However, it was clarified that while not everyone can be directly involved in the committee, their views can still be represented by the select few who will be present during the election. The residents should be involved in monitoring adherence status to the project ESIA report. NEMA is mandated to ensure enforcement for ESIA license conditions. The client will be represented by a consultant through the RE's office who should ensure that the ESIA report is implemented as per the license conditions given by NEMA.</p>	
5.	<p><u>ADDITIONAL COMMENTS FROM KEY STAKEHOLDERS</u></p> <p>KENYA POWER & LIGHTING COMPANY (KPLC) - TRACY KONCHELLA</p> <p>They expressed their support to the project and highlighted concerns regarding the need for continuous engagement by the Consultant and Contractor. She emphasized the importance of</p>	STAKE HOLDE RS

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	<p>initiating the relocation process promptly to prevent power interruptions during construction, she expressed KPLC's desire to collaborate with all involved parties in good faith to ensure the smooth execution of the project.</p> <p>KENYA URBAN ROADS AUTHORITY (KURA) - ENG. JOSEPH KHIKO</p> <p>He expressed gratitude to the Client and Consultant for convening the meeting to address and consider the perspectives of stakeholders. He extended thanks to fellow stakeholders for actively participating in the engagement and voicing their views and concerns. He highlighted that the alignment intersects with KURA's corridor, Joseph emphasized the necessity for the Client to arrange an engagement session involving KURA, Kenya Rural Roads Authority (KeRRA), and Kenya National Highway Authority (KeNHA) to address pertinent design issues. He further emphasized the importance of engaging KURA and other relevant agencies before the submission of the ESIA report to NEMA, stressing that proper alignment presentations must be conducted to the road agencies to provide feedback effectively.</p> <p>He then advised the Client to separately engage other government agencies, including:</p> <ul style="list-style-type: none"> • Kenya Forest Service (KFS) • Nairobi City Water and Sewerage Company • Kenya Power and Lighting Company (KPLC) • Water Resources Management Authority (WARMA) • Relevant County Governments <p>This proactive engagement aimed at securing a motion of No Objection to the project from all these offices to facilitate the smooth continuation of the project without obstacles.</p> <p>Joseph addressed the matter of dualling of Ngong Road, noting that funds had not yet been allocated by the government for the project. He clarified that once funding becomes available; the project would commence. Nonetheless, he advised stakeholders to fulfill their role in advocating for the project by engaging their leaders and correspondingly writing letters to relevant offices to further emphasize the project's significance.</p> <p>NGONG MUNICIPALITY - ANDREW MARASUA</p> <p>He commended the project, noting its potential to bring growth to the area. He addressed the issue of waste management and disposal, emphasizing that the topsoil excavated should not be disposed off into the rivers within the region. Instead, he suggested utilizing the numerous quarry sites in the area as dumping sites.</p> <p>Furthermore, Andrew highlighted the significance of the natural ecosystem in the Ngong area, emphasizing its role as a water catchment area. He stressed the importance of preventing siltation or blockage of surface runoff to safeguard the water collected and treated by Ololaiser Water and Sewerage Company for public use. He further urged the Consultant to provide mitigation measures for oil spills and contamination.</p> <p>Additionally, Andrew emphasized the importance of early tree planting, noting that during the operational phase, the train may produce carbon emissions that could impact public health. Trees, he noted, can absorb such gases, thereby mitigating potential health risks to the general public.</p> <p>NATIONAL POLICE LEADERSHIP ACADEMY - KIPLAGAT CHIRCHIR</p>	

Min	Item	Action
	<p>He emphasized that any government project aims to benefit the community. Kiplagat urged the community to embrace and support the project, acknowledging that both positive and negative impacts are inevitable in any project. He emphasized the importance of understanding how to mitigate the negative impacts to fully enjoy the benefits of the project.</p> <p>OLOOLAISE WATER AND SEWERAGE COMPANY</p> <p>She emphasized that the Contractor should avoid removing their water pipes without notice and not replacing them afterwards. She stated that this caused water problems for the public and that further pushed their office into a corner.</p> <p>NATIONAL ENVIRONMENTAL MANAGEMENT AUTHORITY (NEMA) - ALICE SIANTEI</p> <p>She clarified that the Environmental and Social Impact Assessment (ESIA) is an ongoing process, with the report currently under development. She reminded stakeholders that their engagement was a crucial part of the ESIA process, and thus, their concerns and issues raised were meant to be captured in the report.</p> <p>Alice further explained that NEMA's review of the report involves assessing the presented impacts and their associated mitigation measures and their practicability. She assured stakeholders of another opportunity to engage once the report is submitted by the Consultant. At that point, the report would be published in the dailies twice, allowing stakeholders to raise any concerns to NEMA that may not have been captured.</p> <p>Additionally, Alice informed stakeholders about NEMA's incident report landline, which can be utilized to report any emerging issues during the construction phase of the project:</p>	
6.	<p><u>ADJOURNMENT</u></p> <p>With no additional matters, ACC Mwangaza concluded the proceedings by offering a brief prayer. Subsequently, he expressed gratitude to all attendees for their cooperation and officially adjourned the meeting at 1425hrs.</p>	ALL

Confirmation of Minutes:

APEC/CRDC Representative

Augustine Muenya
(Environmental and Social Impact Assessment Consultant)



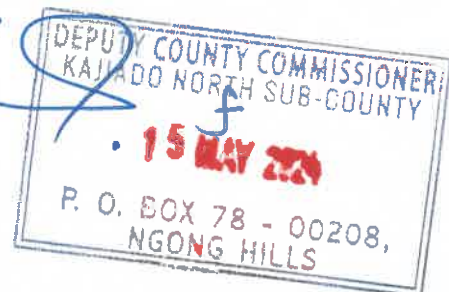
Kenya Railways (KR) Representative

Stella Ndiwa 7/5/2024



DCC Office Representative

Stephen Komora
(Acc - Ngong)





APEC- CRDC CONSORTIUM






















CONSULTANCY SERVICES FOR UNDERTAKING RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR CONSTRUCTION OF THE RIRUTA - NGONG MGR COMMUTER

3RD FLOOR, BLOCK D
KENYA RAILWAYS HEADQUARTERS
WORKSHOP ROAD-OFF HAILE SELASSIE AVENUE
NAIROBI-KENYA




















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EMBULBUL STAKEHOLDERS ENGAGEMENT HELD ON 15TH APRIL 2024, AT CHIEF'S CAMP




















S/No.	Name	Institution/Location	Designation/Occupation	Phone No.	Signature
1.	Elizabeth Wangari	Embulbul	CSR / SOLS INCLINATIONS	0733550016	Elizabeth Wangari
2.	Elizabeth Waweru	Embulbul	Businesswoman / SOLS	0708270648	Elizabeth Waweru
3.	Emm. S.M. KAHUNGU	APEC / CRDC	PR	0722702372	Emm. S.M. KAHUNGU
4.	George Kimani	APEC / CRDC	S & Fmt.	0724770286	George Kimani
5.	Augustine Mwangi	APEC / CRDC	Environment / SOLS	0737302222	Augustine Mwangi
6.	Nadha Mwangi	APEC / CRDC	Ass. Eng.	0713159914	Nadha Mwangi
7.	Bless Mwangi	APEC / CRDC	STE	0708855522	Bless Mwangi
8.	Sophia Katampoi	Embulbul / Doolua	Doolua Ward Climate Change Committee	0716730978	Sophia Katampoi
9.	Carol Kwarisi	Keragon	BUSINESS	0722846888	Carol Kwarisi
10.	DAISY MACHANIA	APEC / CRDC	G. Eng	0794263456	DAISY MACHANIA
11.	Gideon Kibundi	APEC / CRDC	G-Eng.	0700650152	Gideon Kibundi
12.	HASSAN ABBI HASSAN	Embulbul		0757027899	HASSAN ABBI HASSAN

S/No.	Name	Institution/Location	Designation/Occupation	Phone No.	Signature
13.1	Mymina Hassan	Embul bul		0797074629	
14.1	Neak Asang	Prepofo	Rehabilit	0731690787	
15.1	Charles Ameyi	Embul bul	Resident at	0722570375	
16.1	BENED KASIO	ODOUKE	Advien	0715 051408	
17.1	Joseph Hyunge H	Embul bul	RESIDENT	0707180230	
18.1	Mwasura Kinsiro	Embul bul	RESIDENT	0706964203	
19.1	Stanley Hengge	Embul bul	Resident	0708000664	
20.1	Mohamed K.	Embul bul	Resident	07129224640	
21.1	Stephen Komora	Embul bul	ACC	0716013522	
22.1	Alphonse Kuning	Embul bul	Resident/Asst Chief	0727887875	
23.1	Nagato ONKENS	M7P		0723 601415	
24.1	MERIANE M. WATUA	KASIOBO MARKET	DEC	0725662088	
25.1	Loise Mathis	Kajigad NORTH	D/SCA	0723213961	
26.1	ANTHONY MARIKI	Word Admin		0719220743	
27.1	SYLWIA OCTOLA	WASIKBO MARKET	ACC	07116854707	
28.1	MAMINGA SIDA	Embul bul	SDR. CHIEF	0723591126	
29.1	Lumotko Francis	Kasapoch	ASST CHIEF	0728071966	
30.1	JACARSON GITELU	Vit Bul GELK	V/A Bul	0720706486	
31.1	Susan Emithondo	KRC	SSO	0722286910	

S/No.	Name	Institution/Location	Designation/Occupation	Phone No.	Signature
32. J. N. I	Godfrey S. Gisoro	DLobug	Business	072362689	
33. I	BETH WATHURU	EMBU - BUL	Casual	0723199774	B. N
34. I	HANNAH WAMBUI	EMBU - BUL	Casual	0796384347	H. N
35. I	REGINA TABITHA	EMBU - BUL	Casual	0729028283	R. B.
36. I	ISAAC MEMUSI	EMBU - BUL	Business	072065255	
37. I	MUSUMBU MUSA	POLICE OFFICER HPLA	OCS	072032250	
38. I	ESTHER KASANDI	MINISTRY OF INFORMATION	KNA	0705445347	
39. I	GEORGE OTIENO	Bul/Bul	RESIDENCE	0725948447	
40. I	HELEN WAMBUI THUD	KAJIUMU NORTH	BUSINESS	0700387850	
41. I	ESTHER WAMBUI MURITHI	" "	"	0721248051	
42. I	Julia Kambui	Embu - Bul.	Casual	0112731766	B. N.
43. I	Fidelis Kiangosho	Embu - Bul	Casual	0713171664	F. N.
44. I	Gibson Mwangi	Embu - Bul	Casual	0746803686	
45. I	Hiram Muthoni	Embu - Bul	Casual	0769007420	
46. I	JACKSON STELU	V/A Bulbul	C.G.K	072591776	
47. I	MURIEL DADA	SAR. HIRE Bul	7660	0722369864	
48. I	JOHN KARANGA	RESIDENT BULBUL	CASUAL	0722369864	
49. I	KILIAN MUGAT	KIRARA POND	Casual	0722642914	
50. I	Naomi Wanjiku	ole polas resident	Casual	0718504951	

S/No.	Name	Institution/Location	Designation/Occupation	Phone No.	Signature
51	Stella Ndiwa	KRC	SEO	0123332981	
52	ALEX SIMON KIMUNDO	EBULBU	Businessman	0787000007	
53	PAULINE TATUA	NEMA	GO/CI	0927846852	
54	DENNIS NISOKE	EMBU-L-BUL	Resident	070493209	
55	Mapezi Baya	Olepolos	Resident	0486226207	
56	Charles Giso	Kenya-Bul-Kangunda K1	Resident	0722623609	
57	Levine Elishe	EMBU-L-BUL	Resident	0785400995	
58	ALAB NJUNGE	EMBU-L-BUL	Resident	0798141412	
59	Benard Nwangi	EMBU-L-BUL	Resident	0792644523	
60	KILIAN KIMUNDO	APEC	M/E	0714207148	
61	Lowy Kimani	Quete office Kan	Resident	0740576337	
62	Kibee Kutoo	BUL-BOL	Resident	0709029541	
63	Timothy Sambo	Kerempon	Civil Servant	0722914532	
64	Edith Jenga	EBULBU	Resident	079072644	
65	MATRONA MICHAEL	KRC	h/f/s=V	0714399523	
66	Dorcas Sang	Resident	EMBU-L-BUL	0129602624	
67	Lucy Metcha	Ngong	Civil Servant	072074822	
68	David Kipangat	EMBU-L-BUL	RESIDENT	0701834776	
69	MATRONA GATHO	KEREMPON DR	RESIDENT	072276329	

S/No.	Name	Institution/Location	Designation/Occupation	Phone No.	Signature
70.	FLAMIS RAMADHAN	EMBUZUZA PR. SCH	C+AIRMAN	0722868462	
71.	TRACY KACHILLO	KPLC	C/E	0721735290	
72.	Andrew P. Marasus	County Government of Kiambu - Environment Officer	Chief Environment Officer	0725015871	
73.	Francis Nthai	Ngong Municipality	Municipal Accountant	0715110349	
74.	Bartholomew Tiroano	Ngong Municipality	Communication Officer	0712492160	
75.	JERRY BRIAN	KRE	RMA	0702792118	
76.	Veronica Nyairabu	KRC	Civil Engineer	0793876212	
77.	Sylvia Nyokabi K.	Keraniya Unga	Resident	0726829395	
78.	Henry BODIE	DCS OLUDIA	DC	07229681	
79.	Daniel Mutangiri	NOTERION	SNH. A-CHET	0722537584	
80.	Catharina Kabi	OLOOLUA	Resident	0722960499	
81.	Ted Mwandia	OLOOLUA	Resident	0789114807	
82.	Algo Santei	NEMA	E.O	0790053215	
83.	JOSAH WANDUKA KURA		AD-SS	0721611120	
84.	Daniel K. Thuku Ochoals			0795060975	
85.	Davis Mutii	KERARARON	Resident	0722809481	
86.	Joseph Kihiko			072287988	
87.	ERNEST Ngwini	Embul-bul	Resident	0706932267	
88.	Samson Mwangi	Embul-bul	President	0711322998	

S/No.	Name	Institution/Location	Designation/Occupation	Phone No.	Signature
89	MOSES MPESITHA	SUR CHIEF	CHIEF	0722-947748	
90	Michael Mwachira			0702440664	
91	Alamin K. Leander	Velder	Chief's Office	0791 825 663	
92	ABDULLAH ABUHA			08227031366	
93	William Njirig	Kerogon	Business	0723218427	
94	Dr. DOE KOD	Nangvet Farm	fm	0722 312176	
95	VERONICA KIBER	KERENDKERAPADON	KEREA DEP / RESIDENT	0722 644058	
96	Choko SUMA				
97	Robert Kumbusi			0720752228	
98	TIMOTHY MURUGU	KERAPONDA	RESIDENT	0757025950	
99	DAVIS MATOSI	Erukobu	RESIDENT	0798470200	
100	Ari Gitima	Em-bul-bul	RESIDENTS	0715716281	
101	ABDUL MALIK	Em-bul-bul	RESIDENT NOT	0746283191	
102	François Jamanu	WQUA - Ngoni	Secretary WQUA	07222663081	
103	COO NYO	Bul Bul	Resident	0735-162828	
104	Dani Nygo	Bul Bul	Church	0717-572289	
105	Sophie NASHIR	Bul Bul	Resident	074074367	
106	Rene Wambui	Bul Bul	Resident	0744541128	
107	PATITA WENTHA	Bul Bul	RESIDENT	0728405783	

S/No.	Name	Institution/Location	Designation/Occupation	Phone No.	Signature
108. ✓	KHARON JAMN	Bulbul		0722100332	
109. ✓	GEORGE NGATAH	OLOLUA	B/Man	0722562851	
110. ✓	EUGENE KENUTU	OLOLUA	Teacher	0722145337	
111. ✓	WALLACE BATHI	BULBUL	Professor Engineer	0732066000	
112. ✓	William M. Mogaka	OLOLUA	Marketing IPR	0722399553	
113. ✓	Travis R. Nelson	Embulbul	Resident	0720227446	
114. ✓	ELIX MONGGOTO	BULBUL	DR	0753750168	
115. ✓	Hilary Omondi	"	Labr Techn	0724890127	
116. ✓	MOHAMMED OPA	"	Steel fixer	0741998640	
117. ✓	A. Wario	"	C.I.	079381687	
118. ✓	HAWA ISSA	EMBULBUL	Community Policing	0740135523	
119. ✓	David Kimoni	Embulbul	Mechanic	0793584889	
120. ✓	Kevin Ndiriga	Embulbul	Resident	0758470200	
121. ✓	STARSHAN MURRAY	BULBUL	DR	072557355	
122. ✓	Lucy Mwenda	APCC	-	0726262828	
123. ✓	Clinton Afari	OLOLUA	Business Person	0700700968	
124.					-
125.					
126.					



MINUTES OF THE PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT FOR NGONG AREA ON RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE CONSTRUCTION OF THE RIRUTA-NGONG MGR COMMUTER PROJECT HELD ON 2nd FEBRUARY, 2024.

ATTENDANCE:

VENUE: Lenana Primary School (Riruta)

DATE: Wednesday, 28th February 2024.

TIME: 1030hrs.

ATTENDANCE: 48No. participants (As per the attendance list attached).

AGENDA:

1. Introduction.
2. Project introduction and stakeholders briefing.
3. Environmental and social effects of the project.
4. Question-and-answer session.
5. Additional comments from consultant.
6. Comments from Kenya Railways.
7. Adjournment.

Min	Item	Action
1.	<u>INTRODUCTION</u> The ACC, representing the area DCC welcomed the participants to the meeting and appreciated their response to the invitation by the project. The public participation and stakeholder engagement meeting was called to order by MS. Hellen (ACC) at 10:30AM with prayers from Frederick Ouma followed by brief introductions by those present.	ALL
2.	<u>PROJECT INTRODUCTION AND STAKEHOLDERS BRIEFING</u> The Client and Consultant introduced the Riruta-Ngong Meter Gauge Commuter Project, highlighting key aspects as listed below: <ul style="list-style-type: none">• Length of the proposed line - 12.5Km. The commuter railway commences from Riruta to Ngong Station, emphasizing the absence of the necessity for land acquisition citing that the exiting railway corridor will be used within the area.• Operating Speeds - 50km/h maximum. The consultant explained that the speed of the train will be safe since braking and restarting will not be difficult.• Number of the proposed railway stations i.e.<ul style="list-style-type: none">- Ngong Station.- Bulbul Station.	Info

Min	Item	Action
	<ul style="list-style-type: none"> - Karen Station. - Lenana Station. <p>The consultant highlighted that the exact location of the Lenana station had not been determined. They also noted that only Ngong Station will be large, all other stations will be lean.</p> <ul style="list-style-type: none"> • Functionality - <ul style="list-style-type: none"> - Purpose: The meter gauge railway is designed to enhance accessibility for commuters within the project area. - Schedule: The railway will operate at various intervals throughout the day, not limited to peak hours. - Cargo Exclusion: The rail system will exclusively cater to passenger transport and will not facilitate the carriage of cargo. • Reasons for the Project <ul style="list-style-type: none"> - Traffic Reduction: The primary objective of the project is to alleviate traffic congestion on Ngong Road. - Environmental Impact: As a result, there will be a subsequent reduction in carbon emissions, contributing positively to the climate. <p>The client emphasized that a stakeholder engagement holds significance in garnering perspectives from relevant parties before project implementation. This process also serves as a platform for addressing any pertinent questions that may arise.</p>	
3.	<p><u>ENVIRONMENTAL AND SOCIAL EFFECTS OF THE PROJECT</u></p> <ul style="list-style-type: none"> • <u>Disruptions to people, livelihoods and businesses.</u> It was noted that promotion of safety and minimum disruption of livelihoods within the project area are a priority. This being the case, the alignment would traverse the existing road corridor causing minimum disruptions to livelihoods, properties and businesses. • <u>Accesses and Level Crossings.</u> The consultant noted that accesses through level crossings would be provided on minor roads/entrances and grade separation applied to crossings on major roads ensuring minimum disruptions to traffic along the affected routes. They also noted that the contractor would provide alternatives for any access disrupted during the project implementation. • <u>Utility Services.</u> The consultant explained that the utility services on the alignment are in the process of being identified and that protection and relocation measures will be undertaken. • <u>Employment opportunities</u> The consultant explained to the stakeholders, that the proposed project is set to provide employment opportunities to the communities along the alignment. Direct employment 	Info

Min	Item	Action
	<p>would however be limited, however, the residents could exploit indirect employment and income opportunities presented by the project.</p> <ul style="list-style-type: none"> • <u>Corporate Social Responsibility</u> The consultant noted that CSR is not within the contract scope and thus it is not a contractual obligation of the contractor. He highlighted that CSR is not an obligation but a good practice, therefore the contractor is expected to consider CSR initiatives within the project area. KRC advised that the requests of the community on CSR should be directed to Kenya Railways HQ through a letter. • <u>Water and Electricity Disruptions</u> During construction, the contractor is expected to address these disruptions as soon as possible. He is also required to send notices to the communities before any disruption takes effect. • <u>Economic growth</u> In addition to creation of employment opportunities, the consultant noted that the proposed Riruta-Ngong MGR Commuter project would enhance the economy of project areas bordering the alignment. This would be contributed by factors such as: <ul style="list-style-type: none"> - Ease in transportation to, from and within the areas along the alignment. - Easy access to housing and businesses along the alignment. - Visual appeal of the area. - Attraction of investors to the project area, among others. • <u>Grievance redress mechanism</u> The project will establish a grievance redress mechanism to deal with all complaints in regard to the project implementation. The members of the public among other stakeholders will be part of the grievance redress committee members. 	
4.	<p><u>PROJECT CONTRACTUAL PERIOD</u></p> <ul style="list-style-type: none"> • The consultant explained that the proposed project's contract period is 24 months and that construction would officially commence once the design is completed. • It was also explained that the contractor for the proposed project is an Engineering, Procurement and Construction (EPC) contract and that they would be carrying out the design and the construction of the line. 	Info
5.	<p><u>QUESTION-AND-ANSWER (Q&A) SESSION</u></p> <p>Following the project briefing, the consultant introduced the Question-and-Answer session, urging stakeholders to actively participate. Listed below, are the questions asked by the stakeholders and their respective responses by the consultant and KRC.</p> <ul style="list-style-type: none"> • George Ndwaru 	

Min	Item	Action
	<ul style="list-style-type: none"> - Question: Does the proposed infrastructure incorporate provisions for Persons with Disabilities? - Response: The consultant stated that all the stations and their accesses had been designed to be PWD friendly. <p>Security Measures:</p> <ul style="list-style-type: none"> - Question: Are additional security measures in place, considering that in some sections of the existing railway line are an insecurity hotspot? - Response: The client clarified that the existing railway line corridor faced security challenges as it traverses through isolated areas, and secluded section, thus posing to security risks. Conversely, the new line, the client affirmed that it would not pass through isolated or secluded areas. Instead, it would run parallel to Ngong Road and traverse through government-owned land, including Vet Farm, KBC, and KFS. Importantly, these areas would not be opened up to the public during the operation of the railway line. <p>Pedestrian Protection Measures:</p> <ul style="list-style-type: none"> - Question: What control measures are in place to safeguard pedestrians, given that the proposed line is open? - Response: The consultant provided assurance to stakeholders that safety fences would be installed along the railway line in areas where the public might be deemed at risk. <p>Auxiliary benefits of the Project:</p> <ul style="list-style-type: none"> - Question: Are there any other auxiliary benefits aside from employment? - Response: The consultant emphasized the project's employment capacity will be limited. However, the office of the chief will play a role in advertising opportunities and recommending potential employees for the contractor's consideration. Auxiliary benefits were highlighted including but not limited to socioeconomic growth, services provision, supply business/chain, and other business opportunities. <p>Corporate Social Responsibility (CSR):</p> <ul style="list-style-type: none"> - George Ndwaru encouraged the consideration of CSR by the Client/Contractor. - Proposition: He proposed the incorporation of a sewer line in the Ngando Area. - Response: The consultant clarified that Corporate Social Responsibility (CSR) is not the core objective of the project and is therefore not a priority. He emphasized that responsibilities such as sewers fall under the jurisdiction of the Ministry of Water and Sanitation, and each Ministry is tasked with addressing its own core mandates. The consultant highlighted the complexity of designing and implementing sewers, indicating that such tasks are beyond the contractor's mandate. Stakeholders were advised by the client to submit formal letters requesting CSR before the project's completion. Additionally, the requests were encouraged to be realistic, considering the contractor's capacity, such as in the context of leveling access roads. <ul style="list-style-type: none"> • Monicah Njoroge Land Acquisition for the Proposed Project: <ul style="list-style-type: none"> - Question: Where will the land be required to build the proposed project be sourced? Does the project implementation necessitate land acquisition from private 	Client and consultant

Min	Item	Action
	<p>land?</p> <ul style="list-style-type: none"> - Response: The proposed project alignment is anticipated to follow the existing railway corridor, and no private land acquisition is foreseen within Ngando and Riruta section. The sole affected party is expected to be the Kenya Forest Service land within the area. <p>• Paul Maina:</p> <ul style="list-style-type: none"> - Question: Is there a provision to establish a crossing access at Wambire Road, considering the existing railway line already crosses the road without a legal crossing? - Response: The consultant indicated that, contingent on the traffic volume, either grade separations or well-protected manned level crossings would be implemented. Notably, it was clarified that Wambire Road fell outside the project's extents. Stakeholders were advised to submit a written request to the Client for a level crossing provision at the specified Wambire Road location. - Suggestion: He proposed that stakeholder engagements have at least one week's notice to enable the community to deliberate and present their concerns cohesively. - Response: The consultant indicated that the notices were sent out in good time, however, some stakeholders were notified a bit late by those who were mobilizing them. - Suggestion: He suggested that the Lenana station location be in proximity to Wambiri Kimotho Road for increased accessibility and to serve a larger population. - Response: The consultant promised to do a formal assessment of the proposed station location of the Lenana station. The key consideration of the station location will be proximity and accessibility to majority of the targeted population within the project area. <p>• Pauline Mutuku:</p> <p>Impact on Kenya Forest Services (KFS) Property:</p> <ul style="list-style-type: none"> - Concern: The proposed alignment interferes with KFS nursery, piping, houses, trees, and a school. - Request: If there are alternative alignments, KFS hopes they will be made available. - Response: The client and contractor assured KFS that a consultative meeting is planned at a later date on-site to directly address their concerns. This is due to the legal framework governing compensation between government bodies, both being governmental entities. <p>• Dr. Samson Ndegwa:</p> <ul style="list-style-type: none"> - Acknowledgment: He acknowledged and supported the project. - Appreciation: Expressed gratitude to the stakeholders, client, and consultant for organizing and attending the stakeholder engagement. <p>Child Safety Measures:</p> <ul style="list-style-type: none"> - Suggestion: Recommended the installation of fencing around the railway line to 	

Min	Item	Action
	<p>ensure the safety of school children from the potential danger of trains during operation.</p> <ul style="list-style-type: none"> - Response: The consultant acknowledged the importance of children's safety and assured stakeholders that measures, including the installation of fencing along the railway line sections in proximity to learning institutions will be considered to mitigate potential risks to children during train operations. - Suggestion: Advised against placing Lenana station in close proximity to Lenana School or Lenana Primary School to avoid attracting businesses that may pose a negative influence on the school children. - Concern: Emphasized the importance of selecting a location that does not directly impact on the learners. - Response: The consultant committed to carefully evaluating the station's proximity to Lenana School and Lenana Primary School, ensuring it does not adversely affect the students and promised to give feedback to the stakeholders. <ul style="list-style-type: none"> • Slyvester Omollo <ul style="list-style-type: none"> - Suggestion: He suggested the establishment of a CSR Recommendation Portal as an alternative to written letters to the Client for Corporate Social Responsibility (CSR) proposals. - Response: The client conveyed that, at present, there is no dedicated portal for recommendations, and the conventional method of submitting recommendations through written letters remains the current protocol. However, the client assured stakeholders that the suggestion for a recommendation portal would be duly considered for future enhancements and improvements in the communication process. <p>Station Location Recommendations:</p> <ul style="list-style-type: none"> - Question: Is there a template to guide the suggestions of the stakeholders on the station location? Can the consultant distribute questionnaires to stakeholders to facilitate their recommendations on station locations? - Response: Many factors inform the station location which the consultant will consult with the various experts will consider and give feedback to the stakeholder in due time. <ul style="list-style-type: none"> • Christine Wainaina <p>Number of Stations and Accessibility:</p> <ul style="list-style-type: none"> - Question: She inquired whether the number of stations is subject to change and sought assurance on their accessibility. - Response: The consultant assured the stakeholder that the number of stations will remain unchanged and will be accessible to commuters. It is noted, however, that as of the current timeframe, only the location of the Ngong station had been determined. <p>Environmental and Social Impact Assessment:</p> <ul style="list-style-type: none"> - Question: She questioned whether the Environmental and Social Impact Assessment (ESIA) for the project is complete. - Response: The consultant clarified that the Environmental and Social Impact Assessment (ESIA) process is currently underway, and the ongoing meeting itself is 	

Min	Item	Action
	<p>a crucial component of that assessment.</p> <ul style="list-style-type: none"> • Joseph Kibuyu Compensation for Illegal Demolition: <ul style="list-style-type: none"> - Question: He inquired about the provision for compensation in the event of illegal demolition, citing personal experience as a victim without receiving compensation. He mentioned writing demand letters and having the client's surveyor visit the site, but no subsequent response. - Response: The client outlined the land compensation procedure for instances of project encroachment on private property. She advised Mr. Joseph to consult with them (post-meeting) for further clarification, as his concern pertained to a previous project. 	
6.	<p><u>ADDITIONAL COMMENTS FROM THE CONSULTANT</u></p> <ul style="list-style-type: none"> • The consultant unequivocally assured stakeholders that their perspectives and inputs will play a pivotal role in shaping the overall trajectory of the project. These views shared are considered integral to the comprehensive success and development of the project. 	Info
7.	<p><u>CLOSING REMARKS BY ACC. HELLEN WANYONYI</u></p> <p>The ACC, Hellen Wanyonyi, extended her gratitude to the stakeholders for their attendance at the public participation session. She expressed appreciation to Kenya Railways and the consultants for providing a comprehensive overview of the project. Special thanks were extended to Lenana School for providing venue for the stakeholder engagement meeting.</p> <p>ACC Wanyonyi reassured the client of the government's unwavering commitment to ensuring the project's seamless progression from inception to the operational phase, addressing any issues that may arise.</p> <p>She encouraged the community to engage in consultative meetings with her office for efficient resolution of any emerging matters. In anticipation of potential challenges, she requested advance notification to stakeholders in the event of power failures and water disruptions during project implementation.</p> <p>The ACC pledged to maintain security throughout the project's duration and concluded by calling for community support to embrace and contribute to the successful completion of the project within the stipulated timeline.</p>	info



Min	Item	Action
8.	<u>ADJOURNMENT</u> With no additional matters, Chief Murage concluded the proceedings by offering a brief prayer at 1300hrs.	

Minutes Signed by: Augustine Murage

Sign: [Signature]

Date: 11/03/2024

For: APEC/CRDC CONSORTIUM (CAEC)

DCC/ACC

Name: J.A. Paximo

Sign: [Signature]

Date: 08/03/2024



APEC- CRDC CONSORTIUM

中国铁设
CRDC





















CONSULTANCY SERVICES FOR UNDERTAKING RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR CONSTRUCTION OF THE RIRUTA - NGONG MGR COMMUTER
















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ATTENDANCE FOR A STAKEHOLDER ENGAGEMENT HELD ON 28TH FEBRUARY 2024 AT LENANA SCHOOL HALL

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13	Margaret Wambui	Community Leader		0729648536	

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S/No.	Name	Institution	Email	Phone No.	Signature
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39	Catherine Mwangi	NGCDF	—	0724609272	
40	Patrick Nambiri	NGCDF	—	0723130328	
41	Ndori Fred	NGCDF	—	0718760845	
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MINUTES OF THE PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT FOR NGONG AREA ON RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR THE CONSTRUCTION OF THE RIRUTA-NGONG MGR COMMUTER PROJECT HELD ON 2nd FEBRUARY, 2024.

ATTENDANCE:

VENUE: Ministry of Education Social Hall (Ngong)

DATE: Friday, 2nd February 2024.

TIME: 0830hrs.

ATTENDANCE: As per the attendance list attached.

AGENDA:

1. Introduction.
2. Project introduction and stakeholders briefing.
3. Environmental and social effects of the project.
4. Project contractual period.
5. Question-and-answer session.
6. Additional comments from consultant.
7. Comments from Kenya Railways.
8. Adjournment.

Min	Item	Action
1.	<u>INTRODUCTION</u> The public participation and stakeholder engagement kicked off at 9:50am with prayers from the Pastor Gitonga followed by an introduction space.	ALL
2.	<u>PROJECT INTRODUCTION AND STAKEHOLDERS BRIEFING</u> After introductions by the stakeholders, the consultant introduced the Riruta-Ngong Meter Gauge Commuter Project, highlighting its key aspects. The social economic and environmental benefits as well as negative impacts were highlighted. The key project benefits included local employment opportunities, cheaper and convenient means of transport, reduced carbon emissions, reduced traffic congestion, organized transport systems, among other. The highlighted design aspects are listed below: <ul style="list-style-type: none">• Length of the proposed line - 12.5Km. The consultant proceeded to explain the alignment and noted that the proposed railway would use the existing road corridor	CONSULTANT

Min	Item	Action
	<p>along Ngong Road as much as it will be possible in order to avoid unnecessary disruption of local socioeconomic activities and properties of the residents.</p> <ul style="list-style-type: none"> Starting and finishing locations of the proposed alignment: <ul style="list-style-type: none"> Lenana Station, located near Lenana School Railway overpass. The consultant noted that the line would start 700m before the Riruta Station, from the main existing Nairobi-Kikuyu meter gauge line. Locations of the proposed railway stations i.e. <ul style="list-style-type: none"> Ngong Station. Bulbul Station. Karen Station. Lenana Station. <p>It was also noted that the proposed stations would be able to efficiently handle the proposed MGR's traffic by providing adequate parking, ticketing and waiting areas. Accompanying this briefing, was an interactive session where the consultant showed the stakeholders a design drawing of the proposed Ngong Station noting that it would also be visually appealing.</p>	
3.	<p><u>ENVIRONMENTAL AND SOCIAL EFFECTS OF THE PROJECT</u></p> <ul style="list-style-type: none"> <u>Disruptions to people, properties and businesses.</u> It was noted that safety and minimum disruption of movement are a priority. This being the case, the alignment would traverse the existing road corridor causing minimum disruptions to properties and businesses. The consultant also stated that project affected persons (PAPs) would be documented during project Resettlement Action Plan (RAP) study upon completion of the final alignment, after which, compensation will be done. <u>Accesses and Level Crossings.</u> The consultant noted that accesses and level crossings would be provided on minor roads/entrances and grade separation applied to crossings on major roads ensuring minimum disruptions to traffic along the affected routes. <u>Utility Services.</u> The consultant explained that the utility services on the alignment are in the process of being identified and that protection and relocation measures are underway. <u>Employment opportunities</u> The consultant explained to the stakeholders, that the proposed project is set to provide employment opportunities to the communities within the project area. <u>Economic growth</u> 	CONSULTANT

Min	Item	Action
	<p>In addition to creation of employment opportunities, he noted that the proposed Riruta-Ngong MGR Commuter project would enhance the economy of areas bordering the alignment as well as enhancing property values and business opportunities. This would be contributed to by factors such as:</p> <ul style="list-style-type: none"> - Ease in transportation to, from and within the areas along the alignment. - Easy access to housing and businesses along the alignment. - Visual appeal of the area by spurred socioeconomic dynamics. 	
4.	<p><u>PROJECT CONTRACTUAL PERIOD</u></p> <ul style="list-style-type: none"> • The consultant explained that the proposed project contract period is 24 months and that construction would officially commence once the design was approved. • It was also explained that the contract for the proposed project is an Engineering, Procurement and Construction (EPC) contract and that they would be carrying out the design and the construction of the line simultaneously. 	CONSULTANT
5.	<p><u>QUESTION-AND-ANSWER (Q&A) SESSION</u></p> <p>Following the project briefing, the consultant introduced the Question-and-Answer session, urging stakeholders to actively participate. Listed below, are the questions asked by the stakeholders and their respective responses by the consultant.</p> <ul style="list-style-type: none"> • Chief George Kimemia asked whether upgrading of link roads and accesses is part of the proposed project as this would aid in easing traffic and improving access to the stations. <p>Consultant's response: He said that the station access roads would be designed and constructed to meet the traffic volumes to the stations. The consultant also noted that access to the stations would be highlighted in the Environmental and Social Impact Assessment (ESIA) report. It was also noted that the station accesses would also be designed to cater for the needs of disabled persons.</p> • Bishop Dr. Steven Gitonga: Following the earlier project brief, Bishop Gitonga highlighted the benefits of the project and welcomed it as a resident in the project vicinity. He then inquired on the provision of health facilities such as ambulances and clinics during the project period stating that this would aid in managing project-related community illnesses. <p>Bishop Gitonga also asked whether there would be provision of adequate and functional non-motorized Traffic (NMT) facilities within Ngong road; such as</p>	Consultant and KRC

Min	Item	Action
	<p>walkways along the alignment despite the road corridor been 60 meters which was to be shared with the MGR project.</p> <p>Bishop Gitonga emphasized that provision of functional NMT facilities would ensure safety of non-motorized traffic during the commuter train operation.</p> <p>Consultant's response: The consultant noted that within the project areas, there are sufficient health facilities which will cater for community health. However, the station will have first aid facilities. With regards to provision of NMT facilities, the consultant explained that the provided 60-meter corridor was wide enough to cater for the proposed line and functional NMT facilities as well as the carriageway.</p> <p>The consultant also urged the stakeholders to be keen on road use behaviors in order to enhance road safety during and after construction of the proposed railway line. The consultant concluded by stating that public sensitization would be done to ensure that the general members of public are mindful of their safety and associated behaviors as they receive the proposed project.</p> <ul style="list-style-type: none"> Capt. (Rtd) J. Kirongothi (KERA chairman): Emphasized that the project contractor should be mindful of the effects of the proposed project on the PAPs. He also urged that issues such as blasting, dust and noise should be minimized during the construction of the proposed MGR line. <p>Consultant's response: The consultant noted that there would be no works involving blasting and that compaction and other related works would be done in a mindful manner. It was also noted that the contractor would be urged to conduct a baseline of the existing buildings on or near the alignment to ensure that all project-related impacts are accounted for.</p> <ul style="list-style-type: none"> Samuel Gitau: As a resident of Zambia, opposite the proposed Ngong Station, Samuel stated that he had already started facing project related challenges such as dust emissions, congestion around his premises before dawn, noise pollution and insecurity fears. He asked that the project contractor to be mindful of his property during the construction of the proposed Ngong Station. Samuel concluded his remarks by commending the project on providing employment opportunities to the youth. <p>Consultant's response: The consultant noted that the construction of the proposed Ngong Station would only take approximately 3 months thereafter, relieving him of the inconveniences. He also stated that operational times and work hours would be clearly stipulated to the contractor to reduce residential disruptions in the project affected areas.</p> <ul style="list-style-type: none"> Peter Kosgei: Peter thanked the government for the project whilst emphasizing the 	

Min	Item	Action
	<p>benefits of the project to the youth and the county government. He urged the contractor to comply with the soil dumping regulations; payable fees for dumping soil at Kshs.500 per truck.</p> <ul style="list-style-type: none"> Christopher Kimiti: Kimiti inquired on how construction of the proposed MGR line would affect normal traffic along the alignment. As well as the PSV industry in the area. <p>Following to this, Kimiti recommended that the proposed line be extended and connected to other existing lines to enhance the railway's usefulness to the people in Ngong. Kimiti concluded by suggesting the creation of a follow-up committee to ensure implementation of all action items.</p> <p>Consultant's response: Responded by highlighting some of the previously discussed positive impacts of the proposed project, specifically in the transportation industry. The consultant also noted that connection to other lines falls outside the proposed project's scope and only works stipulated in the contract would be carried out.</p> <ul style="list-style-type: none"> John Omurai: Inquired on matters of employment, he asked what would be required of the job applicants and what criteria would be used to secure employment. John also stated that there have been significant dust emissions from the ongoing bush clearing works of the proposed Ngong Station. Mungai Kang'ethe: Mungai stated that a liaison officer from Ngong area should be employed and employment criteria for locals should be well laid out. Mungai also urged that the recruitment be conducted in a fair manner. <p>Consultant's response: To John and Mungai's remarks, the consultant stated that available vacancies would be properly advertised, though the local chiefs and urged interested stakeholders to adequately prepare all necessary documents in anticipation of the project job opportunities.</p> <ul style="list-style-type: none"> Caroline Newet: Caroline requested that boreholes be sunk in Kerarapon due to water shortage effects that resulted from previous projects. <p>Consultant's response: Following Caroline Newet's remarks, advised the stakeholders to raise any arising issues that were relate to previous projects through Kenya Railways offices for diligent follow-up.</p> <p>Onesmus Ngogoyo (MP Kajiago North): Thanked everyone for attending the public participation and recommended that another stakeholder engagement be held in Bulbul.</p> <p>MP Ngogoyo proceeded to state that the main road providing access to the proposed Ngong Station is heavily damaged due to ongoing construction. Ngogoyo urged the project contractor to rehabilitate the road and provide traffic guides to aid in decongestion and smoother flow of traffic.</p>	



Min	Item	Action
	<p>In addition to these, he insisted that a liaison from the project area be employed and urged that the environmental impacts of the project be stated in the ESIA report and that Project Affected Persons be documented in the RAP and compensated for their losses.</p> <p>The MP concluded by requesting a Corporate Social Responsibility project of a school to aid in decongesting the primary schools in Ngong.</p> <ul style="list-style-type: none"> • Mbiriri Mwaura (MCA Ngong): MCA Mwaura thanked the government for the project and urged the stakeholders to welcome the project. He also focused on benefits of the project highlighting that construction of the proposed line would create employment for the youth and requested that more employment opportunities be provided during operation and maintenance of the proposed Riruta-Ngong Commuter MGR line. 	
6.	<p><u>ADDITIONAL COMMENTS FROM THE CONSULTANT</u></p> <ul style="list-style-type: none"> • As stated earlier, the consultant emphasized that the contractor would not conduct project related works on any private property before proper authorization and that Project Affected Persons (PAPs) would be documented in the RAP and the PAPs be compensated accordingly. • The consultant urged the local chiefs to announce project vacancies once they are out and to encourage project acceptance within their locations. 	CONSULTANT
7.	<p><u>COMMENTS FROM KENYA RAILWAYS</u></p> <ul style="list-style-type: none"> • Kenya Railways (KR) thanked stakeholders for attending the public participation. The client then emphasized that baselines studies were ongoing for the properties abutting the railway corridor in order to ascertain the structures conditions for impact assessment and monitoring. The client and consultant also assured the stakeholders that they will work together to ensure that the proposed project will cause minimum disruptions to the neighbouring communities. • Kenya Railways assured the stakeholders that they would liaise with KURA to grade project relevant roads therefore providing functional accesses to stations. • Kenya Railways also noted that a liaison officer would be provided once the project officially commences, to aid in sorting out arising issues on site. 	KENYA RAILWAYS

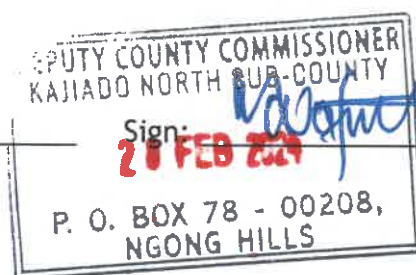


Min	Item	Action
8.	<u>ADJOURNMENT</u> With no additional matters, Pastor Gitonga concluded the proceedings by a word of prayer. Subsequently, ACC Mwangaza, serving as the Chair, expressed gratitude to all attendees for their cooperation and officially adjourned the meeting at 1225hrs.	ALL

Minutes Signed by:

Name METRINE M- WAFULA-

Date: 28/02/24.



For: APEC/CRDC CONSORTIUM (CAEC)

Name Augustine Mwangaza

Date: 27/02/2024

Sign: [Signature]

DCC Ngong Subcounty



APEC- CRDC CONSORTIUM

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CRDC

CONSULTANCY SERVICES FOR UNDERTAKING RELOCATION ACTION PLAN (RAP) AND ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR CONSTRUCTION OF THE RIRUTA - NGONG MGR COMMUTER





















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ATTENDANCE FOR PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT FOR NGONG AREA HELD ON 2ND FEBRUARY 2024 AT MINISTRY OF EDUCATION SOCIAL HALL (NGONG) STARTING AT 0830HRS

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8	PAUL SUPERT	Former WFP	Manager						Mv
9	Stella Xidiwa	Kenya Railways	SFO		PaulSupert254@gmail.com		0727157960		Fv
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22	JOSEPH K. RUTHU	ZAMBIA	BUSINESSMAN	---	0721572581	
23	JOSEPH N. GIKIBE	ZAMBIA	BUSINESSMAN	---	0721779536	
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27	FRAG KONDALLAH	Ngong	KPLC	nseleinc@gmail.com	0721735290	
28	Emma Ayaka	Ngong	KPLC	ayakayy@gmail.com	0728283574	
29	ERIC SOKOINE	Kerarapon	Constitutional Office	serikoince@gmail.com	0720554505	
30	PETER KOSKEI	County Government of Kerarapon	Deputy Director Revenue	Peter.Koskei@gmail.com	0724820534	
31	J. K. KARIUKI	NGONG	Resident	---	0700327500	
32	JOSIAH. M. PARIST	Uloobu	ACC. AGG	N/A	0722346997	

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34	Nicholas Karamagi	Bulbul-bul	Nyumba kumi	NicholasKaramagi@gmail.com	0704405696	
35	Angela Haisola	Kerapara	Hlyumba kumi	naisolaangela52@gmail.com	0724650450	
36	Moses Mbatia	Oloolof	SWA CHIEF	mpesgamadesi@gmail.com	0709474814	
37	Moses W. Chopsany	Scheme 205	Security Committee	Moseschopsany@yahoo.com	0722738807	
38	Jeremiah Nyaga	Scheme 305	Security Committee	jeremiahnyaga@yahoo.com	076656074	
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40	Edith N. Karamagi	NGAO	ACC - KID WEST	KaramagiEdith@gmail.com	0720232135	
41	Mekine M. Wafala	NGAO	ACC - O. RONGAI	Mwafala637@gmail.com	0725662088	
42	Bis. Dr. Steven Gitonga	CELEBY	NGONG	Szigitonga2001@yahoo.com	0796089084	
43	Stephen Komora	Ngao	Acc-Ngong	mulekomora@gmail.com	0710013522	
44	Uk. Felix Karamagi	Concise	Ngong	felixk@gmail.com	07248828	
45	Joseph Wathaka	NGONG	Resident	JosephWathaka@gmail.com	0722666039	
46	Murimi Murene	Ngong	Ngong	byronm2@gmail.com	0723229174	
47	Obadiah Nuchera Wamoi	Ngong	Resident Ngong	emuchera@gmail.com	0722495117	
48	Vincent Nyamweya	ANF	Property Officer	nyamweya@awf.org	0711358111	
49	Lasoi Charity	C.G.K	Administrator	lasoiaily@gmail.com	0735668538	
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51	Antony Minda	Ngong	Resident	tonyminda@yahoo.com	0722730589	

S/No.	Name	Institution/ LOCATION	Designation/ OCCUPATION	Email	Phone Number	Signature
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53	M ^r KIRITI	PROVINCIAL GOVERNMENT ASSOCIATION	S.G	Kiriti Kiriti@gmail.com	0723038189	[Signature]
54	M ^r ANTHONY MARIAM	COUNTRY GOVT OF KARIPO	WARD ADMIN NGON	kanyagishum@gmail.com	0719220743	[Signature]
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58	M ^r THOMAS MBIRIRI	NGONG	MCA	—	0704204610	[Signature]
59	M ^r Kelvin GITHAU	NGONG	P.A to the Area MP WARD CLIMATE CHANGE COMMITTEE	kgithau3@gmail.com	0700455721	[Signature]
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62	M ^r JOEL TIPINA	OLASIT	Resident	—	0740171416	[Signature]
63	M ^r WATU SARIKE	KIBIKO	Resident	—	0723922457	[Signature]
64	M ^r JAMES Koyei	OLUPUKO	Resident	—	0101058898	[Signature]
65	M ^r Brian Kipjago	WAFAM	Resident	—	0718770807	[Signature]
66	M ^r JOHN LEBENEX	KIBIKO	Resident	—	0702187603	[Signature]
67	M ^r Mungai Kanyekhe	K. NANTH	Resident	Mungai Kanyekhe@gmail.com	0703487260	[Signature]
68	M ^r Joseph KODATANGA	K. WEST	Resident	—	0745050231	[Signature]
69	M ^r DANIEL NGANGA	KIBIKO	Resident	—	0724545755	[Signature]
70	M ^r JOHN WANJAMBA	NGONG	Resident	kanyagajon@gmail.com	0745271015	[Signature]
71	M ^r MOSES TALIAN	KID WEST	Resident	—	07224722840	[Signature]

S/No.	NAME	INSTITUTION/LOCATION	DESIGNATION OCCUPATION	PHONE NUMBER	SIGN
FV 117.	AGNES KRAMBORA	KPAAK A MONTH/KGONS	Resident	077682105	
FV 118	Anne	Kinyanjui	Resident		
FV 119	Annu	MBUGUA	Resident	0712 092089	
FV 120	Loise	WAGAI	Resident	0719 517 288	
FV 121	Ruth	Kemay	Resident	0735 023179	
FV 122	ESTHER	NERI	Resident	0743985510	
FV 123	Joyus	Mugambi	Resident	0702540504	
MV 124	Eric	Muruki	Resident	07140272397	
MV 125	Ench	Mugambi	Resident	0718 197 157	
MV 126	James	Murini	Resident	0711 858 332	
MV 127	LaRula	KIDUNGU	Resident	0707 196 174	
		Ololuva	Resident	0723 328482	

S/No.	Name	Institution/ LOCATION	Designation/ OCCUPATION	Email (OPTIONAL)	Phone Number	Signature
72 M	Emmanuel Tajel	Ngong	Resident	—	0710834808	
73 M	Joshua Sankale	Ngong	Resident	—	0703292913	
74 M	Likam Kuntai	Ngong	Resident	—	0796809252	
75 M	David Kitarhi	Ngong	Resident	—	0740493670	
76 M	Joseph Sannoe	Ngong	Resident	—	0727158144	
77 M	Moses Kolian	Ngong	Resident	—	0724240247	
78 M	Moses Satorra	Ngong	Resident	—	0725439831	
79 M	Kennedy Ngugi	Ngong	Resident	—	0728944673	
80 M	Peter Mwari	Ngong	Resident	—	0724090621	
81 M	Jared Odongo	Ngong	Resident	—	0718635269	
82 M	Stephen Mutnini	Ngong	Resident	—	0701908137	
83 M	Stephen Muga	Ngong	Resident	—	0708329210	
84 M	Daniel Migwi	Ngong	Resident	—	0740738482	
85 M	John Melumbe Karanja	Ngong	Resident	—	0746585800	
86 M	Stephen Nzioka	Ngong	Resident	—	0748946670	
87 M	Simon	WIRIIPA				
88 M	Njeri Anne	Ngong	Resident	annnganga@gmail	0721193814	
89 M	Samuel Satorra	Ethiopia	MP Office	Satorra@gmail	0722-109730	
90 M	Richard Komind	Kibiko	V.A. KIBIKO		0716608974	
91 M	Daniel Kipkiri	Ngong			0705599385	

S/No.	Name	Institution / Location	Occupation / Designation	Phone Number	Sign.
112	M. Simon Elnria	Olooluq.	Farmer operator	0720784327	(S)
113	M. JACAN MUNEDE	Mgonq		076212901	
114	M. JOHN MURRAY	KIBIKO	farmer	0700413908	
115	M. ISAAC NDUKU	OLOLUA	farmer	0734465948	
116	M. Samson Kwarah	NALPO	farmer	0708335529	

S/No.	Name	Institution LOCATION	Designation/ OCCUPATION	email (OPTIONAL)	Phone Number	Signature
92 M	B. Maseu	Kibiko	Community	—	0722529018	
93 M	Julius Kichu	Kibiko	Resident	—	0710661990	
94 M	J.M. KARUNIA	Kibiko	CHIEF	—	072518186	
95 M	M.W. NSITHA	Kibiko	CHIEF	—	0715136403	
96 M	LUMIKEN JOSEPH	Kibiko	RESIDENT	—	0723707446	
97 M	Kiranti Wilson	Kibiko	Resident	—	0758054683	
98 M	Robert Rethchy	KAREN	—	—	0706709907	
99 F	Colletah Josei	Ngong	Resident	Colletahjosei@gmail	0708666634	
100 M	Emmanuel Toton	Ngong	Resident	—	09979845	
101 F	Leah wanjiru	Ngong	Resident	—	0714387287	
102 F	Nancy mwende	Ngong	Resident	—	0792243569	
103 M	Simion OTWORI	Kibiko	Resident	—	0727324998	
104 M	Benjamin Owendo	NGONG	Resident	—	0713104951	
105 M	Robert Mwangi	NGONG	Resident	RobertKabueli@gmail	0790487077	
106 M	Daniel Kiplimo	KIBIKO	Resident	Kipl.modnie183@gmail.com	0722864169	
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110 M	STEPHEN NTANGURU	Ngong	Resident	DangoStephenH@gmail.com	0717184488	
111 M	EPHAIUS SAINAHARE	choba	Resident	Sainahare@gmail.com	0726427683	

S/no.

Name.

Institution / Location

Occupation / Designation

Phone Number

Sign.



Kenya Railways Corporation

Document Title: Minutes Record Form

MINUTES FOR PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT FOR NGONG-
RIRUTA MGR COMMUTER LINE AT HELD AT DCCC CDF MULTIPURPOSE HALL ON NOVEMBER
29TH 2023.

Meeting Attendance:

(See attached)

Agenda:

1. Opening prayer
2. Introduction of Members
3. Opening remarks and Project briefing
4. Comments from DCCC
5. Comments from MP Kajiado North Constituency
6. Comments from MCA Ololua Ward
7. Comments from Vet farm Manager
8. Comments from Chairman Ololua Forest
9. Comments from Business community and other participants
10. Response from Railway staff
11. A.O.B

Min.	Matters Arising	Action
01/29/23	<u>Opening prayer</u> Opening prayer was offered by one of the participants	All
02/29/23	<u>Introduction of members</u> Members present introduced themselves. The members comprised of Kenya Railway representatives, representatives from the Consultant CAEC, National and County Government representatives like DCC, ACC, area MCA, area MP, area Chief and Asst. Chief, KPLC representative from Ngong, Ololua residents, Vet farm Manager, Kerarapon Residents, Business and agricultural community, KFS representative and Youth representative	

03/29/24	<p><u>Opening Remarks</u></p> <p>The DCC brought the meeting to order at 12:30 pm and gave the background of the proposed Riruta-Ngong MGR Commuter Project. He said that the line will be linked from Nairobi-Kikuyu MGR line. The MGR link line will start from Lenana School all the way to Ngong with 4 No. stations namely Lenana, Karen, Bulbul and Ngong. The project will mainly use Ngong road corridor to minimize land acquisition.</p> <p>He also said that the project will be done in phases i.e;</p> <ul style="list-style-type: none"> • Phase 1 Riruta Ngong • Phase 2 Ngong Kiserian and • Phase 3 Kiserian Rongai <p>Part of the line will go through KFS and KBC and Vet Farm. The launching of the project will be done at Vet farm on a date that will be confirmed. The project will be composed of bridges, embankments, underpasses and level crossings and the project will be under the EPC ()contract. He told the participants that as an awareness creation so as to be good ambassadors to the project and as a statutory requirement of community involvement and participation.</p>	
04/29/23	<p><u>Comments from DCC</u></p> <p>The DCC reiterated that the project has a component of community participation so as to get views from on the ground. That is why key stakeholders were invited to give their input with regard to the design and route alignment coupled the positioning of the stations appropriately.</p>	All
05/29/23	<p><u>Comments from MP Kaliado North Constituency</u></p> <p>The MP welcome members to his constituency and said that Riruta-Ngong MGR line will decongest Ngong road and enhance park and ride policy where motorists park their vehicles at the stations and reach Nairobi CBD via train. He also declared his 100 percent support to the project and requested that the design be made public for probing and allow the public to give their suggestions on its improvement.</p> <p>However, the area MP made the following requests;</p> <ul style="list-style-type: none"> • The contractor to provide access roads to the proposed stations. • Employment of locals to be given a priority at 70 percent with the aid a point man from the community to positively identify locals for job opportunities. • He requested to be notified in prior for public participations so as to make it easy for KR in the project as a link to the community. • The MP proposed for a mini market to put at Ngong station. • That a yellow vaccine factory to be established at Ngong vet farm 	
06/29/23		

07/29/23	<ul style="list-style-type: none"> • The plans be put in place for stations with space for future expansions <p>The MP further talked of water shortage in the area since the underground water was interfered with during the construction of SGR phase 2A which occasioned the depletion of water in Kererapon.</p> <p><u>Comments from MCA Ololua Ward</u></p> <p>The area MCA raised a concern that the CRBC contractor is known for not giving residents a listening ear with regard to their grievances concerning flood waters and provision of access roads. He requested KR to consider procuring tree seedlings from the community for planting during the launch of the project. He further requested KR to hold more baraza to meaningfully engage the community. He requested for a CSR in the form of upgrading access roads along the project area. He made a requested that the design be shared for input from the stakeholders and that stations be put behind the police training school and PCEA respectively.</p>	
08/29/23	<p><u>Comments from Vet Farm Manager</u></p> <p>The Vet farm Manager made it clear that Vet farm land belongs to the Government and not for an individual. He urged the community to accept this reality and not claim that the land belongs to the community.</p>	
09/29/23	<p><u>Comments from Chairman Ololua Forest</u></p> <p>The chairman Ololua forest said since CRBC built roads under CSR under SGR project, he requested for the same in Bulbul to upgrade access roads and improve on drainage. He said that blasting as a result of railway construction is a source of worry as houses stand to be affected. He also expressed a concern that water levels in Kerarapon area is dwindling.</p> <p><u>Comments from business community and other participants</u></p> <ul style="list-style-type: none"> • EPZ to be constructed next to Ngong station to promote import and export. • Ngong – Suswa road to be upgraded as part of CSR project • Security lights requested • Procurement of tree be done from Ololua forest 	
10/29/23	<ul style="list-style-type: none"> • The county placed a request to Vet farm for a portion of land to start a school. • The community declared support for the project as it boost the economy of the area by attracting tourism and promotion of tourism in the region. <p><u>Response from Railway staff</u></p> <p>The staff from Kenya Railways made the following responses</p>	

	<ul style="list-style-type: none"> • 30% of building materials comes from the local community • Route alignment to be projected to the public for their input • More meetings will organized for RAP and ESIA • The possibilities of altering the positioning of the stations along the line will depend on among other factors the steepness of a place as railway stations mostly are suited for a flat surfaces • 	
6/6/22	<u>AOB</u> There being no other business the meeting ended at 2:30pm	

Attendance List

Secretary

Confirmed by

18



29/11/2023


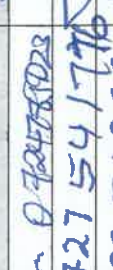


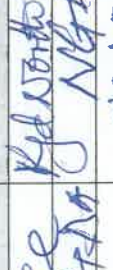

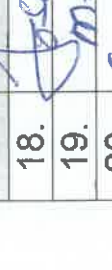

ATTENDANCE REGISTER

SUBJECT: STAKEHOLDER ENGAGEMENT FOR NGONG-RIROIA MGR COMMUTER LINE.

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2.	Henry G. G. G.	MCA DCC	henryg@kenya-railways.co.ke	0720532441	[Signature]
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4.	DR. J. A. O. K. O.	VET farm MP	drjao@kenya-railways.co.ke	0720532441	[Signature]
5.	Diana Jagamba	Land Registrar	djagamba@gmail.com	0706136550	[Signature]
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17.	DR. FELIX KARWIKI	CLM	felix@kenya-railways.co.ke	0724828282	[Signature]











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32.	Faith Nguny	Business	FaithNguny@gmail.com	0722396974	
33.	Felista Kaptein	Agriculture	FelistaKaptein@gmail.com	0720770318	
34.	Maureen Aieno	NGAO's Office	maureenaieno@gmail.com	0703889729	

ATTENDANCE REGISTER

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8.	Michael Muriu			0722340936	
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10.	Richard Seki	Doolwa Resident		0721597698	
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13.	Ann Moyi	Ngong		0710757129	
14.	MARY MUMA HAUEN	OLKENA	Njigirumbi@gmail.com	0703000173	
15.	GEORGE OSEKA MURITHI	B.O.M. OLKENA	osekageorge@gmail.com	0720536506	
16.	Sosthen Eugene Simiyu	Yotha Represen tative KRA	SOSTHEN EUGENES@gmail.com	0705601477	
17.	Gloria Ngatho	Systems analyst - Yotha	gloriatv@gmail.com	0768603927	



ATTENDANCE REGISTER

SUBJEC:

S/No.	Name	Organization	Email address	Phone number	Signature
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21.	MAR-TARI WAKHARIA	Resident / KWS	Maryamwakharia@gmail.com	0722175323	
22.	Daniel Wangohu	Resident		0704879140	
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24.					
25.					
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34.					

Annex 3: Lead Expert Practicing License



FORM 7



EAE 23061896

(r.15(2))

**NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING
LICENSE**

License No : NEMA/EIA/ERPL/20839

Application Reference No: NEMA/EIA/EL/27685

M/S APEC CONSORTIUM LTD
(individual or firm) of address
P. O. BOX 3786 - 00100, Nairobi

is licensed to practice in the
capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts**
registration number **836**

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

Issued Date: 2/12/2024

Expiry Date: 12/31/2024

Signature.....

(Seal)
f Director General
The National Environment Management Authority

P.T.O.



ISO 9001 : 2015 Certified





FORM 7



EAE 23061896

(r.15(2))

**NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY(NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
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Expiry Date: 12/31/2024

Signature.....

(Seal)
f Director General
The National Environment Management Authority

P.T.O.



ISO 9001 : 2015 Certified



Annex 4: Meeting Notices

REF: KR/M-3/5/43

2nd April, 2024

The Deputy County Commissioner
Lang'ata Sub-County
P.O Box 34833-00100
NAIROBI

Member of Parliament, Lang'ata Constituency
P.O Box 34833-00100
NAIROBI

Member of County Assembly, Karen Ward
KAREN

Secretary,
Karen & Langata District Association
P.O Box 15226-00509
NAIROBI

St. Christopher's International School, Karen
P.O Box 21378-00505
NAIROBI

Chairman,
Muteero-Muhugu Association
P.O Box 1609-00502
NAIROBI

Dear 

**RE: CONSTRUCTION OF RIRUTA / LENANA- NGONG COMMUTER MGR
LINE**

STAKEHOLDERS PARTICIPATION AND ENGAGEMENT MEETING

The subject above refers.

The Government of Kenya through Kenya Railways Corporation (KRC) appointed APEC-CRDC Consortium to undertake Environmental and Social Impact Assessment (ESIA) for the proposed Riruta-Ngong MGR Commuter Railway. The objective of the ESIA study is to predict, assess and analyze the possible positive and negative Environmental and Social impacts that are expected during the Design, Construction and Decommissioning phases of the project.

According to Environmental Management and Coordination Act (EMCA) 1999 and Environmental Impact and Audit Regulation 2003; public and stakeholders' consultation is an important aspect for effective and adequate Environmental and Social Impact Assessment (ESIA) Process. APEC-CRDC Consortium has scheduled for a Stakeholders meeting on Wednesday, 10th April, 2024 at 1000hrs, at St Christopher's International School, The Lecture Theatre, Entry at Gate 3A, Ngong Road, Karen.

The purpose of this letter is to:

- i. Appraise you on the ongoing activities under the Project;
- ii. Notify you of the planned Stakeholder engagement in your sub county
- iii. Request your assistance in mobilizing the public to attend the Stakeholders engagement meeting.

Yours *Sincerely*
mpa

Philip J. Mainiga, EBS
MANAGING DIRECTOR

P.O. BOX 30121-00100, Nairobi, Kenya
Tel: 0709-907 000
Cell: 0728-603 581, 0728-603 582
Email: info@krc.co.ke
Website: www.krc.co.ke



Ref: KR/M-3/5/43

Date: 21st February, 2024

The Deputy County Commissioner
Dagoreti South Sub-County
NAIROBI

Dear *gud*

RE: CONSTRUCTION OF NGONG –RIRUTA COMMUTER MGR LINE:

STAKEHOLDERS PARTICIPATION AND ENGAGEMENT MEETING

The subject above refers.

The Government of Kenya through The Kenya Railways Corporation (KRC) appointed APEC-CRDC Consortium to undertake Environmental and Social Impact Assessment (ESIA) for the proposed Riruta-Ngong MGR Commuter Railway. The scope of the assignment covers Environmental and socio-economic feasibility studies of the project in order to document the possible impacts related to the construction and implementation of the project.

According to Environmental Management and Coordination Act (EMCA) 1999 and Environmental Impact and Audit Regulation 2003; public and stakeholders' consultation is an important aspect for effective and adequate ESIA. KRC has scheduled for a Stakeholders meeting on Wednesday, 28th February 2024 at 1000hrs, at a location to be identified.

The purpose of this letter is to:

- i. Apprise you on the ongoing activities under the Project;
- ii. Notify you of the planned Stakeholder engagement in your sub county
- iii. Request your assistance in mobilizing the public to attend the Stakeholders engagement meeting; and
- iv. Request you to identify and communicate to us the appropriate location for the meeting.

Yours

Sincerely
mya

Philip J. Mainga, EBS
MANAGING DIRECTOR

P.O. BOX 30121-00100, Nairobi, Kenya
Tel: 0709-907 000
Cell: 0728-603 581, 0728-603 582
Email: info@krc.co.ke
Website: www.krc.co.ke



Ref: KR/M-3/5/43

Date: 9th April, 2024

The Deputy County Commissioner
Kajiado North Sub-County
KAJIADO

Member of Parliament
Kajiado North Constituency ✓
NGONG' HILLS

Dear 

**RE: CONSTRUCTION OF RIRUTA / LENANA- NGONG COMMUTER MGR
LINE:**

STAKEHOLDERS PARTICIPATION AND ENGAGEMENT MEETING

The subject above refers.

The Government of Kenya through Kenya Railways (KR) appointed APEC-CRDC Consortium to undertake Environmental and Social Impact Assessment (ESIA) for the proposed Riruta Ngong MGR Commuter Railway. The objective of the ESIA study is to predict, assess and analyze the possible positive and negative Environmental and Social impacts that are expected during the Design, Construction and Operation phases of the project.

According to Environmental Management and Coordination Act (EMCA) 1999 and Environmental Impact and Audit Regulation 2003; public and stakeholders' consultation is an important aspect for effective and adequate ESIA process. APEC-CRDC has scheduled for a Stakeholders meeting on Monday, 15th April, 2024 at 1000hrs, at the Chiefs office at Em-bulbul.

The purpose of this letter is to:

- i. Appraise you on the ongoing activities under the Project;
- ii. Notify you of the planned Stakeholder engagement in your sub county
- iii. Request your assistance in mobilizing the public to attend the Stakeholders engagement meeting.

Yours

Philip J. Mainga, EBS
MANAGING DIRECTOR

P.O. BOX 30121-00100, Nairobi, Kenya
Tel: 0709-907 000
Cell: 0728-603 581, 0728-603 582
Email: info@krc.co.ke
Website: www.krc.co.ke



Ref: KR/ID-RD/RNMGR/FL134

Date: 30th January, 2024

The Deputy County Commissioner
Kajiado North Sub-County
KAJIADO COUNTY

Dear *SW*

**RE: THE PROPOSED RIRUTA-NGONG MGR COMMUTER PROJECT:
PUBLIC PARTICIPATION AND STAKEHOLDER ENGAGEMENT
MEETING FOR NGONG AREA**

Kenya Railways Corporation (KRC) is in the process of implementing the Riruta-Ngong MGR Commuter project with aims to construct a new railway transport infrastructure facility within Nairobi and Ngong in order to attract passenger traffic from the roads, reduce road congestion and create an efficient and affordable mass rapid transit transport system across the Country.

KRC has engaged APEC-ORDC Consortium to undertake an Environmental and Social Impact Assessment (ESIA) for the project. The scope of the assignment covers Environmental and Socio-economic Feasibility studies of the proposed Riruta-Ngong MGR Commuter in order to document the possible impacts related to the construction and implementation of the project.

According to Environmental Management and Coordination Act (EMCA) 1999 revised 2015 and Environmental Impact and Audit Regulation 2003; public participation and stakeholders' consultation is an important aspect for effective and adequate environmental and Social Impact Assessment (ESIA).

In this respect, we have scheduled for a stakeholders meeting to be held on Friday, 2nd February 2024 at Ministry of Education Social Hall at 8.30am.

With this letter, we therefore request your facilitation and support for the public meeting forum in your area.

Yours

sincerely
WJ

Philip J. Mainga/EBS
MANAGING DIRECTOR

Annex 5: Project Summary BoQ

Summary Page		
	N/M	Description
Items	1	Preliminary 57,350,000.00
	2	Embankment 2,733,393,547.05
	3	Track works 890,496,376.40
	4	Culvert Works 354,895,916.20
	5	Bridge Works 1,866,831,331.00
	6	Communications 126,041,475.00
	7	Information 13,080,000.00
	8	Power supply 140,162,000.00
	9	Water supply and drainage 172,792,800.00
	10	Buildings 423,975,000.00
	11	Temporary works 114,200,000.00
	12	SUB-TOTAL (1) 6,893,218,445.65
	13	ADD A SUM OF 2.7% OF SUB-TOTAL (1) FOR THE DESIGN WORKS 186,116,898.03
	15	SUB-TOTAL (2) = (12)+(13)+(14) 7,079,335,343.69
	16	ADD A SUM OF 16% OF SUBTOTAL (2) FOR VALUE ADDED TAX 1,132,693,654.99
	17	BID PRICE = (15)+(16) 8,212,028,998.68

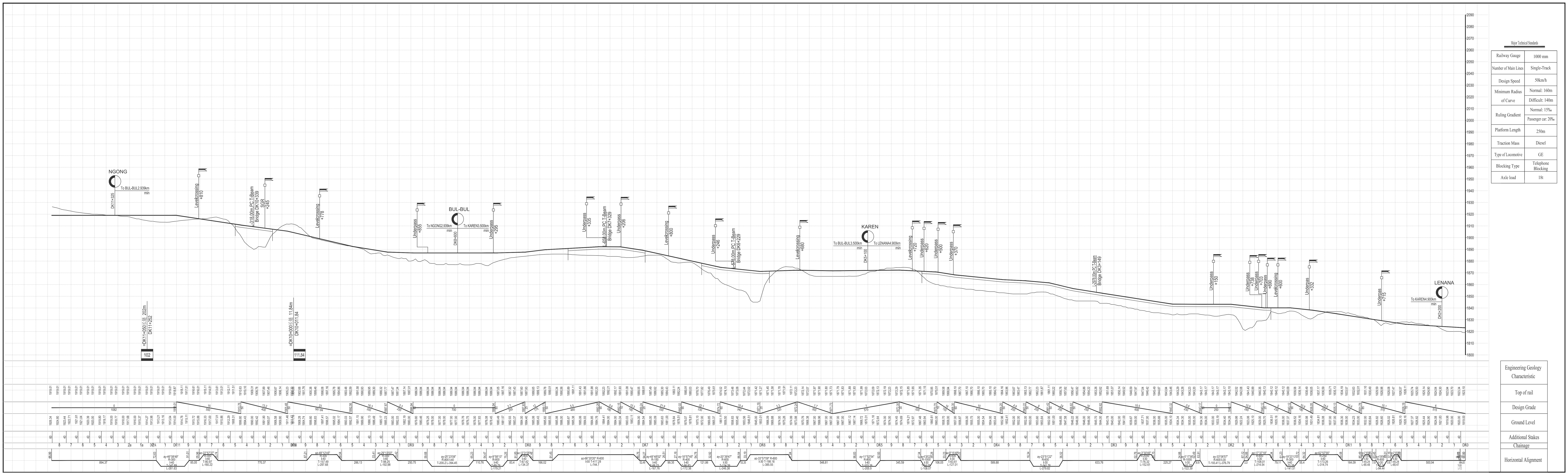


REF NO: KR/SCM/DP/013/2022-2023

PROJECT RIRUTA- NGONG MGR COMMUTER LINE (LINE 8).

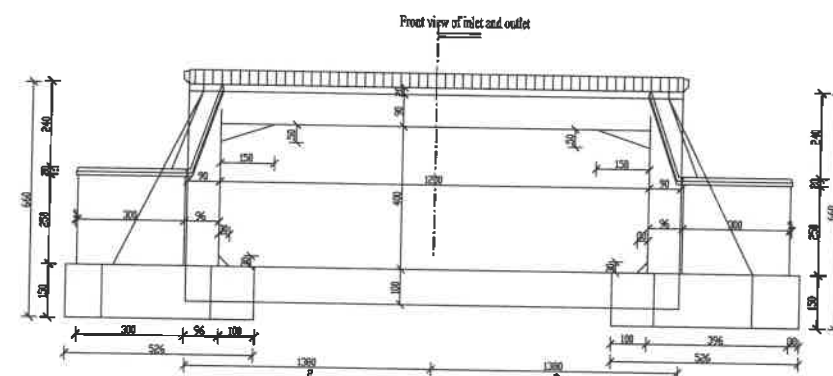
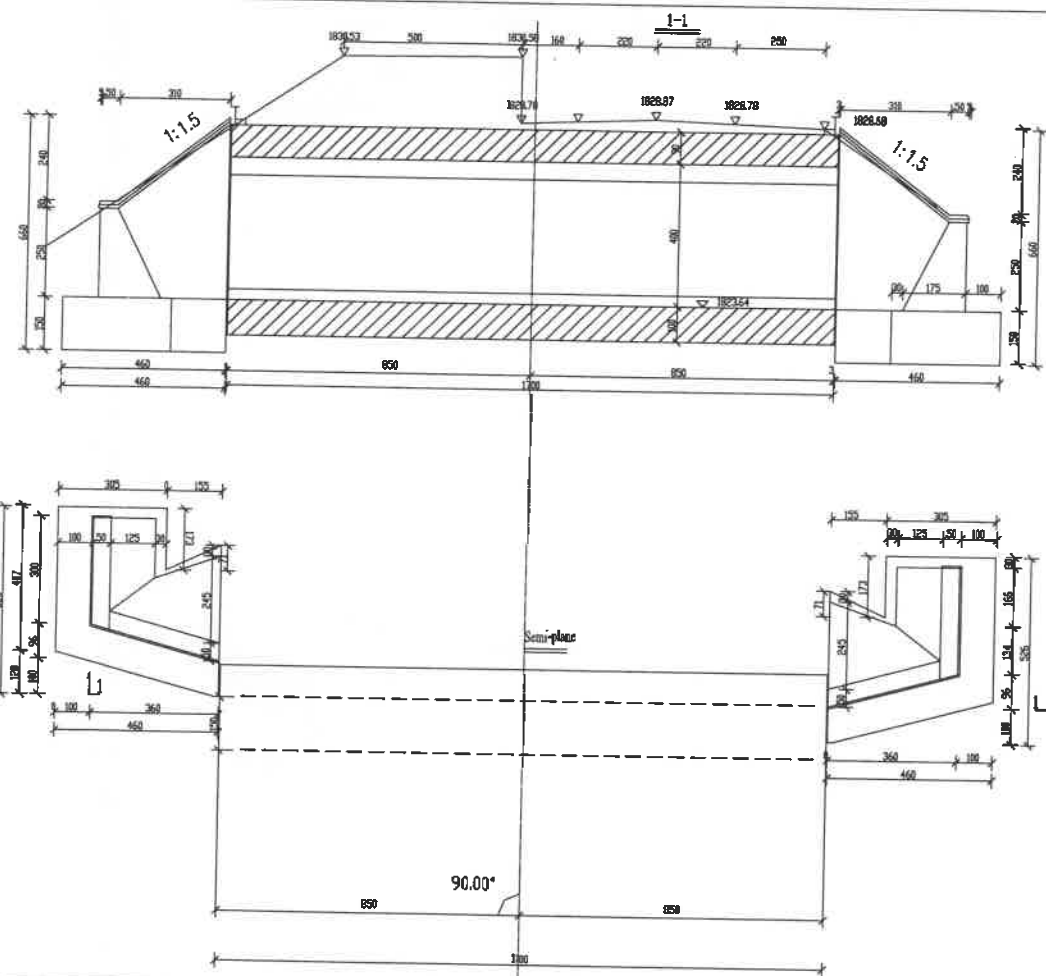
NEGOTIATION MINUTES FOR TENDER CONSTRUCTION OF PROJECT

Annex 6: Project Component Designs

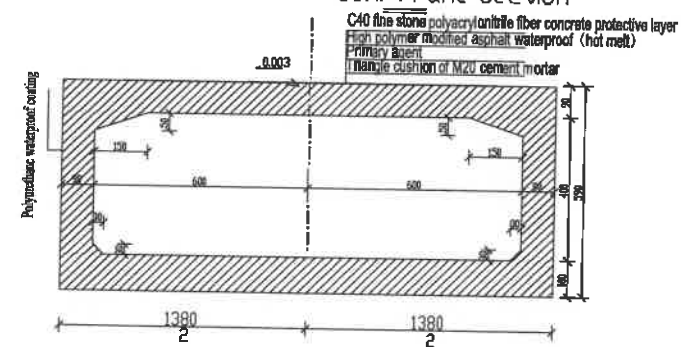


Major Technical Standards	
Railway Gauge	1000 mm
Number of Main Lines	Single-Track
Design Speed	50km/h
Minimum Radius of Curve	Normal: 160m Difficult: 140m
Ruling Gradient	Normal: 15‰ Passenger car: 20‰
Platform Length	250m
Traction Mass	Diesel
Type of Locomotive	GE
Blocking Type	Telephone Blocking
Axle load	18t

Engineering Geology Characteristic
Top of rail
Design Grade
Ground Level
Additional Stakes
Change
Horizontal Alignment



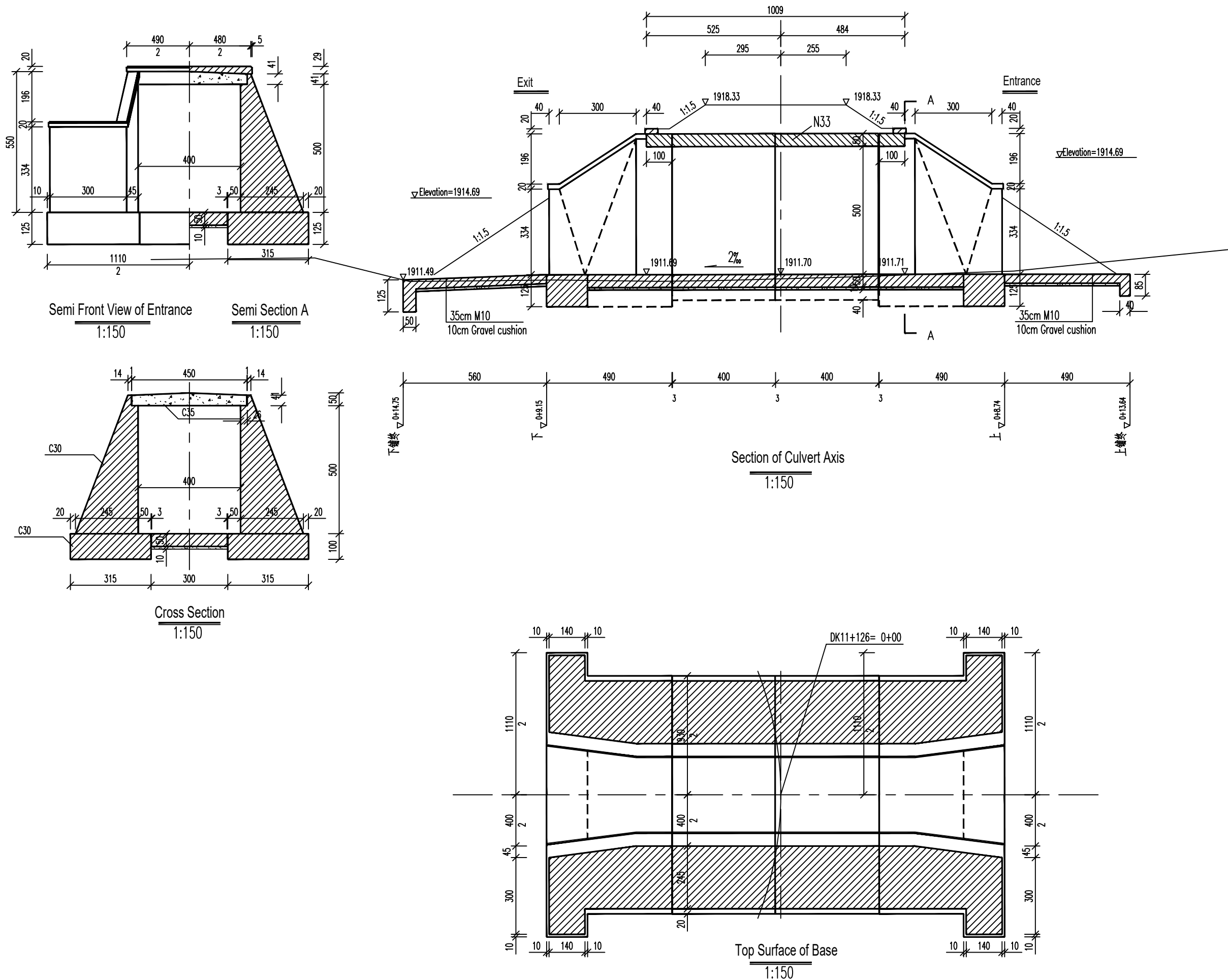
Semi-Frame Section



Notes:

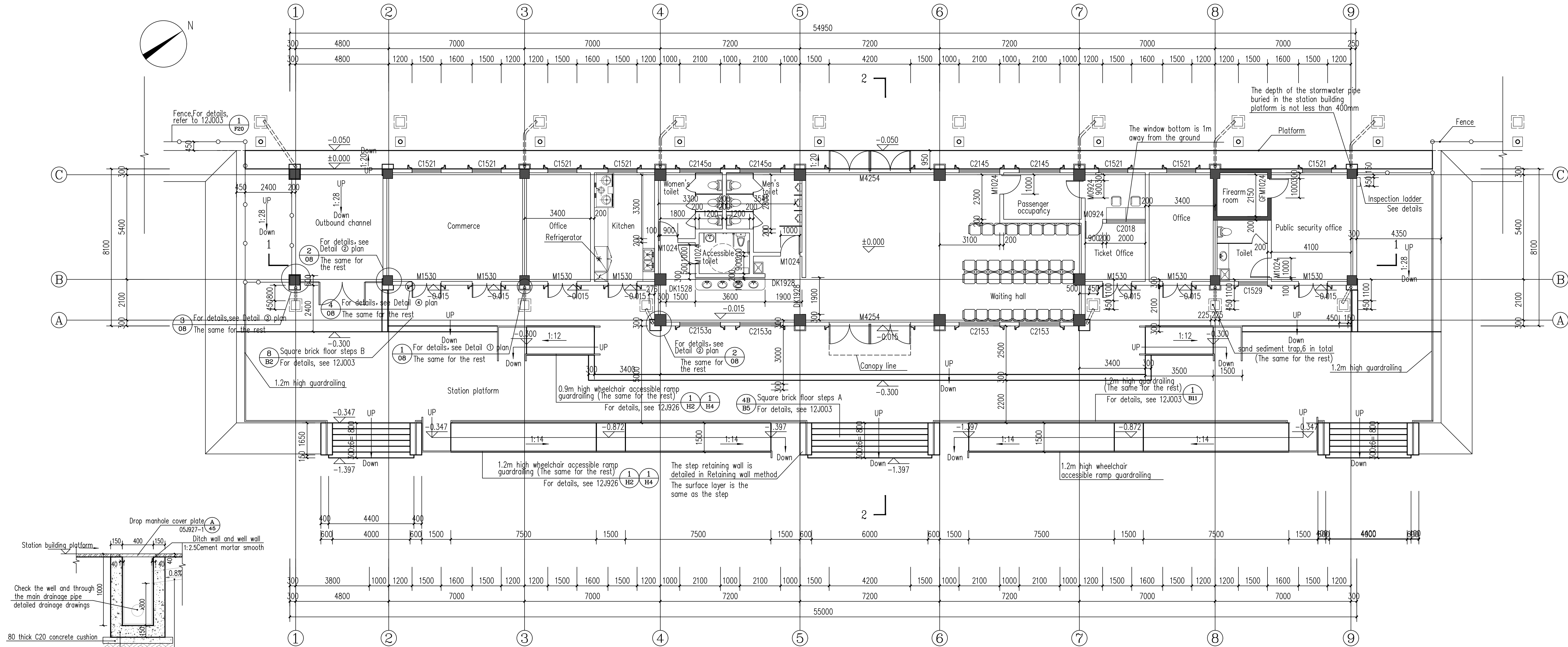
1. All dimensions here are in centimeters, except chineage and elevation which are in meters or otherwise specified.
2. This frame is located at straight line, and designed for overpass. The clearance requirement is 12x4.0 m.
3. The designed bearing capacity for ground soil of frame and wing walls shall be more than 250 kPa.

China Road and Bridge Corporation		Project	CONSTRUCTION OF PROPOSED DUTANGONG MICROINTERLINE	
Designed	李俊	Detailed Design	Code	RNWD Br-01-01 (V2)
Checked	新		Scale	As shown
Approved	李俊		Date	2024.02
DK0+700 1-12.0 m Reinforced Concrete Frame Bridge			Page 1 of 2	



- Notes:
- Generally, dimensions shown here are in centimeters, except for chainage and elevation, which are shown in meters.
 - The culvert mentioned here is designed for drainage.
 - Design Flow: $Q1/100=10\text{ m}^3/\text{s}$
 - Geological Conditions:
 - Silty clay: $0\sim 0.5\text{ m}$, $\sigma=0.15\text{ MPa}$.
 - Fully weathered layer of tuff: $0.5\sim 1.0\text{ m}$, $\sigma=0.25\text{ MPa}$.
 - Strong weathered layer of tuff: $1.0\sim 10.0\text{ m}$, $\sigma=0.4\text{ MPa}$.
 - The axis of the culvert mentioned here and the railway line is just perpendicular to the railway line./
 - The culvert ,with N33 slab, entrance has no raised sections, high side wall (HT = 5.0 m), and supported on separating foundation, is designed according to RNNGDCu-01. Masonry work is determined according to this drawing and waterproof is determined according to RNNGDCu-05. Every segment of foundation of culvert must be constructed phased stagger step and be laid flat.
 - The culvert mentioned here should be placed on the Trachyte ($\sigma=0.40\text{ MPa}$), and the allowable capacity of base ground should be not less than 0.30 Mpa.
 - The paver of culvert entrance and exit should be constructed in accordance with RNNGDCu-01. The entrance and exit should be paved with 35 cm thick M10 motor rubble ,10 cm thick broken stone bed and M10 motor rubble for the vertical apron .
 - M10 motor rubble steps are built at the upstream of culvert, refer to RNNGDCu-01.
 - Attentions for construction:
 - The culvert should be pre-installed a camber that is $H/80$. H is the distance between surface of launder of culvert and bottom of railway on midline of alignment.
 - The soil of the embankment at both sides of the culvert must be filled symmetrically, and the filled soil should be tamped in layers, which density of every layer should reach 90%.
 - Vehicles could not be allowed to pass on the culvert until the thickness of the filled soil on the top of the culvert is over 1 meter, or the ballast has been filled up to the bottom of the sleepers.
 - The constructors should clear the surface of ground, dredge the natural ditches nearby to let the water or flood to pass through the culvert.
 - The constructors should check and verify the site conditions and detailed design of the culvert mentioned here, such as length of embankment, Elevation, slope rate, geological data and dimensions of structure. If you find any errors, mistakes, or difference, please inform the designers immediately.
 - The constructors should check and verify the bearing capacity of base ground. If the bearing capacity of the base ground is uneven distribution, the constructors should take measures to let the base ground to meet the requirements of design before construction.
 - The constructors should first construct the bottom slab of the culvert once base ground cleared and base ground treatment finished, then enclose the ground field in time to avoid the surface water and longtime base ground exposure which will lead the reduction of bearing capacity of base ground.
 - The environment action grade of the culvert mentioned here is defined as T1、T2, according to durability design of concrete structure. The constructors should carry out the relative standards, codes and criteria to construct main parts of the culvert which includes top slab, bottom slab, inner walls and side walls.
 - Anti-cracking reinforcement mesh shall be set at culvert foundation. Anchor rebar shall be set at the joints of sidewall and foundation, details see NMGDBr-13.
 - Prior to construction, underground utilities such as pipelines and optical cable shall be checked to avoid being destroyed because of culvert const5ruction. If there is any, inform the owner for agreement and meanwhile necessary protective measures shall be taken to ensure safty,

China Road and Bridge Corporation			Project	CONSTRUCTION OF PROPOSED RIRUTA-NGONG MGRCOMMUTER LINE(LINE 8)	
Designed		Detailed Design		Code	RNMDD Cu-01-01 (V2)
Checked				Scale	As shown
Approved				Date	2024.03
				Page 1 of 2	
		DK11+126 1-4.0 m Reinforced Concrete Slab Culvert			



Retaining wall method:(Exterior step and wheelchair accessible ramp)
Selected from "Retaining Wall Atlas" 17J008, P127 cantilever shoulder wall XJA2.5, retaining wall buried depth of 2.5 meters, the bearing layer is fully weathered tuff, the bearing capacity of the foundation is 250KPA. The height of the outside retaining wall of the step and ramp is 100mm higher than the step with the height of the ramp and step; The elevation of the top of the retaining wall near the plaza in front of the station is the same as that of the plaza in front of the station.

Ground Floor Plan 1:100
Architectural Area:376.62m²

China Road And Bridge Corporation		Project	CONSTRUCTION OF PROPOSED RIRUTA-NGONG MGR COMMUTER LINE(LINE 8)	
Designed By	史文波	Detailed Design Ngong Station Station Building Ground Floor Plan	Drawing No.	RNMD-BU-01-01-01-05 (V3)
Checked By	李松		Scale	1:100
Verified By	史文波		Date	2024. 02
Approved By	张永翔		page 5 of 31	

Annex 7: Air and Noise Quality Measurement Report

**BASELINE AMBIENT AIR QUALITY MEASUREMENTS REPORT FOR
THE PROPOSED RIRUTA-NGONG METER GAUGE RAILWAY
COMMUTER**



BASELINE AMBIENT AIR QUALITY MEASUREMENTS

FINAL REPORT

Sampling Date: 7th March 2024



CONSORTIUM LIMITED

APEC Consortium Co. Ltd
P. O. Box 3786-00100 Nairobi, Kenya
Email: apec ltd@gmail.com
www.apec ltd.co.ke



China Railway Design Corporation
Address: P.O. Box 2290-00200 Nairobi, Kenya
Email: liliguo@crdc.com
www.crbc.com

Report prepared by:

Prof. Anthony Gachanja

Ecoserv Consultants Limited

P. O. Box 1303 - 00100

Nairobi, Kenya.



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Email: projects@ecoservkenya.com
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CELL: 254-0722882879

NEMA Registration No: 1858

Tel: 0722882879

Email: info@ecoservkenya.com

gachanja@ecoservkenya.com

Experts Sign:

Signed:

Date:

19th March 2024

Prof. Anthony Gachanja (PhD, CChem, FRSC, DSc (Hon), NEMA Reg.) Managing Director

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1.0 INTRODUCTION

Apex Systems Consulting Group Ltd contracted Ecoserv Consultants Limited to take baseline measurements of ambient air quality at selected sampling points along the proposed Riruta-Ngong commuter train railway line for the Kenya Railways.

The proposed railway line connects with the existing line in the residential suburb of Riruta, and run 12.5 km through Karen and Bulbul to reach Ngong to the southwest of Nairobi.

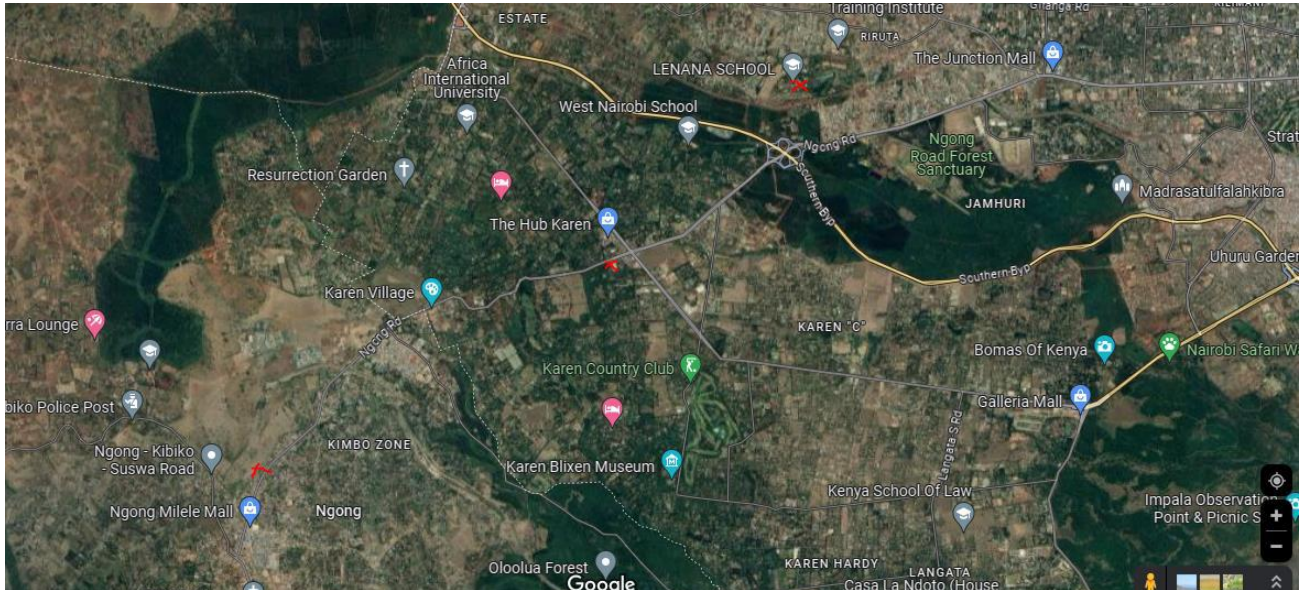
The measurements are in compliance with National Environment Management Act, 1999, and air quality regulations, 2014.

During the construction and operations, environmental pollutants are emitted; these emissions are related to dust (Particulate Matter (PM), noise and gaseous emissions. Dust and noise emissions increase significantly with the excavation and transportation of construction materials within the construction areas. Other factor that interferes with air quality is the combustion of fuels, both fossil and biomass. This is expected to occur during transportation and movement of vehicles. Pollutants may include carbon, Sulphur, and nitrogen oxides and odor. Potential impacts of such emissions include; poor visibility by adhering to glass screens and other surfaces, interference with plants growth, acid rain formation in affected areas, pollution of water sources, adverse effects on building structures, transport of air-borne disease vectors. In addition, the pollutants may adversely affect the health and safety of the workers at site

The objective of this assignment is to take baseline measurements of ambient air quality along the proposed Riruta-Ngong Commuter train railway line at selected sites in compliance with Air Quality regulations, 2014.

1.1 LOCATION OF THE SITE

The Nairobi Commuter Rail Service (NCRS) development is part of Nairobi Metropolitan Transport Master Plan. The project aims to carry out a modernization and expansion of under-utilized railway transport infrastructure facilities within Nairobi in order to attract passenger traffic from the roads thus reduce congestion; and create an efficient and affordable mass rapid transit transport system for the city. It will integrate rail transport with other modes of transport i.e., road and air transport. The Riruta-Ngong Meter Gauge Railway Commuter line will connect with the existing line in the residential suburb of Riruta, and run 12.5 km through Karen and Bulbul to reach Ngong to the southwest of Nairobi.



Map 1: Overview map of the proposed project coverage area (Source: Google maps)

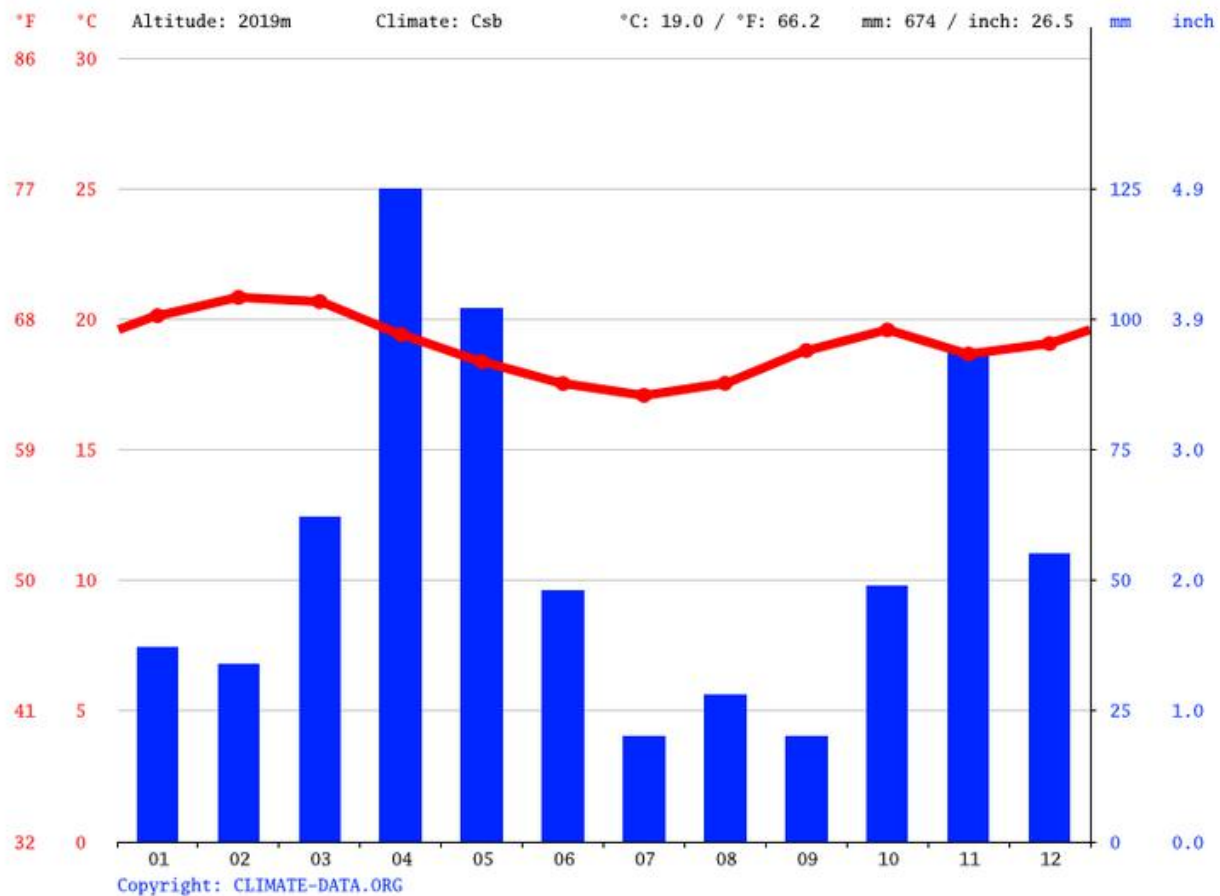
1.2 CLIMATIC CONDITIONS

1.2.1 Average Daily Temperatures in the areas surrounding the proposed site, Lenana in Nairobi County and Ngong in Kajiado County.

DATA AND GRAPHS FOR WEATHER & CLIMATE IN NGONG

The weather conditions in Ngong are characterized by a mild and moderate climate. In Ngong there is a lot of rain even in the driest month. This climate is considered to be Cfb according to the Köppen-Geiger climate classification. The mean yearly temperature observed in Ngong is recorded to be 19.0 °C. The precipitation level on a yearly basis amounts to 674 mm inch as per the meteorological records.

CLIMATE GRAPH // WEATHER BY MONTH NGONG



The month with the least amount of precipitation is July exhibiting a mere 20 mm rainfall. The greatest amount of precipitation occurs in April, with an average of 125 mm

WEATHER BY MONTH // WEATHER AVERAGES NGONG

	Ja nu ar y	Febr uary	Mar ch	A pri l	Ma y	Jun e	Jul y	Aug ust	Septe mber	Octo ber	Nove mber	Dece mber
Avg. Temperat ure °C (°F)	20 .1 ° C (6 8. 2) °F	20.8 °C (69.5) °F	20. 7 °C (69. 2) °F	19 .4 °C (6 7) °F	18. 4 °C (65 .1) °F	17. 5 °C (63 .6) °F	17. 1 °C (62 .7) °F	17.5 °C (63. 6) °F	18.8 °C (65.8) °F	19.6 °C (67.3) °F	18.7 °C (65.6) °F	19.1 °C (66.3) °F

Min. Temperature °C (°F)	14.6 °C (58.2) °F	14.9 °C (58.9) °F	15.5 °C (59.8) °F	15.6 °C (60) °F	14.5 °C (58.1) °F	13.2 °C (55.7) °F	12.2 °C (53.9) °F	12.6 °C (54.8) °F	13.3 °C (56) °F	14.6 °C (58.4) °F	14.6 °C (58.3) °F	14.4 °C (58) °F
Max. Temperature °C (°F)	26.3 °C (79.4) °F	27.2 °C (81) °F	26.7 °C (80) °F	24.4 °C (76) °F	22.9 °C (73.1) °F	21.9 °C (71.5) °F	21.8 °C (71.2) °F	22.5 °C (72.6) °F	24.5 °C (76.1) °F	25.2 °C (77.4) °F	23.7 °C (74.7) °F	24.6 °C (76.3) °F
Precipitation / Rainfall mm (in)	37 (1)	34 (1)	62 (2)	125 (4)	102 (4)	48 (1)	20 (0)	28 (1)	20 (0)	49 (1)	94 (3)	55 (2)
Humidity (%)	55%	50%	55%	68%	70%	66%	61%	59%	54%	55%	69%	65%
Rainy days (d)	5	4	9	16	13	7	3	4	3	8	14	9
avg. Sun hours (hours)	9.5	9.6	8.5	6.6	5.7	4.6	4.2	4.3	6.5	7.2	6.4	8.1

There is a notable variation in precipitation levels between the driest and wettest months, amounting to 105 mm. The variation in temperatures throughout the year is 3.8 °C

<https://en.climate-data.org/africa/kenya/kajiado/ngong-103422/>

WEATHER BY MONTH // WEATHER AVERAGES LENANA

The climatic conditions prevailing in Lenana are characterized by a warm and moderate temperature. Lenana has a significant amount of rainfall during the year. This is true even for the driest month. As per the Köppen-Geiger classification, the prevailing weather conditions in this region are categorized under Cfb. The mean yearly temperature observed in Lenana is recorded to be 17.9 °C Approximately 674 mm of rainfall occurs on a yearly basis.

	Janu ary	Febru ary	Mar ch	Apr il	Ma y	Jun e	Jul y	Aug ust	Septe mber	Octo ber	Nove mber	Dece mber
Avg. Tempera ture °C (°F)	19 °C (66. 1) °F	19.7 °C (67.4) °F	19. 6 °C (67. 2) °F	18. 4 °C (65. 2) °F	17. 5 °C (63. 6) °F	16. 7 °C (62) °F	16. 2 °C (61. 1) °F	16.5 °C (61. 7) °F	17.7 °C (63.8) °F	18.4 °C (65.2) °F	17.5 °C (63.6) °F	17.9 °C (64.3) °F
Min. Tempera ture °C (°F)	13.6 °C (56. 5) °F	14 °C (57.3) °F	14. 6 °C (58. 2) °F	14. 8 °C (58. 6) °F	13. 8 °C (56. 9) °F	12. 5 °C (54. 4) °F	11. 4 °C (52. 6) °F	11.8 °C (53. 3) °F	12.4 °C (54.4) °F	13.7 °C (56.7) °F	13.8 °C (56.9) °F	13.6 °C (56.5) °F
Max. Tempera ture °C (°F)	25 °C (77) °F	25.9 °C (78.7) °F	25. 5 °C (77. 9) °F	23. 4 °C (74. 1) °F	22 °C (71. 6) °F	21 °C (69. 8) °F	20. 8 °C (69. 4) °F	21.4 °C (70. 4) °F	23.3 °C (73.9) °F	24 °C (75.2) °F	22.4 °C (72.4) °F	23.3 °C (74) °F
Precipit ation / Rainfall mm (in)	37 (1)	34 (1)	62 (2)	125 (4)	102 (4)	48 (1)	20 (0)	28 (1)	20 (0)	49 (1)	94 (3)	55 (2)
Humidit y(%)	58%	53%	58 %	71 %	72 %	67 %	64 %	63%	57%	59%	73%	69%
Rainy days (d)	5	4	9	16	13	7	3	4	3	8	14	9
avg. Sun hours (hours)	9.5	9.6	8.5	6.6	5.7	4.6	4.2	4.3	6.5	7.2	6.4	8.1

There exists a variation of 105 mm in precipitation levels between the month with the least rainfall and that which experiences maximum downpour. During the year, the average temperatures vary by 3.5 °C.

<https://en.climate-data.org/africa/kenya/nairobi-1677/>

2.0 METHODOLOGY

Methodology is basically a guideline for solving a problem with specific components such as tasks, methods, phases, techniques and tools. Methodologies contain procedures followed, analysis and interpretation of the data gathered.

The methodology outline for this exercise incorporated the following aspects:

- Identification of sampling points
- On-site data collection of the sampling points
- Deployment of the air quality measuring equipment to the site
- Downloading of data for analysis
- Analysis of the downloaded data

2.1 Equipment for Air Quality Measurement

Multiple Gas Sensors



Figure 1: Crowcon Gaspro 1-5 Sensor Multi Gas detector

The Crowcon Gas-Pro can feature up to five potentially hazardous gases from an extremely wide range including, hydrogen Sulphide, carbon monoxide, carbon dioxide, oxygen and 11 flammable gases, as well as industry-specific gases such as ozone, ammonia, chlorine, chlorine dioxide and Sulphur dioxide. Before entering a confined space, operatives will be required to undertake samples of the atmosphere to ascertain if it is safe to enter or breathing apparatus are required. The Crowcon Gas-Pro

features an internal pump option, taking the pain out of pre-entry testing and allows Gas-Pro to be worn either in pumped or diffusion modes.

It is flexible because:

- It is tailored +ve Safety to organizational requirements
- Monitor 5 gases from many different options
- Multipurpose; pumped and diffusion solutions offering multiple uses within one compact detector

Portable CO₂, NH₃ monitor-G10



With leading operation menu, 1700MA rechargeable lithium batteries, and replaceable inserted gas sensing module, our model works in environment of -20°C to 70°C, and for its features such as explosion-proof, waterproof and dustproof, it is the preferred tool for oil production engineering, metallurgy, chemical industry, municipal, sewage treatment, electricity, gas, mining, tunnel construction, storage, paper making, pharmaceutical, brewing ,and other fields which need to detect hazardous gases!

Key features

- Upload to computer function

- Using advanced ultra-low energy micro component
- Ultra bright LCD display
- Ultra small ergonomic design
- Sensor fault self-test, automatic calibration function
- Replaceable insert sensor module
- Two levels triple alarms (sound, light, vibration)
- Sound and light alarm can be clearly identified

MultiRAE Lite Pumped / 10.6 eV PID / LEL / H₂S / CO / O₂ (PGM-6208)

Figure 2: MultiRAE Lite Pumped



The MultiRAE Lite is ideal for personal protection and multi gas leak detection in industries including chemicals, food and beverage, oil and gas (downstream), telecommunications and wastewater treatments. It's a highly versatile monitor from RAE Systems. It is a multi-gas detector with a broad range of sensors available and is able to monitor up to six gases. This particular model is a pumped model and features the following sensors: Photoionization (PID), Combustible Gases (LEL), Hydrogen Sulphide (H₂S), Carbon Monoxide (CO) and also Oxygen (O₂). In order to carry

out bump tests and calibration checks the MultiRAE Lite can be used with the AutoRAE2 which is also available from Frontline Safety.

Key Features include:

- i. Intelligent sensors store calibration data
- ii. Large graphical LCD screen and simple user interface
- iii. Unit is easily maintainable
- iv. Replaceable sensors, pump, and plug-and-play battery
- v. Data logging capability – continuous (6 months for 5 sensors, 24 x 7)
- vi. Range of languages available

CEL-712 Microdust Pro

The CEL-712 Microdust Pro is a rugged, hand-held, data logging instrument for the real-time detection of airborne dusts, fumes and aerosols. It has a large colour display and a graphical facility, allowing the user to instantly view the dust level and trends. It is ideal for walkthrough surveys of ambient and indoor workplace environments, a quick, easy to use instrument, giving the user additional qualitative data which cannot be gained by gravimetric air sampling methods alone. This extremely versatile instrument can also be used with a range of accessories for static and size selective sampling applications. The CEL-712 Microdust Pro has the highest measurement range of any occupational dust measurement instrument available on the market. Up to 500 measurements can be taken and stored with the large memory. Key features include: Real-time graphical display of dust levels Simple icon driven user interface Extensive range: 0.001mg/m³ to 250 g/m³ (Auto-ranging) Unique removable sampling probe Rugged design for harsh environments Multi-language operation Sampling for total, respirable, PM2.5 or PM10 with optional adaptor Unique on-site calibration insert Environmental enclosure available for boundary monitoring applications.



Figure 3: *CEL-712 Microdust Pro Real-time Dust Monitor*

2.2 ***Downloading Data***

Gas sensors

The instrument displays a floppy disk icon to indicate that a datalog is being recorded. The instrument stores the measured gas concentration for each sensor, date and time for each measurement, Site ID, User ID, and other parameters. The MultiRAE memory is sufficient to record six months' worth of data for five sensors at one-minute intervals, 24/7. All data are retained (even after the unit is turned off) in non-volatile memory so that they can be downloaded at a later time to a PC.

The MultiRAE communicates with a PC running ProRAE Studio II instrument Configuration and Data Management software to download datalogs, configure the instrument, or upgrade the instrument's firmware. The MultiRAE must be connected to a PC through the supplied Desktop Cradle, Travel Charger, or AutoRAE 2 and must be in the PC or AutoRAE 2 communications mode

CEL-712 Microdust Pro

The CEL-712 Microdust Pro is downloaded to Casella Insight Data Management Software using the USB cable. Once downloaded, the time history of the dust level can be displayed and analysed as necessary, so the times and extent of particularly 'dusty' events can be seen. Measurements can be

stored in relation to the person or area they were measured and reports can be produced showing the relevant data for multiple people or places as required.

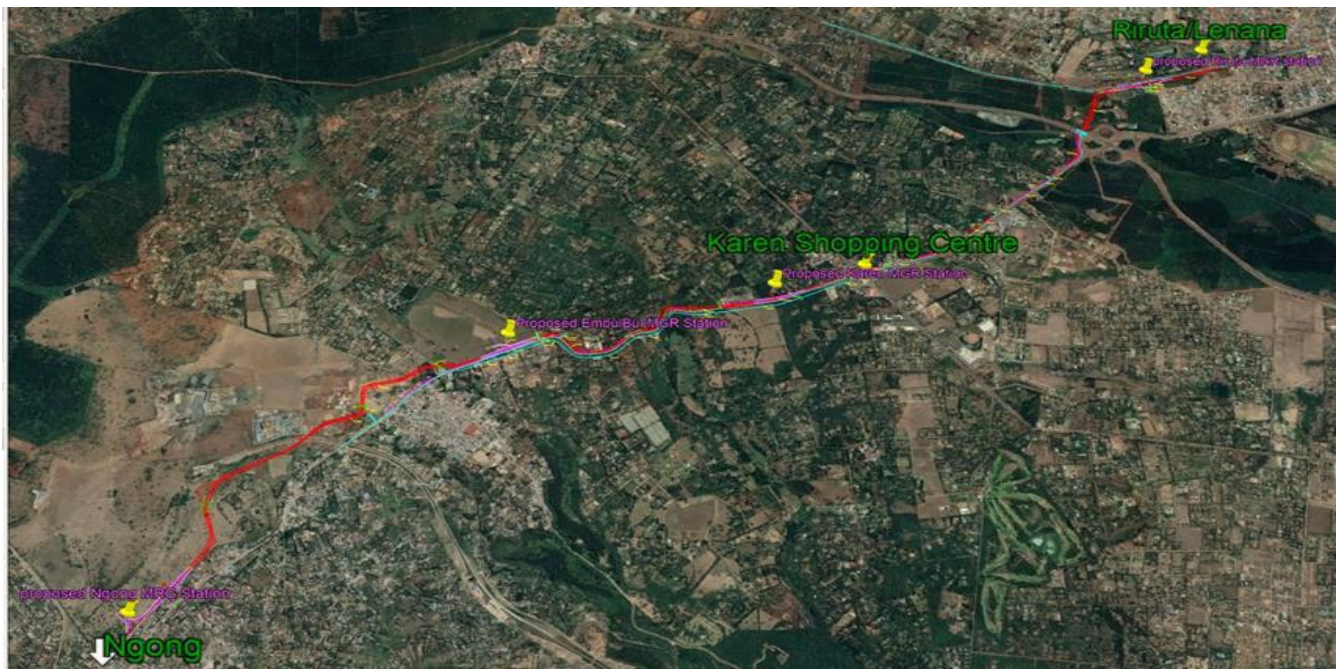
2.3 Identification of Sampling Points

The sampling point was identified after a site visit conducted by the consultant in accordance with the Environmental Management and Co - Ordination (Air Quality) Regulations), 2014 for property boundary air quality monitoring, and in relation to proposed activities on the site. All the sampling sites were identified considering the activities currently taking place in the neighborhood.

The sites identified were as follows (see Map 2):

Site 1: Riruta – Lenana	Proposed terminus
Site 2: Karen shopping centre	Proposed commuter train station
Site 3: Ngong Town	Proposed terminus

2.4 On-Site Data Collection



Map 2: proposed commuter train showing start and terminus and stations.

Onsite data collected on the acknowledged sampling point was documented on a data collection sheet. The sheet documented the location, coordinates, date and run time and any additional information of the sampling points. Photographs were also taken to document the sampling site

Table 2: Data collection sheet for air quality sampling points

Site	COORDINATES	DATE	RUN TIME (HH:MM:SS)									
			CO	NO ₂	SO ₂	CxHy	H ₂ S	VOCs	O ₂	PM ₁₀	CO ₂	NH ₃
Site 1 (Lenena)	1°18'08.9"S 36°43'53.0"E	7th March 2024	3:01:02	3:01:02	3:01:02	3:01:02	3:01:02	3:01:02	3:01:02	3:01:02	3:01:02	3:01:02
Site 2 (Karen)	1°19'22.3"S 36°42'21.3"E	7th March 2024	3:02:08	3:02:08	3:02:08	3:02:08	3:02:08	3:02:08	3:02:08	3:02:08	3:02:08	3:02:08
Site 3 (Ngong)	1°21'05.9"S 36°39'23.0"E	7th March 2024	3:04:09	3:04:09	3:04:09	3:04:09	3:04:09	3:04:09	3:04:09	3:04:09	3:04:09	3:04:09

2.6: Photographs of the Selected Sampling Points

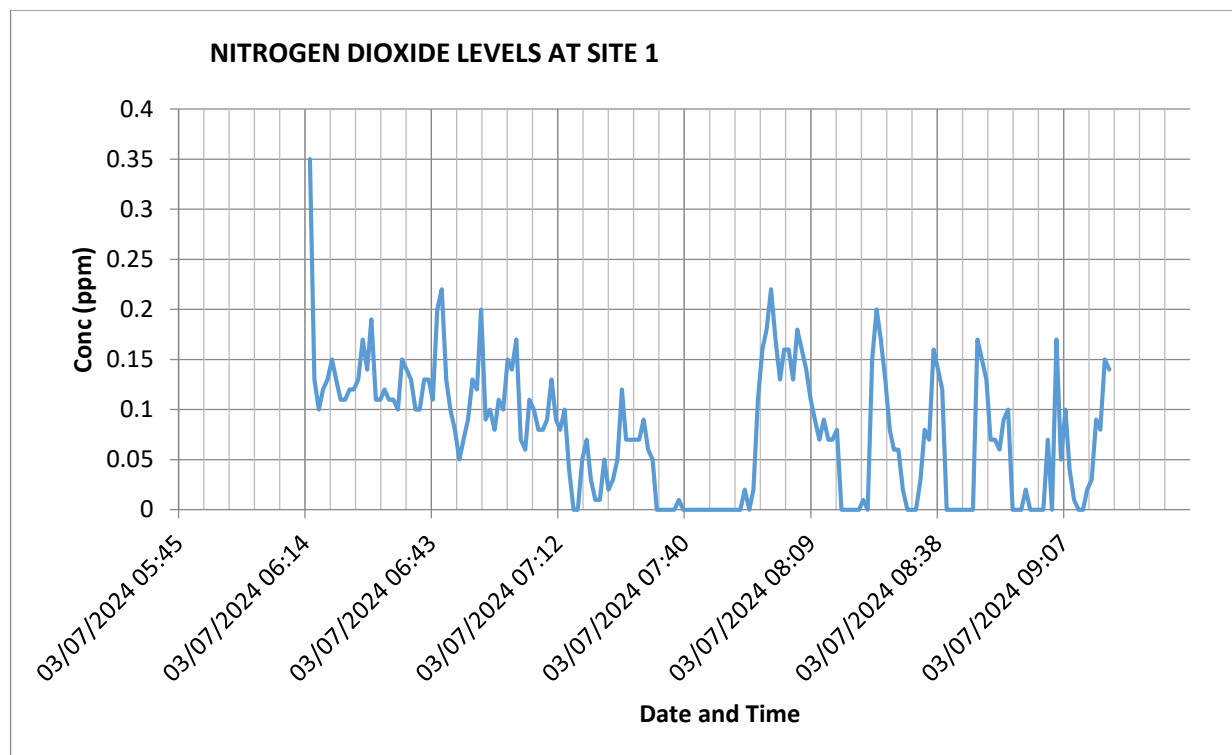
		
Site 1: Train passing by and air sampling at Lenana	Site 2: ongoing sampling at Karen	Site 3: Sampling of gases at Ngong

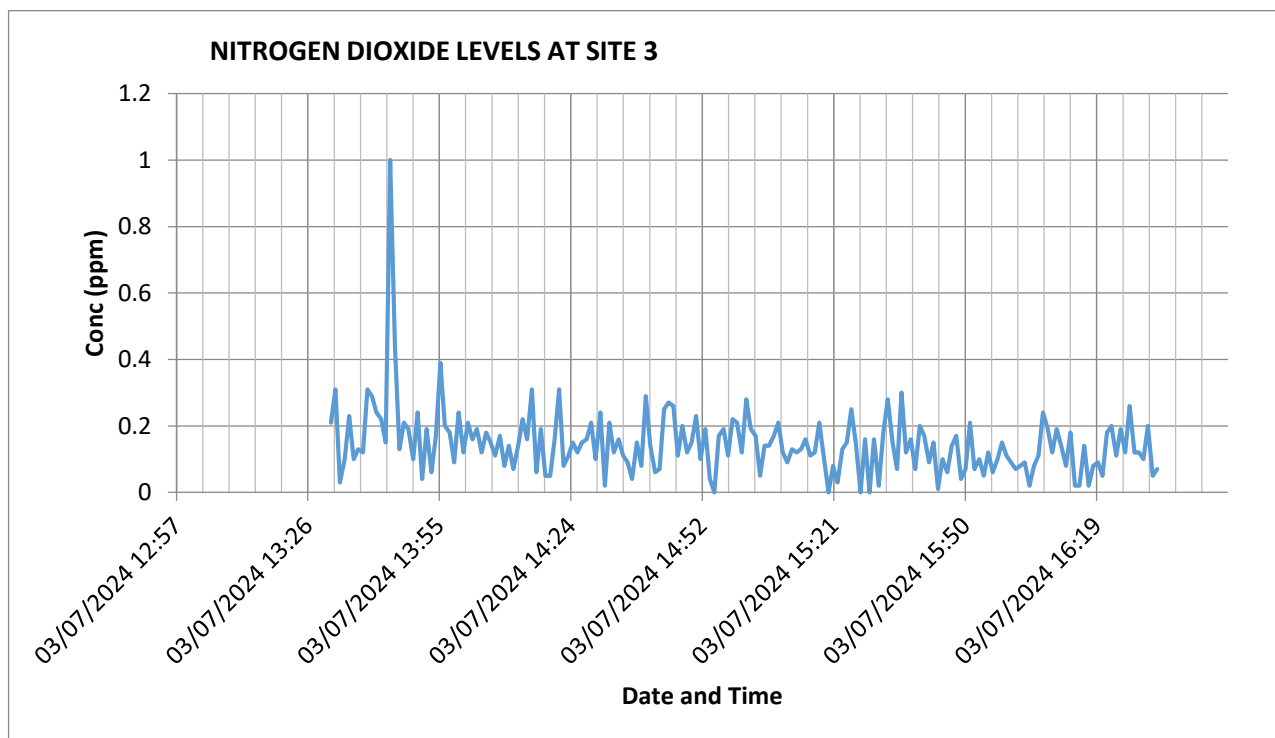
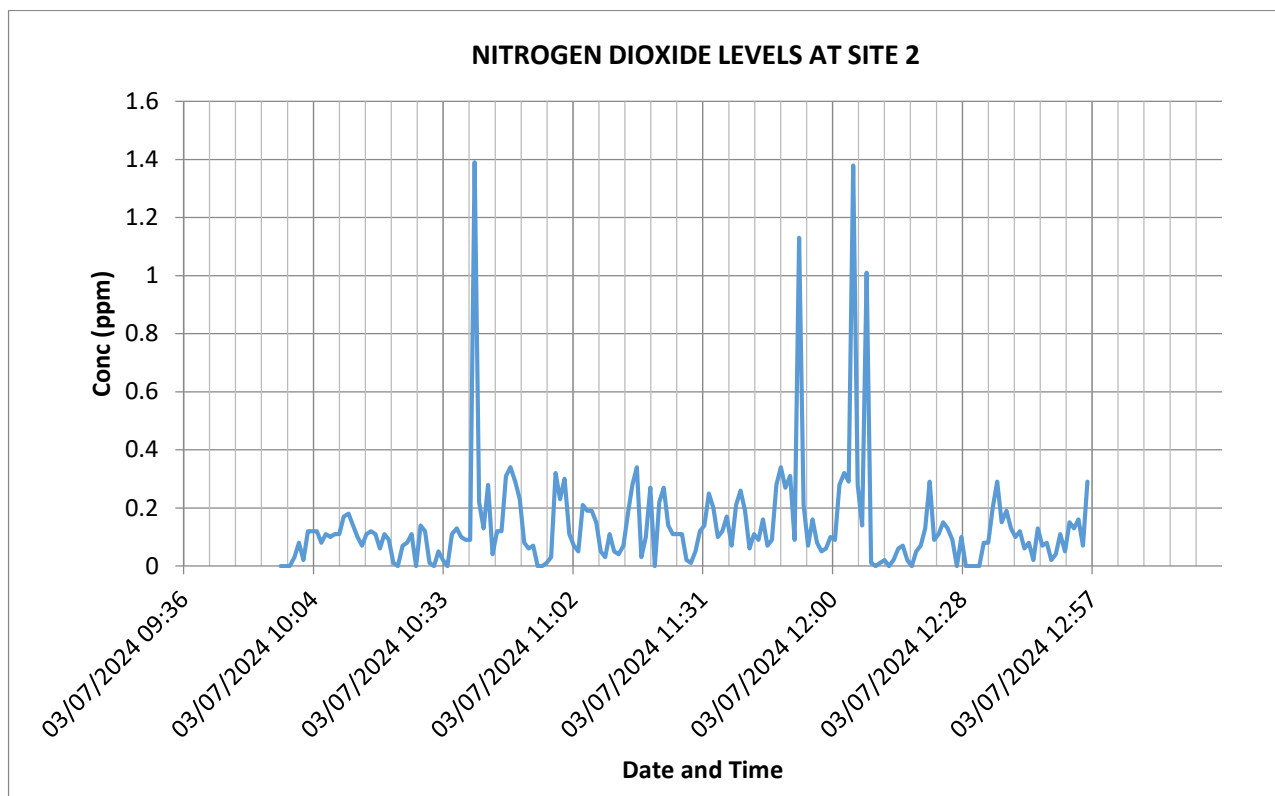
3.0 DATA ANALYSIS AND DISCUSSIONS

3.1 Results

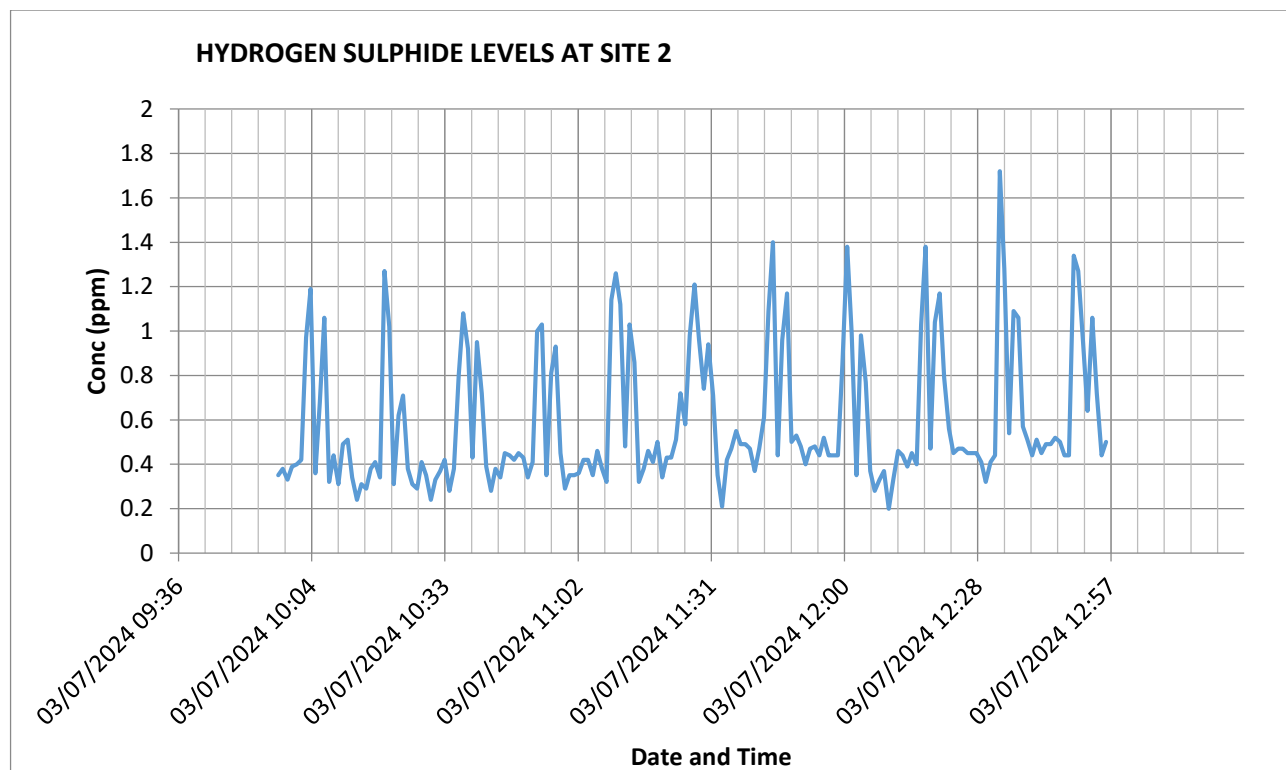
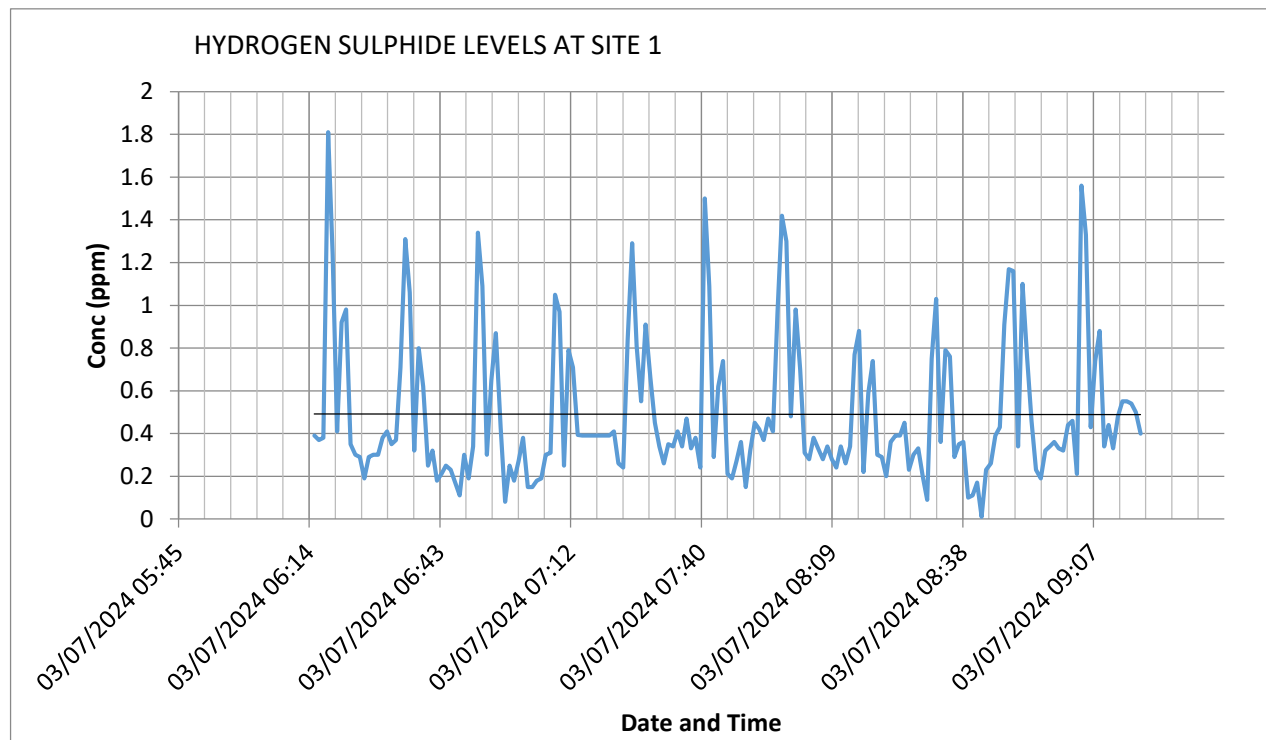
Results from the identified sampling sites are given below

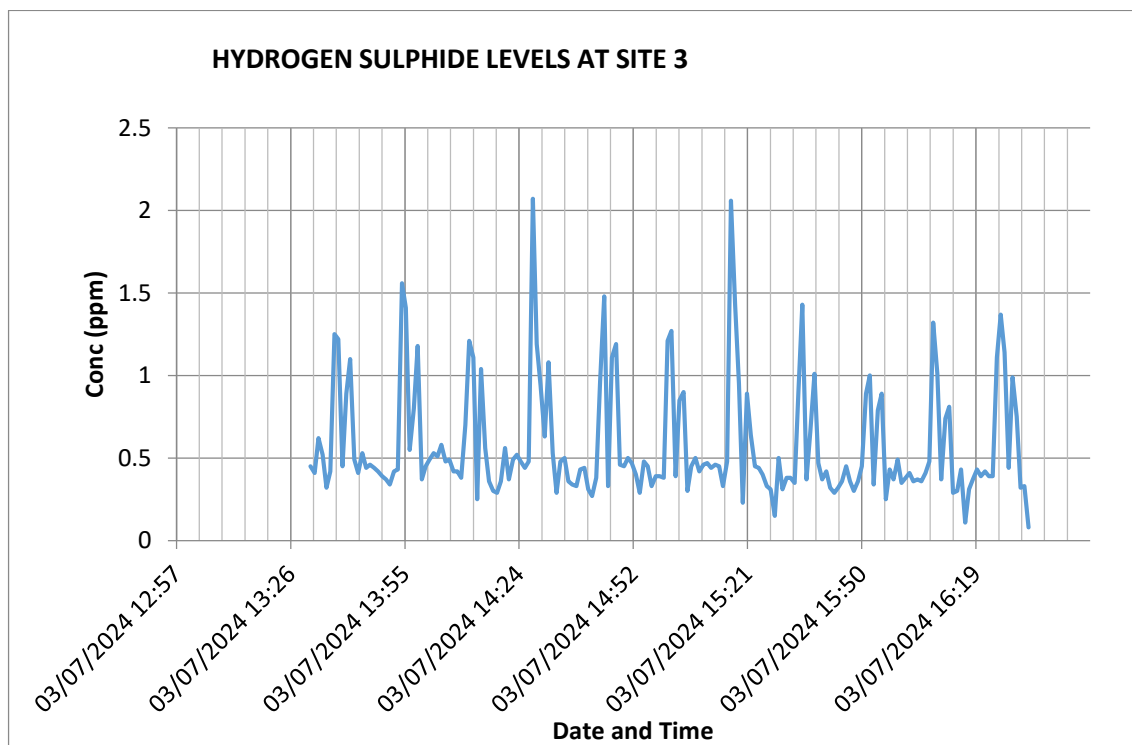
Nitrogen Dioxide levels



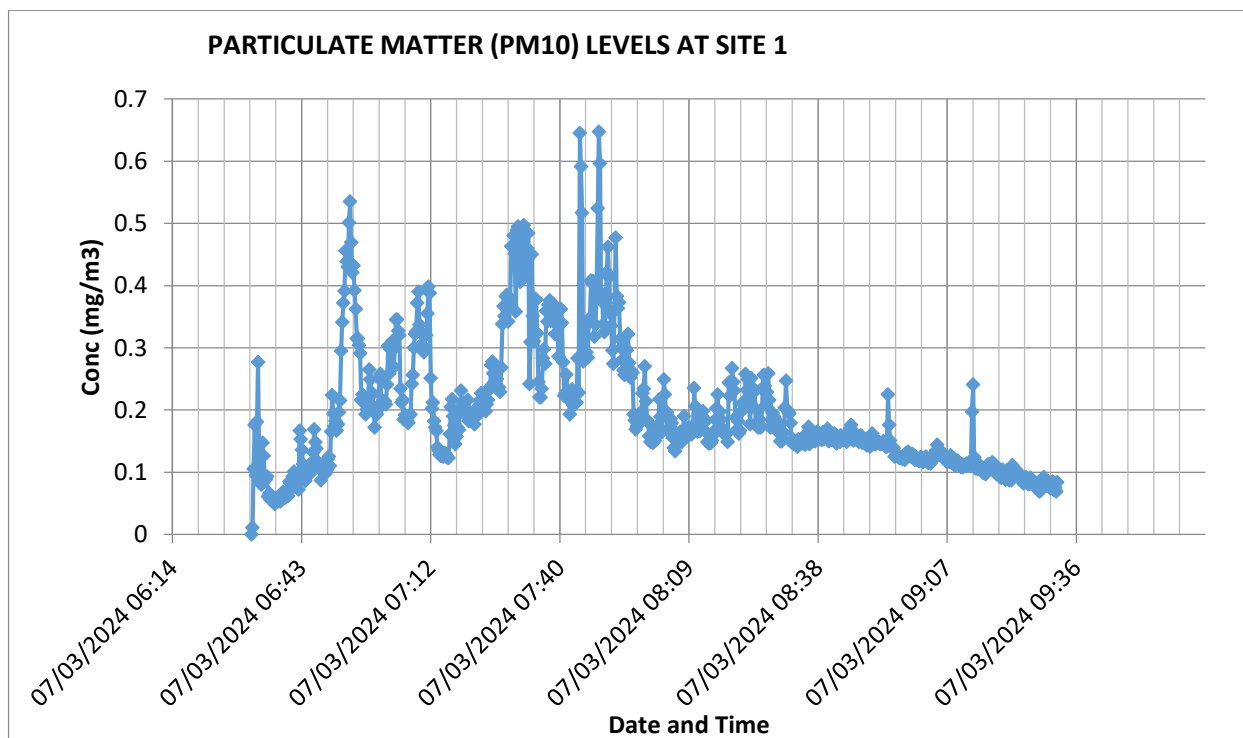


Hydrogen Sulphide levels

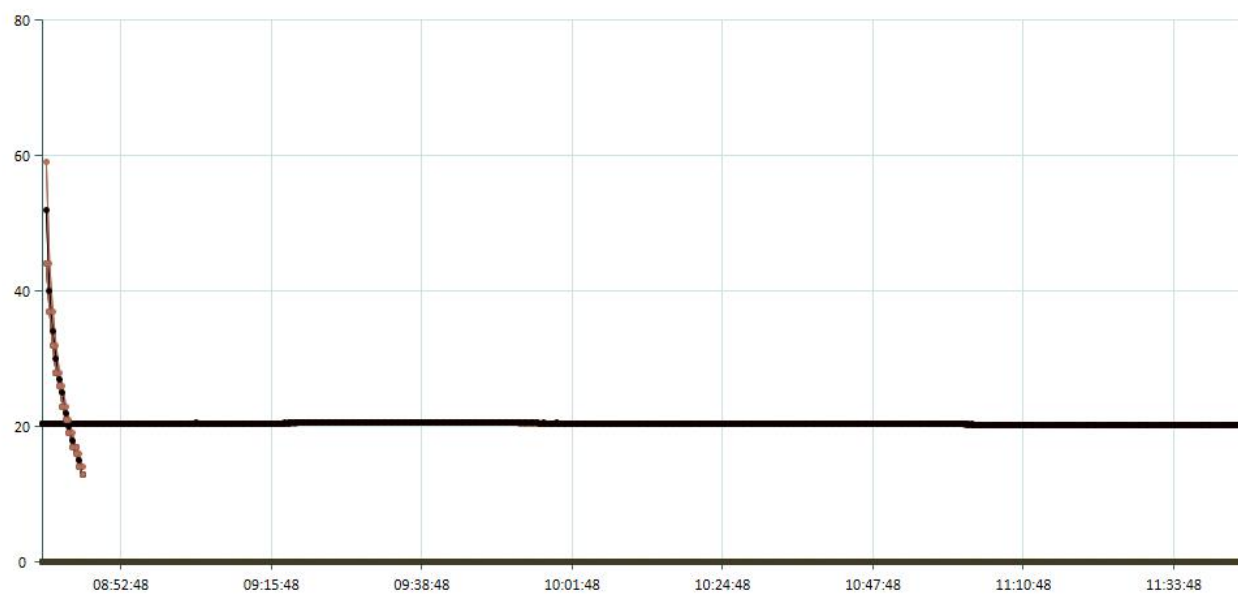




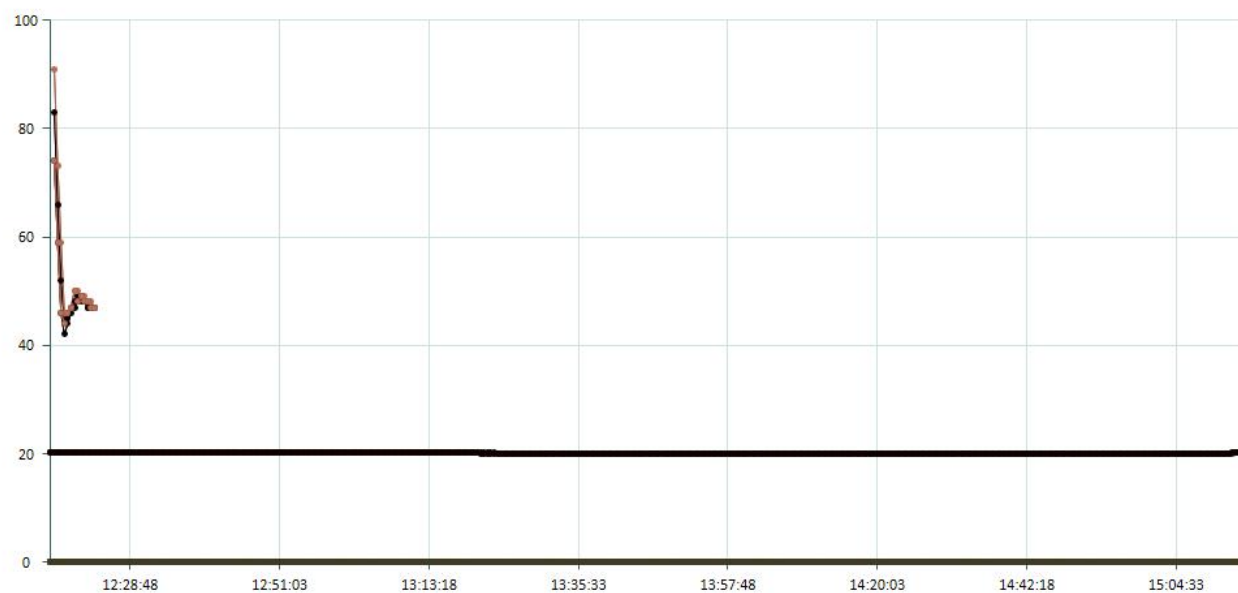
Particulate Matter (PM₁₀) levels



CO and VOC levels Lenana



Karen



Ngong

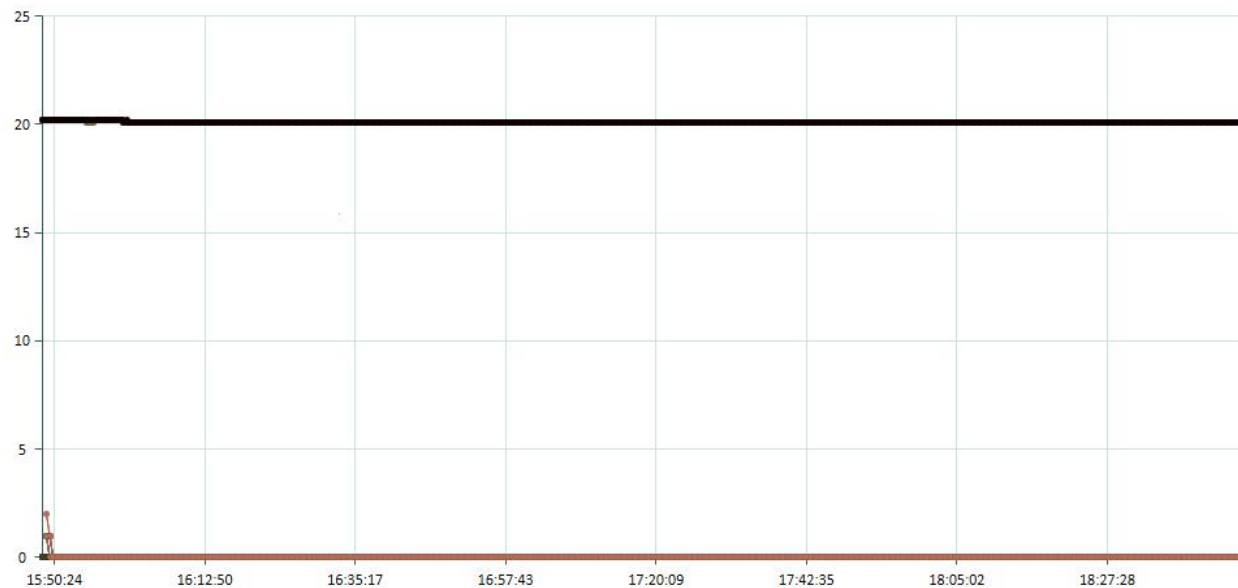


Table 3: Air quality standards

Pollutant	TLV	WHO	OSHA
PM₁₀	10 mg/m ³	50 µg/m ³ 24h mean	5 mg/m ³
CO	10 ppm	90 ppm 15 min 25 ppm 1 hr 10 ppm 8 hr	50 ppm
SO₂	0.125 mg/m ³	20 µg/m ³ 24 h limit 500 µ g/m ³ 10 min	5 ppm
VOCs	600 ppm		5000 ppm
H₂S	15 ppm Short term limit	150 µg/m ³ 24 hr	
NO₂		200 µg/m ³ 1hr limit	5 ppm

Table 4: NEMA air quality standards*r 5,6, 7,10,11,33,38*

**FIRST SCHEDULE
AMBIENT AIR QUALITY TOLERANCE LIMITS**

Table 1: Ambient Air Quality Tolerance Limits

	Pollutant	Time weighted Average			
			Industrial area	Residential, Rural & Other area	Controlled areas***
1.	Sulphur oxides (SO _x);	Annual Average*	80 µg/m ³	60 µg/m ³	15 µg/m ³
		24 hours**	125 µg/m ³	80 µg/m ³	30 µg/m ³
		Annual Average		0.019 ppm/50µg/m ³	
		Month Average			
		24 Hours		0.048ppm /125µg/m ³	
		One Hour			
		Instant Peak		500 µg/m ³	
		Instant Peak (10 min)		0.191 ppm	
2.	Oxides of Nitrogen (NO _x);	Annual Average*	80 µg/m ³	60 µg/m ³	15 µg/m ³
		24 hours**	150 µg/m ³	80 µg/m ³	30 µg/m ³
		8 hours			
		Annual Average		0.2 ppm	
		Month Average		0.3 ppm	
		24 Hours		0.4 ppm	
		One Hour		0.8 ppm	
		Instant Peak		1.4 ppm	
3.	Nitrogen Dioxide	Annual Average	150 µg/m ³	0.05 ppm	
		Month Average		0.08 ppm	
		24 Hours	100 µg/m ³	0.1 ppm	
		One Hour		0.2 ppm	
		Instant Peak		0.5 ppm	
4.	Suspended Particulate	Annual Average*	360 µg/m ³	140 µg/m ³	70 µg/m ³

35

	Pollutant	Time weighted Average			
	matter (SPM)				
		24 hours**	500 $\mu\text{g}/\text{m}^3$	200 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$
			Industrial area	Residential, Rural & Other area	Controlled areas***
		mg/Kg			
		Annual Average****		100 $\mu\text{g}/\text{m}^3$	
		24 hours***		180 $\mu\text{g}/\text{m}^3$	
5.	Respirable Particulate Matter (<10 μm) (RPM)	Annual Average*	70 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$	50 $\mu\text{g}/\text{m}^3$
		24 hours**	150 $\mu\text{g}/\text{Nm}^3$	100 $\mu\text{g}/\text{Nm}^3$	75 $\mu\text{g}/\text{Nm}^3$
6.	PM _{2.5}	Annual Average	35 $\mu\text{g}/\text{m}^3$		
		24 hours	75 $\mu\text{g}/\text{m}^3$		
7.	Lead (Pb)	Annual Average*	1.0 $\mu\text{g}/\text{Nm}^3$	0.75 $\mu\text{g}/\text{Nm}^3$	0.50 $\mu\text{g}/\text{m}^3$
		24 hours**	1.5 $\mu\text{g}/\text{m}^3$	1.00 $\mu\text{g}/\text{m}^3$	0.75 $\mu\text{g}/\text{m}^3$
		Month Average		2.5	
8.	Carbon monoxide (CO)/ carbon dioxide (CO ₂)	8 hours**	5.0 mg/m ³	2.0 mg/m ³	1.0 mg/m ³
		1 hour	10.0 mg/m ³	4.0 mg/m ³	2.0 mg/m ³
		mg/Kg			
		24 hours**			
9.	Hydrogen Sulphide	24 hours**	150 $\mu\text{g}/\text{m}^3$		
10.	Non-methane hydrocarbons				
		instant Peak	700ppb		
11.	Total VOC	24 hours**	600 $\mu\text{g}/\text{m}^3$		
12.	Ozone	1-Hour	200 $\mu\text{g}/\text{m}^3$	0.12 ppm	
		8 hour (instant Peak)	120 $\mu\text{g}/\text{m}^3$	1.25 ppm	

Table 5: Air quality results

Site	Air quality parameters monitored (max recorded)										
	CO (ppm)		NO ₂ (ppm)	SO ₂ (ppm)	VOCs (ppm)	PM (µg/m ³)		HC (ppm)	H ₂ S (ppm)	O ₂ (% Vol)	CO ₂ (% Vol)
						Average	max				
Site 1	1.5		0.22	BDL	BDL	196	645	BDL	1.81	20.9	0.045
Site 2	2		1.39	BDL	BDL	4	115	BDL	1.72	20.98	0.055
Site 3	BDL		1	BDL	BDL	<1	26	BDL	2.07	21	0.041
NEMA limits (ambient)	8 h	1 h	24 h	24 h	24 h	24 h		INS	24 h		1h
	5.0 mg/m ³ 4.3 ppm	10 mg/m ³ 8.6 ppm	100 µg/m ³ 0.05 ppm	125 µg/m ³ 0.05 ppm	600 µg/m ³ 600 ppb	150 µg/m ³		700 ppb	150 µg/m ³ (0.11 ppm)		4.0 mg/m ³
NEMA Limits (property boundary)	NA	NA	150 µg/m ³ (24 h)	125 µg/m ³ (24 h)	NA	70 µg/m ³ (24 h)		NA	50 µg/m ³ (0.03 ppm) (24 h)		NA

Note:

NA –Not Applicable

BDL–Below detection limit of the sensor

ND – test not done

3.2 Discussions

Maximum nitrogen dioxide levels recorded for during very short time intervals exceeded the NEMA limits. NO₂ is formed during photochemical reactions in air, involving emissions from engines which involve combustion of fossil fuels. The average level of NO₂ is also above the NEMA limit level, i.e. 0.05 ppm. All sampled sites records main contribution is from road traffic as a result of combustion of fossil fuels.

The maximum and average sulphur dioxide recorded was below the NEMA limit level

Hydrocarbons, Ammonia and volatile organic compounds recorded were all below the detection limit of the sensors, and thus below the NEMA limit levels for property boundary.

Hydrogen sulphide maximum concentration levels for sites recorded were 2.07 ppm and the average concentrations recorded was 1.87 ppm while the NEMA limits for ambient air is 0.1 ppm.

The sampled sites, notably Lenana, Karen and Ngong, are located in highly vegetative areas, decay of organic matter can be attributed to the presence of hydrogen sulphide in the ambient air.

Carbon Dioxide and oxygen levels were also recorded. NEMA does not give any limit levels for these parameters since they are not pollutants. However, the data was recorded during the day, and the proposed site is surrounded by trees and other vegetation, high and good levels of oxygen was recorded in all the sites monitored. Carbon dioxide is consumed; oxygen is produced during photosynthesis, demonstrating the importance of forest cover to reduce global warming since carbon dioxide is one of the greenhouse gases.

Average and Peak PM₁₀ for site one were elevated and therefore above the NEMA limit of 150 µg/m³, this can be attributed to the unpaved-road running along the Lenana School boundary to connect the residents to Ngong road and traffic passing in close proximity to the sampling site.

Average and Peak PM₁₀ levels recorded for the other two sites, Karen and Ngong during the sampling period for all the sampled sites were below the NEMA limit levels.

4.0 RECOMMENDATIONS

- ✓ Ensure the machinery and trucks that will be used during the construction phase are well serviced and maintained and operated within the applicable levels.
- ✓ Ensure delivery vehicles accessing the sites during construction phase are not speeding
- ✓ Enclose dust generating activities and water access paths during the construction period
- ✓ Reduce engine idle time for vehicles accessing the sites during construction and the facility during the operations phase
- ✓ Increase the tree cover around the facility during operation phase
- ✓ Ensure air quality monitoring is done within 12 months after commencement of operations in accordance with EMCA, 1999, and air quality regulations 2014.

5.0 REFERENCES

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7. http://www.raesystems.com/sites/default/files/content/resources/Datasheet_MultiRAE_Lite_DS-1071-08_EN_US_LR.pdf
8. <https://www.crowcon.com/product/download/18/Gas-Pro+web+GB.pdf>

Calibration Certificates of equipment used

BASELINE ENVIRONMENTAL NOISE MONITORING REPORT FOR THE
PROPOSED RIRUTA-NGONG METER GAUGE RAILWAY COMMUTER



BASELINE ENVIRONMENTAL NOISE MONITORING FINAL REPORT

Sampling Date: 7th March 2024



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EXECUTIVE SUMMARY

An Expert from Ecoserv Consultants Limited, a NEMA designated laboratory carried out an Environmental Noise Impact Assessment for Kenya Railways Corporation for the proposed Riruta-Ngong commuter train rail.

The proposed railway line connects with the existing line in the residential suburb of Riruta, and run 12.5 km through Karen and Bulbul to reach Ngong to the southwest of Nairobi

The noise survey is a legal requirement under Factories and Other Places of Work (Noise Prevention and Control) Rules 2005 and Noise Prevention and Excessive Vibration Pollution Control Rules 2009 administered by NEMA to establish the potential impact to the existing working environment and provide data that can be used to mitigate the noise emission from the operations.

For the noise survey, the noise levels were assessed within the proposed sites for activities of the commuter train, i.e. during construction and operations.

The results of measurement indicate that the measured noise levels in the proposed commuter train sites are within the acceptable limits.

This report presents the details of the measurements.

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Occupational noise is a global problem, covering a wide range of industry sectors and occupations. The construction of the Riruta-Ngong commuter train rail just like other work places, is not an exception.

The Nairobi Commuter Rail Service (NCRS) development is part of Nairobi Metropolitan Transport Master Plan. The project aims to carry out a modernization and expansion of under-utilized railway transport infrastructure facilities within Nairobi in order to attract passenger traffic from the roads thus reduce congestion; and create an efficient and affordable mass rapid transit transport system for the city. It will integrate rail transport with other modes of transport road and air transport.

The proposed railway line connects with the existing line in the residential suburb of Riruta, and run 12.5 km through Karen and Bulbul to reach Ngong to the southwest of Nairobi.

The major consequences of occupational noise are health related issues with hearing impairment being characterized as the main one. Annoyance, disturbance of speech and communication, stress, increased risks of accidents, disturbance of psychosocial well-being and psychiatric disorders are some of the other effects associated with occupational noise. According to a report by World Health Organization in 2011 on '*Burden of disease from noise quantification of healthy life years lost in Europe*'; stress associated with long term noise exposure can lead to long term health effects such as hypertension, acute myocardial infarctions, strokes and dementia. The report further outlined a strong link between cardiovascular disorders and exposure to occupational noise.

1.2 INTRODUCTION

A NEMA Registered EIA Lead Expert carried out baseline noise impact assessment at along the proposed Riruta-Ngong commuter rail line on selected sampling on 7th March 2024 during the day shift. The noise survey is a legal requirement under the Occupational Safety and Health (Noise Prevention and control) Rules 2005 and Noise Prevention and Excessive Vibration Pollution Control Rules 2009 administered by NEMA to establish the potential impact to the existing working environment, environment and provide data that can be used to mitigate the noise emission from the factory operations.

1.2.1 NOISE

Noise can be defined as unwanted or undesirable sound derived from sources such as industrial set up and operations, road traffic or construction works. Noise interferes with conversation and communication, sleep, recreation, general work performance, thought and concentration, relaxation, causes annoyance and induces hearing loss.

Related to noise is vibration, which results from the transmission of low frequency energy through the medium of ground or buildings. Vibration results in small movements of the transmitting medium, which can cause discomfort if the movements are large enough.

The exposure limit (benchmark)

After analysis, the noise levels obtained were compared with the standards set by Legal Notice no. 25 of 2005 under the Occupational Safety and Health Act Cap 514 and Environment Management and Coordination Act Laws of Kenya, Threshold Limit Values (TLV) from International Labour Organization (ILO), World Health Organization (WHO) and American Conference of Industrial Hygienist (ACGIH) 1989-guideline document.

1.2.2 Noise Propagation

Sound propagates through air or other mediums as a longitudinal wave, in which the mechanical vibration constituting the wave occurs along the direction of propagation of the wave. Sound is a sequence of waves of pressure which propagates through compressible media such as air or water. Sound can propagate through solids as well. During their propagation, waves can be reflected, refracted, or attenuated by the medium.

The levels of outdoor Noise, whether they are intrusive or the normal background environment, vary extensively at distances greater than about a hundred meters from the source. This variation is caused by changes in weather conditions and by topographical features such as ground cover, hills and other obstacles between the source and the receiver.

There are several important factors which affect the propagation of sound: geometric spreading, atmospheric effects, and surface effects.

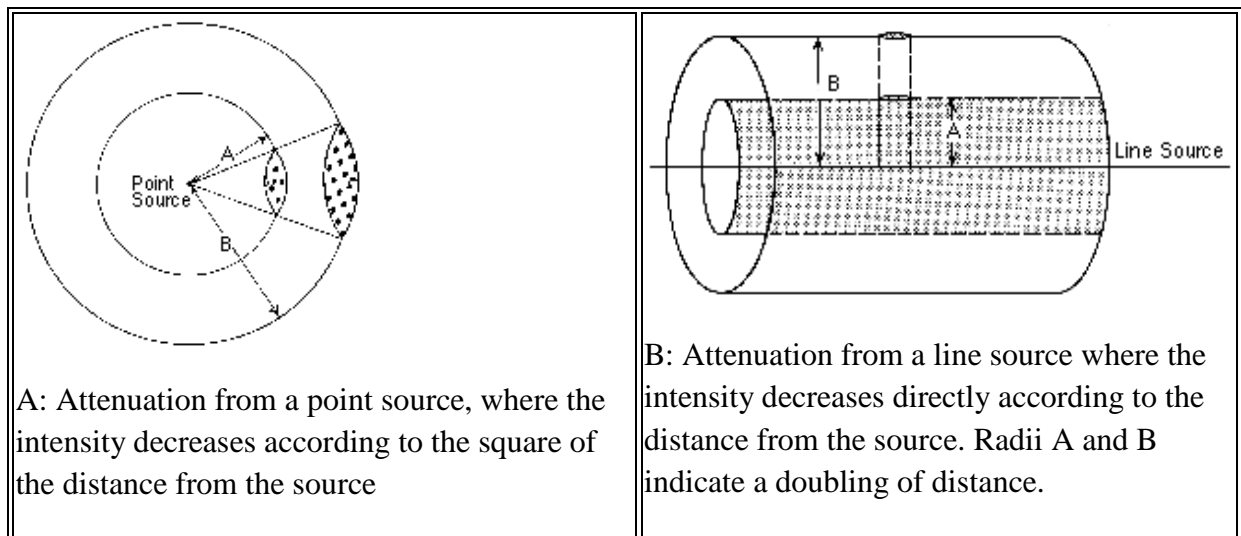
Geometric Spreading

This refers to the spreading of sound energy as a result of the expansion of the wave-fronts. Geometric spreading is independent of frequency and has a major effect in almost all sound propagation situations.

There are two common kinds of geometric spreading: spherical and cylindrical spreading.

For example,

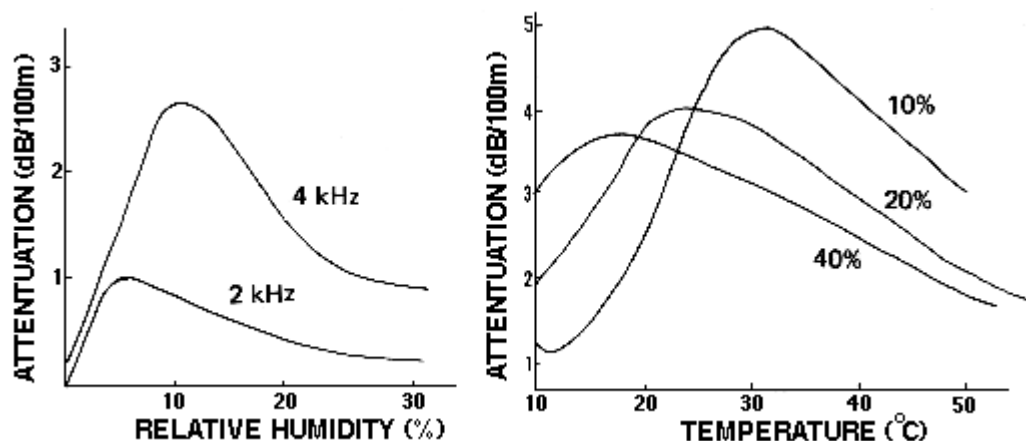
1. Spherical spreading from a point source: Noise source radiating sound equally in all directions, the sound level is reduced by 6 dB for each doubling of distance from the source.
2. Line source from a busy highway approximates to equal sound power output per unit length of highway. A line source will produce cylindrical spreading, resulting in a sound level reduction of 3 dB per doubling of distance.



Atmospheric Effects

(a) **Air Absorption:** There are two mechanisms by which acoustic energy is absorbed by the atmosphere. These are molecular relaxation and viscosity effects. By far the most important of these is molecular relaxation. High frequencies are absorbed more than low. The amount of absorption depends on the temperature and humidity of the atmosphere. The figures show the variation of the absorption with temperature and relative humidity.

From the diagrams it can be seen that for the middle of the speech frequency range (2 kHz), the absorption is typically .25 dB/100 m for 30% relative humidity and 20°C (68°F). It should be noted, however, it can be as high as 5 dB/100 m at 8 kHz when the temperature is 20°C and the humidity is 10%.



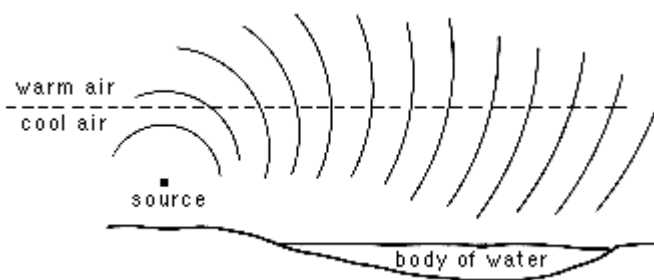
- i. Frequency dependence of attenuation as a function of relative humidity at 20°C.
- ii. Attenuation as a function of temperature for various percentages of relative humidity.

Precipitation, rain, snow, or fog, has an insignificant effect on sound levels although the presence of precipitation will obviously affect the humidity and may also affect wind and temperature gradients. Under normal circumstances, atmospheric absorption can be neglected except where long distances or very high frequencies are involved.

Ref.: Cyril Harris, (2004) "Absorption of Sound in Air versus Humidity and Temperature," *Journal of the Acoustical Society of America*, 40, p. 148.

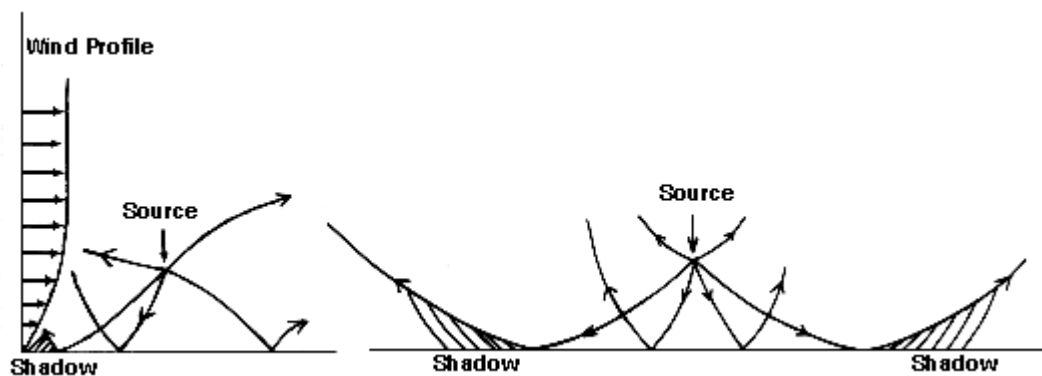
(b) Wind and Temperature Gradients: the speeds that sound propagate in a gas depends on the temperature of the gas. Higher temperatures produce higher speeds of sound. Since the temperature of the atmosphere is not uniform there are local variations in the sound speed. For example, under normal conditions the atmosphere is cooler at higher altitudes. This results in sound waves being 'bent' upwards. This will result in the formation of a shadow zone, which is a region in which sound does not penetrate. In reality some sound will enter this zone due to scattering. Scattering occurs when sound waves are propagating through the atmosphere and meet a region of inhomogeneity (a local variation in sound speed or air density) and some of their energy is re-directed into many other directions. In environmental noise situations, scattering is caused by air turbulence, rough surfaces, and obstacles such as trees. The scattering of sound by rain, snow or fog at ordinary frequencies is insignificant.

Under conditions of a temperature inversion, the sound waves will be refracted downwards, and therefore may be heard over larger distances. This frequently occurs in cold weather and at sundown.



Refraction of sound waves by two layers of air at different temperatures as a result of the change of speed of the sound.

When a wind is blowing there will always be a wind gradient. This is due to the layer of air next to the ground being stationary. Wind gradient results in sound waves propagating upwind being 'bent' upwards and those propagating downwind being 'bent' downwards.



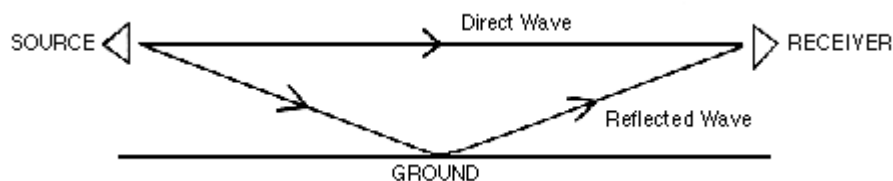
Temperature and wind gradients can result in measured sound levels being very different to those predicted from geometrical spreading and atmospheric absorption considerations alone. These differences may be as great as 20 dB. These effects are particularly important where sound is propagating over distances greater than a few hundred meters. Temperature inversions and winds can also result in the effectiveness of a barrier being dramatically reduced.

Ref.: Uno Ingard, (2004) "A Review of the Influence of Meteorological Conditions on Sound Propagation," Journal of the Acoustical Society of America, 25, p. 405.

Surface Effects

(a) **Ground Absorption:** If sound is propagating over ground, attenuation will occur due to acoustic energy losses on reflection. These losses will depend on the surface. Smooth, hard surfaces will produce little absorption whereas thick grass may result in sound levels being reduced by up to about 10 dB per 100 meters at 2000 Hz. High frequencies are generally attenuated more than low frequencies.

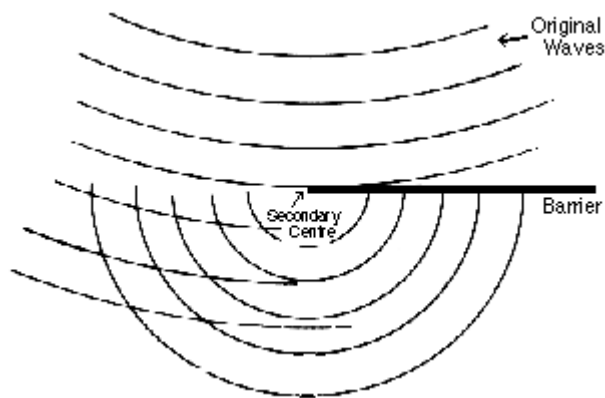
Reflection from the ground can result in another mechanism by which sound levels are reduced. When the source and receiver are both close to the ground, the sound wave reflected from the ground may interfere destructively with the direct wave. This effect (called the ground effect) is normally noticed over distances of several meters and more, and in the frequency range of 200-600 Hz. For the effect on spectrum,



Ref.: Wiener and Keast, (2004) "Experimental Study of the Propagation of Sound Over Ground," Journal of the Acoustical Society of America, 31, p. 724.

(b) **Attenuation Due to Barriers and Trees:** Research on propagation through trees has produced greatly conflicting results. It is clear, though, that trees are of more benefit aesthetically than acoustically. A band of trees several hundreds of feet deep is required in order to achieve significant attenuation.

Significant attenuation can be achieved by the use of solid barriers. A barrier should be at least high enough to obscure the 'line of sight' between the noise source and receiver. Barriers smaller than this may have a negative effect by elimination of the destructive interference phenomenon. A barrier is most effective for high frequencies since low frequencies are diffracted around the edge of a barrier more easily. The maximum performance of a barrier is limited to about 40 dB, due to scattering by the atmosphere. A barrier is most effective when placed either very close to the source or to the receiver. It should be remembered that a barrier's performance can be severely reduced by temperature and wind gradients.



Diffraction of a low frequency sound wave around a barrier

Barriers not built for acoustical purposes are often found in sound propagation situations. The most common of these are hills and buildings. In urban situations, buildings can be effective barriers. It is possible for buildings to produce a different acoustical effect. In a street, multiple reflections from parallel building facades can result in considerable reverberation, and consequently reduced attenuation. This is often referred to as the canyon effect.

Ref.: D. Aylor, (2004) "Noise Reduction by Vegetation and Ground", Journal of the Acoustical Society of America, 51, p. 197.

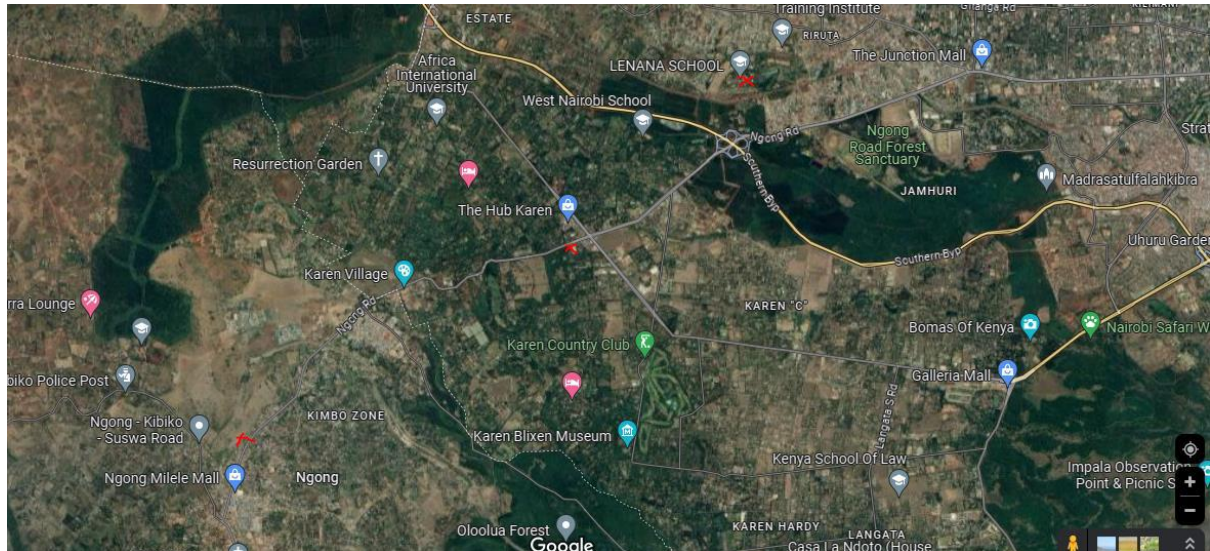
1.2.2 THE AIM OF THE ASSESSMENT

The aim of the assessment was to establish baseline noise exposure levels in the proposed commuter train corridor. The data collected will be used to form basis for planning the control measures to eliminate or minimize noise exposure to workers and general environment during the construction and operation phases of the project.

CHAPTER TWO: PROJECT SITE DESCRIPTION

2.1 GEOGRAPHICAL LOCATION

The Riruta-Ngong railway line will connect with the existing line in the residential suburb of Riruta, and run 12.5 km through Karen and Bulbul to reach Ngong to the southwest of Nairobi



Map 1: Overview map of the proposed project coverage area (Source: Google maps)

2.2 ENVIRONMENTAL SETTING

The project site environmental setting reflects areas surrounding the proposed sites generally that of Lenana in Nairobi County and Ngong in Kajiado County.

2.2.1 Topography

Lenana is located in Nairobi County. The estimate terrain elevation above sea level is 1844metres. The Ngong railway station is located behind Ngong town at an altitude of 1961m above sea level. This is characterised by plains, valleys and occasional volcanic hills.

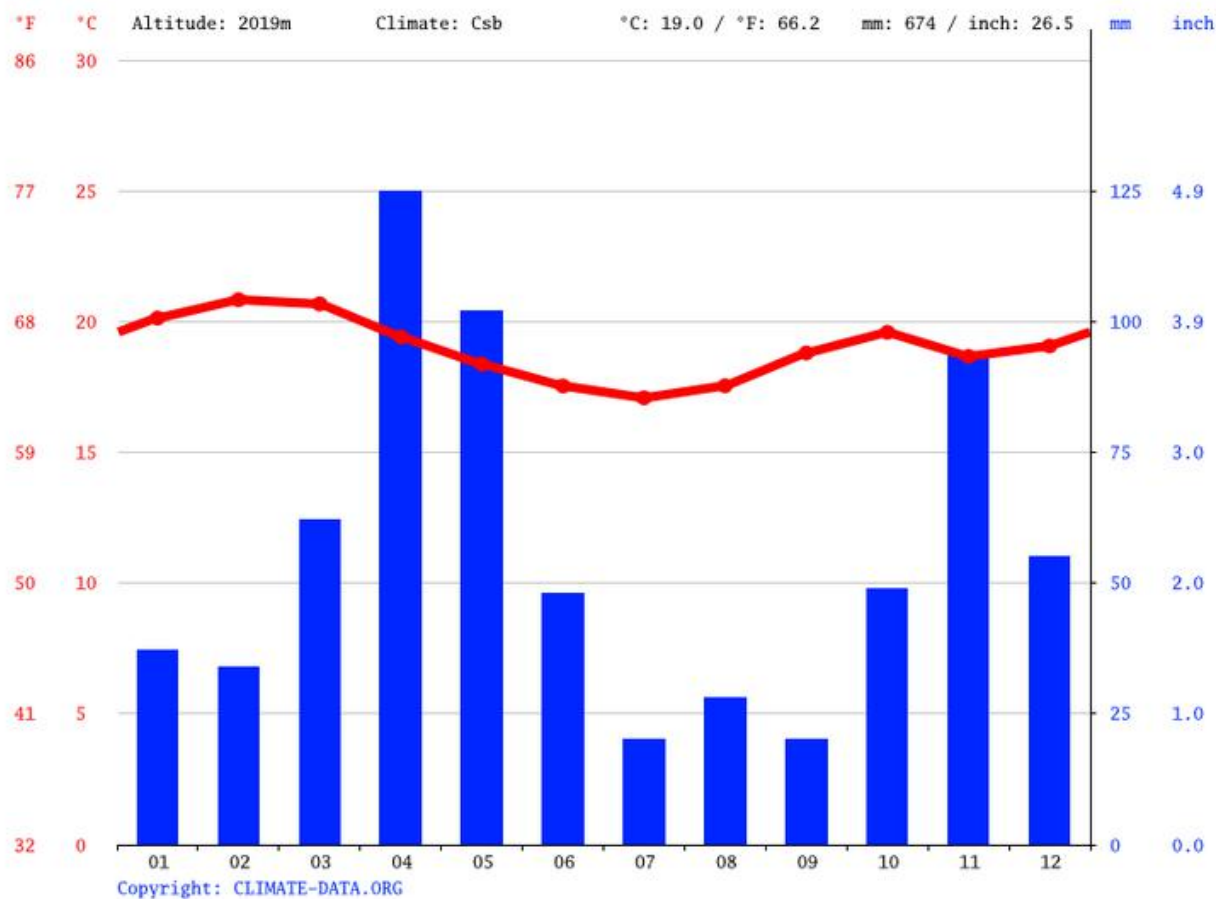
2.2.2 Climatic Conditions

2.2.2.1 Average Daily Temperatures in the areas surrounding the proposed site, Lenana in Nairobi County and Ngong in Kajiado County.

DATA AND GRAPHS FOR WEATHER & CLIMATE IN NGONG

The weather conditions in Ngong are characterized by a mild and moderate climate. In Ngong there is a lot of rain even in the driest month. This climate is considered to be Cfb according to the Köppen-Geiger climate classification. The mean yearly temperature observed in Ngong is recorded to be 19.0 °C. The precipitation level on a yearly basis amounts to 674 mm inch as per the meteorological records.

CLIMATE GRAPH // WEATHER BY MONTH NGONG



The month with the least amount of precipitation is July exhibiting a mere 20 mm rainfall. The greatest amount of precipitation occurs in April, with an average of 125 mm

WEATHER BY MONTH // WEATHER AVERAGES NGONG

	Janu ary	Feb ruar y	Mar ch	Ap ril	M ay	Ju ne	Jul y	Aug ust	Septe mber	Octo ber	Nove mber	Dece mber
Avg. Temperat ure °C (°F)	20.1 °C (68.2) °F	20. 8 °C (69. 5) °F	20. 7 °C (69. 2) °F	19. 4 °C (67) °F	1 8. 4 °C (6 5. 1) °F	17. 5 °C (6 3.6) °F	17. 1 °C (62 .7) °F	17.5 °C (63. 6) °F	18.8 °C (65.8) °F	19.6 °C (67.3) °F	18.7 °C (65.6) °F	19.1 °C (66.3) °F
Min. Temperat ure °C (°F)	14.6 °C (58.2) °F	14. 9 °C	15. 5 °C	15. 6 °C	1 4. 5	13. 2 °C	12. 2 °C	12.6 °C	13.3 °C (56) °F	14.6 °C (58.4) °F	14.6 °C (58.3) °F	14.4 °C (58) °F

		(58.9) °F	(59.8) °F	(60.7) °F	°C (58.1) °F	(55.7) °F	(53.9) °F	(54.8) °F				
Max. Temperature °C (°F)	26.3 °C (79.4) °F	27.2 °C (81) °F	26.7 °C (80) °F	24.4 °C (76) °F	22.9 °C (73.1) °F	21.9 °C (71.5) °F	21.8 °C (71.2) °F	22.5 °C (72.6) °F	24.5 °C (76.1) °F	25.2 °C (77.4) °F	23.7 °C (74.7) °F	24.6 °C (76.3) °F
Precipitation / Rainfall mm (in)	37 (1)	34 (1)	62 (2)	125 (4)	102 (4)	48 (1)	20 (0)	28 (1)	20 (0)	49 (1)	94 (3)	55 (2)
Humidity (%)	55%	50%	55%	68%	70%	66%	61%	59%	54%	55%	69%	65%
Rainy days (d)	5	4	9	16	13	7	3	4	3	8	14	9
avg. Sun hours (hours)	9.5	9.6	8.5	6.6	5.7	4.6	4.2	4.3	6.5	7.2	6.4	8.1

There is a notable variation in precipitation levels between the driest and wettest months, amounting to 105 mm. The variation in temperatures throughout the year is 3.8 °C

<https://en.climate-data.org/africa/kenya/kajiado/ngong-103422/>

WEATHER BY MONTH // WEATHER AVERAGES LENANA

The climatic conditions prevailing in Lenana are characterized by a warm and moderate temperature. Lenana has a significant amount of rainfall during the year. This is true even for the driest month. As per the Köppen-Geiger classification, the prevailing weather conditions in this region are categorized under Cfb. The mean yearly temperature observed in Lenana is recorded to be 17.9 °C Approximately 674 mm of rainfall occurs on a yearly basis.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	19 °C (66.1) °F	19.7 °C (67.4) °F	19.6 °C (67.2) °F	18.4 °C (65.2) °F	17.5 °C (63.6) °F	16.7 °C (62) °F	16.1 °C (61.1) °F	16.5 °C (61.7) °F	17.7 °C (63.8) °F	18.4 °C (65.2) °F	17.5 °C (63.6) °F	17.9 °C (64.3) °F
Min. Temperature °C (°F)	13.6 °C (56.5) °F	14 °C (57.3) °F	14.6 °C (58.2) °F	14.8 °C (58.6) °F	13.8 °C (56.9) °F	12.5 °C (54.4) °F	11.4 °C (52.6) °F	11.8 °C (53.3) °F	12.4 °C (54.4) °F	13.7 °C (56.7) °F	13.8 °C (56.9) °F	13.6 °C (56.5) °F
Max. Temperature °C (°F)	25 °C (77) °F	25.9 °C (78.7) °F	25.5 °C (77.9) °F	23.4 °C (74.1) °F	22 °C (71.6) °F	21 °C (69.8) °F	20.8 °C (69.4) °F	21.4 °C (70.4) °F	23.3 °C (73.9) °F	24 °C (75.2) °F	22.4 °C (72.4) °F	23.3 °C (74) °F
Precipitation / Rainfall mm (in)	37 (1)	34 (1)	62 (2)	125 (4)	102 (4)	48 (1)	20 (0)	28 (1)	20 (0)	49 (1)	94 (3)	55 (2)
Humidity(%)	58%	53%	58%	71%	72%	67%	64%	63%	57%	59%	73%	69%
Rainy days (d)	5	4	9	16	13	7	3	4	3	8	14	9
avg. Sun hours (hours)	9.5	9.6	8.5	6.6	5.7	4.6	4.2	4.3	6.5	7.2	6.4	8.1

There exists a variation of 105 mm in precipitation levels between the month with the least rainfall and that which experiences maximum downpour. During the year, the average temperatures vary by 3.5 °C.

CHAPTER THREE: METHODOLOGY

Methodology is generally a guideline for solving a problem with specific components such as tasks, methods, phases, techniques and tools. Methodologies encompass procedures followed, analyse and interpret the data gathered. The methodology outline for this exercise incorporated the following aspects:

1. Identification of sampling points
2. On-site data collection of the sampling points
3. Deployment of the noise measuring equipment to site
4. Downloading of data for analysis

3.1 NOISE MEASUREMENT

Equipment Used for the assessment

Make:	Description:	Model:	Serial No.:
Casella	Sound Level meter	CEL633A1	0442237
Casella	Sound Level Calibrator	CEL-120/1	5230733

Calibration reference 94.0 ± 0.4 and 114 ± 0.4 dB (A) at 1000 Hz

The calibration was used to check the sensitivity of the systems immediately before, during and after the measurement period. The meter was set to automatically measure all the noise responses including $L_{A_{max}}$, $L_{AF_{max}}$, $L_{AI_{Max}}$, $L_{C_{peak}}$, $L_{A_{eq}}$, $L_{AI_{eq}}$. The most relevant for this report is the A-weighted noise levels, which varies with the frequency and intensity like the sensitivity of the human ear.

L_{eq} measurements

The L_{eq} – the continuous equivalent sound pressure levels were taken: This is indicative of the ‘average’ noise level over a given period.

The measurement of L_{eq} is based on the equal energy principle where:

$$L_{eq} = 10 \log \left[\frac{1}{T} \int_0^T \left(\frac{P(t)}{P_0} \right)^2 dt \right] ,$$

and

P_0 is the reference sound pressure (20μpa), $P(t)$ is the time varying sound pressure measured using the A-weighting network and T is the time interval in which it is measured.

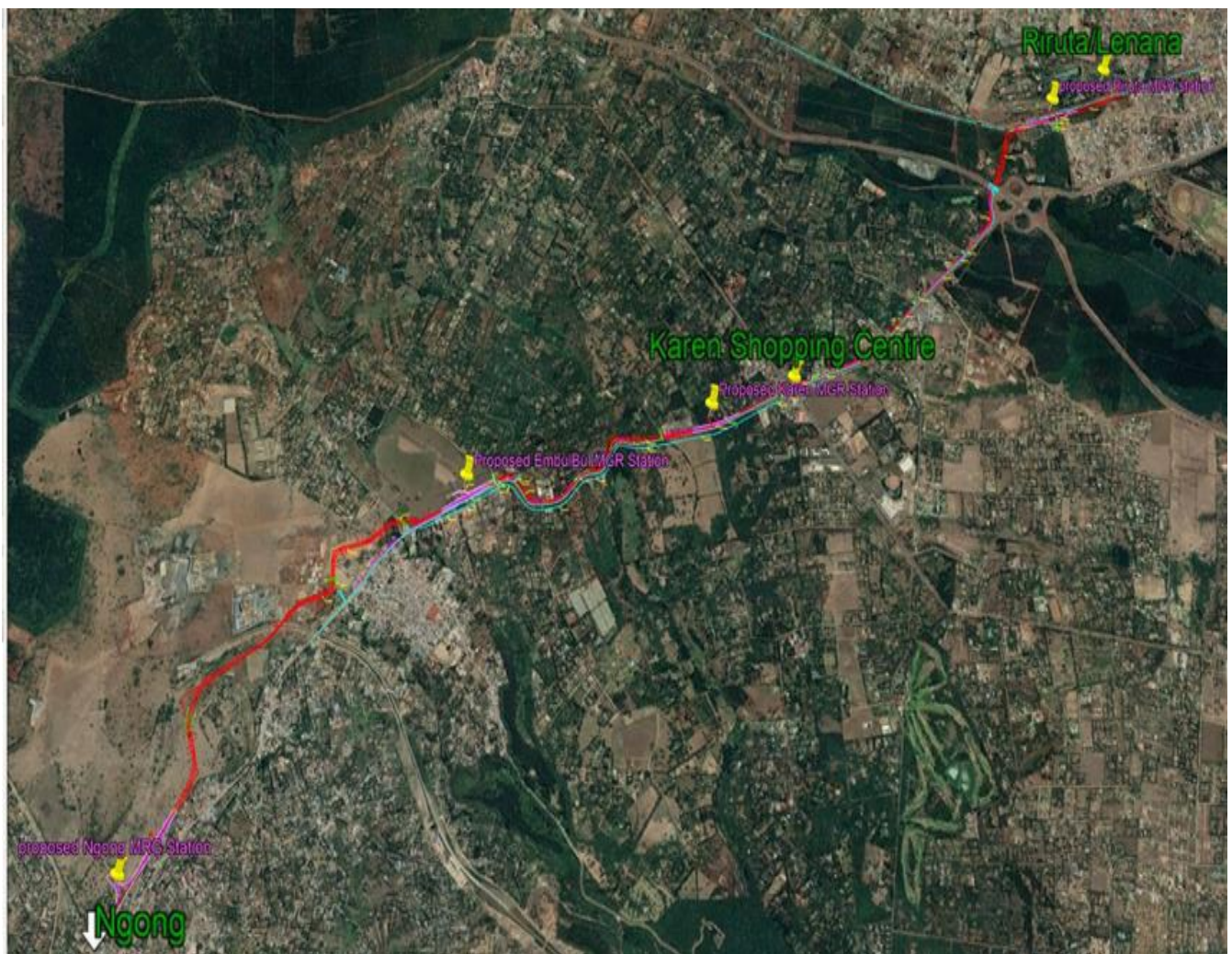
A-weighting – 20Hz – 20KHz range. Shape is similar to the response of the human ear. C-weighting is used for high level measurements and peak sound pressure levels. It follows the

100 phon curve. The C-weighting correlates better with human ear response at high noise levels.

LAF refers to A-weighted fast sound level, LA_{Ieq} is A-weighted impulse Leq sound level, LAS is A weighted slow sound level, and LC is C weighted peak sound level. LA_{eq} is also written as dBA or dB(A).

3.2 IDENTIFICATION OF SAMPLING POINTS

The sampling points were identified after a site visit conducted by Ecoserv Consultant Ltd, Environment and Health Department in accordance with the Environmental Management and Co - Ordination Act and Noise, Excessive Vibration Pollution Control Regulations, 2009 of Kenya. The Statement of requirement stipulated that actual environmental noise, continuous noise equivalent and peak sound levels be taken along the railway corridor within the railway stations. The GPS of identified 3 sampling sites are given in Table 4 and shown in Map 2.



Map 2: Site sampled along the Kenya railway Authority Stations (google map)

Method of Measurement

The sound level meter was set at 1 metre from ground and sample measurements were taken at selected sites in the proposed commuter train corridor as shown in Map 2. The noise

assessments were carried out when routine activities were taking place normally at all sites for 3 hr sampling period within the daylight hours i.e. between 6.30am and 5.00pm. Table 4 below shows the sampling sites, and GPS reference together with the date of sampling.

Table 1: Sampling Sites for Kenya railway Authority Stations

LOCATION	COORDINATES	DATE
Site one	1°18'08.9"S 36°43'53.0"E	7 th March 2024
Site Two	1°19'22.3"S 36°42'21.3"E	7 th March 2024
Site Three	1°21'05.9"S 36°39'23.0"E	7 th March 2024

3.3 DEPLOYMENT EQUIPMENT

3.3.1 Noise Meter Level

The equipment that was used for measuring the actual noise levels in this exercise was the Casella CEL-63x Environmental & Occupational Noise Meter. This instrument uses the latest digital signal processing technology to provide a full range of functions, including integrating and real-time octave and 1/3-octave band analysis. It uses a colour screen to show a range of information, including operating menus and messages, warnings, and the results of measurements. The screen is clear and easy to read under all ambient lighting conditions, including total darkness. Measurements captured by the CEL-63x instrument conform to international standards for acoustic measurement. The measurements are saved automatically in high-capacity internal Flash memory. You can transfer the measurement results to a PC where you can manage the results and create reports by using the Casella insight data management software. Audio recording is available on all CEL-63X models. Audio notes are available on all models to allow annotation of measurements.

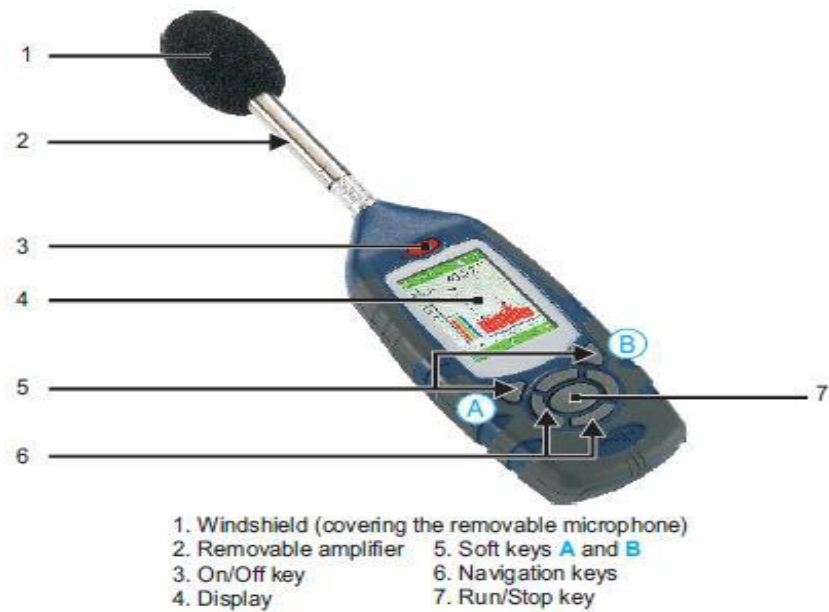


Figure 1: Noise Meter Level

The following procedure was followed during deployment of the noise metre level to a given sampling point:

1. Identification of a suitable area to mount the noise metre
2. Once the area has been identified, the equipment is assembled by fitting the windshield to the microphone.
3. The instrument requires three AA batteries.
4. To switch on the instrument, the on/off key was pressed. The initialisation screen was displayed for approximately 10 seconds, and then the measurement screen was displayed in the STOP mode (with red bars at the top and the bottom of the screen).
5. The Menu Key was pressed to access the settings, memory and instrument status.
6. Once the settings had been set, the next step was to take the measurements.
7. The Run/Stop key was pressed to start making measurements. Here, the screen displayed green bars at the top and bottom.
8. The Play symbol is displayed at the top left-hand corner of the screen, and the Pause symbol is displayed at the bottom left-hand corner of the screen. The left hand soft key is the Pause/Run control and toggles between these two modes when operated.
9. The instrument is left to run for at least 8 hours as required.
10. To stop the run, the Run/Stop key was pressed. A screen was displayed asking you to confirm the action - press Yes to end the run.
11. The instrument was then disconnected from the battery and stored away for use for the next sampling point after battery has been fully charged.
12. The instrument was calibrated weekly using a calibrator

3.4 ON-SITE DATA COLLECTION

Onsite data collected on the acknowledged sampling points was documented on a data collection sheet. The sheet documented the location, coordinates, elevation, run, date and run time and any additional information of the sampling points. The sheets are elaborated in chapter four.

		
Site 1: Sampling at Lenana with train passing- by	Site 2: Sampling at Karen	Site 3: Sampling at Ngong

3.5 DOWNLOADING DATA FOR ANALYSIS

The CEL-63x instrument has 2 GB of memory that is available to store the results of the instrument's measurements. The results memory stores all measurements made when the instrument operates in the measurement run mode. To download data for analysis, the equipment has a mini USB port that allows you to connect it to a PC running Windows® XP or Windows® Vista or Windows® 7. When the instrument detects that it is connected to a PC, the instrument displays an option to stop any run that is currently active. It then switches to Active USB mode. The insight program supplied by Casella to download results to the PC is used.

CHAPTER FOUR: RESULTS

4.1 NOISE STANDARDS

The Kenya Government has set a noise standard limit at 90 dB (A) for 8 hours as the Occupational Exposure Level (OEL), which most workers can continually be exposed to noise without developing occupational hearing loss in industries. This is the recommended noise limit to reduce hearing loss (occupational deafness). The regulations also require that:

1. Where noise gets transmitted outside the workplace shall not exceed 55 dB (A) during the day and 45 dB (A) during the night;
2. Noise measurements shall be carried out at least once in every period of twelve months in order to determine the prevailing noise conditions at workplace;
3. Where noise exceeds continuous equivalent of 85 dB (A) an effective noise control and hearing conservation programme shall be developed and implemented.
4. World Health Organization has recommended for residential area noise exposure limits not to exceed L_{eq} 55dB (A) daytime and L_{eq} 45dB(A) night time.

For Industrial and commercial area: Day Time – 70 dB (A) and Night Time –55 dB (A)

- Daytime is dawn or 7 am (whichever is later) to dusk or 7 pm (whichever is earlier)
- Evening is from the end of the daytime to 10pm
- Night is from 10 p.m. to the start of daytime

Source: (BS 5228, 1997)

Other international Recommended Threshold Limit Values (TLV)

(International Labour Organization (ILO) and American Conference of Industrial Hygienist (ACGIH) 1989-guideline document)

In offices however, the nature of work requires higher mental concentration and therefore, the noise level should be below **60 dB (A)**.

- For speech, comfort and work interference, noise levels less than **60 dB (A)** is adopted.
- For workshop and plant area where occasional communication is required, the recommended limit is **75 dB (A)**.
- For workshop office, control room, laboratories and workshop where easy communication is required, the recommended limit is **60 dB (A)**.
- For offices, mess-room, canteens, the limits recommended is **50 dB (A)**.
- For prestige offices, conference rooms, the noise level limits recommended are **35 dB (A)**.

Other relevant standards:

- World Health Organization has recommended noise exposure limits for residential area not to exceed L_{eq} 55dB (A) daytime and L_{eq} 45dB (A) night time.
- **For Industrial and commercial area:**
Industrial Day Time – 70 dB (A), Residential Day 55 dB (A) Night 45dB (A)
Source: Pollution Prevention and Abatement Handbook, WORLD BANK GROUP, Effective July 1998
- The International Standards Organization (ISO) has recommended that the time spent in a noise environment to be halved for each 3 dB rise in the noise level above the set standard limit.

4.2 NOISE ACCEPTABILITY

The difference between the ambient noise level and the noise levels measured at 1m from the noise-emitting source determines the acceptability of the noise at a workstation and the difference provides an indicator for the likelihood of complaints. Where the difference is +10 dB or more, the complaints are likely but when the difference is less than 10 dB, the complaints are not likely.

Table 2: [EMCA] Noise and excessive Vibration pollution)(Control) Regulations, 2009 (reg. 5 6(1), 11(1))

MAXIMUM PERMISSIBLE NOISE LEVELS

ZONE		Sound Level Limits dB(A) (Leq 14 h)		Noise Rating Level (NR) (Leq. 14 h)	
		Day	Night	Day	Night
A	Silent Zone	40	35	30	25
B	Places of worship	40	35	30	25
C	Residential : Indoor	45	35	35	25
	Outdoor	50	35	40	25
D	Mixed residential (with some commercial and places of entertainment	55	35	50	25
E	Commercial	60	35	55	25

Noise parameters including $L_{AS_{max}}$, $L_{AF_{max}}$, $L_{AI_{Max}}$, $L_{C_{peak}}$, $L_{A_{eq}}$, $L_{AI_{eq}}$ were continuously measured and data logged in the meter. The data was then processed in the equipment to output a summary giving peak, maximum and equivalent readings during the measurement period. A graphical representation for all the noise parameters is also provided by the software. The data summary and graphs for representative days during the data collection period is included in Annex 1.

4.3 RESULTS OF THE MEASUREMENTS

Table 3: Results of noise measurement

Site	Duration	Noise levels dB(A)		Comments
	hh:mm	LAeq	NEMA	
Site 1	03:00:32	61.5 dB(A)	60	Within Limit
Site 2	03:00:07	67.8 dB(A)	60	Above Limit
Site 3	03:01:54	47.4 dB(A)	60	Within Limit

4.4 DISCUSSION OF THE RESULTS

The noise standard limit set by the National Environment Management Authority for mixed residential and commercial area is 55 dBA and 60dBA for commercial areas. The Kenya Government has set the noise limit at 90 dB(A) for 8hr OEL (for industry environment) and for Industrial and commercial area: Day Time – 70 dB (A) and Night Time –55 dB (A)

In addition, if the noise level exceeds 85 dB(A), noise control and hearing conservation programme should be developed.

The LAeq value at each of the sampling sites measured for sampling durations of 3hours did not exceed 85 dB(A) as shown in Table 6.

World Health Organization has recommended noise exposure limits for residential area not to exceed L_{eq} 55dB (A) daytime and L_{eq} 45dB (A) night time.

Site 1 and 2 are located in areas with activities such as road traffic and also train activities. The baseline levels at site 2 were above the NEMA limits as it was located on road side of Karen to Ngong next to water company offices in karen shopping centre. The activities of the proposed project will add to the baseline noise levels recorded.

The results of the survey indicate that the noise levels at the sites sampled were within the recommended limits set by NEMA, the Kenya government and World Health organization (WHO).

CHAPTER FIVE: CONCLUSION

5.1 CONCLUSIONS

1. The baseline noise levels were recorded and are within the set limits by NEMA, and the Kenya government.
2. Areas with urban set-up, like Karen recorded significantly higher noise levels than other sampled point along the proposed commuter train rail line

5.2 RECOMMENDATIONS

1. Workers in other areas prone to high noise levels during construction should be provided with health surveillance.
2. All employees and workers engaged during the construction phase of the project should be provided with adequate training.
3. Community sensitization on noise should be done during the construction phase

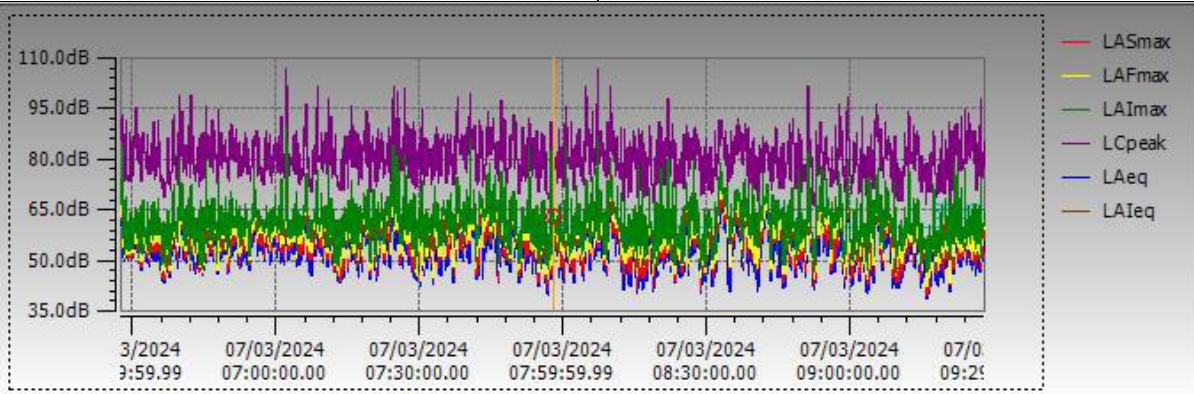
REFERENCES

1. British Standards BS 55228 Part 1, 1997: Noise and Vibration Control on Construction Site.
2. Bruel & Kjaer, Noise Control Principles and Practice, 1982 ISBN 87 87355 38 8 (hf.)
3. Government of Kenya (1999). *Environmental Management and Coordination Act*. Nairobi: Government Printer
4. ILO encyclopedia of Occupational Health and Safety Vol. II, Geneva 1983.
5. ILO Occupational Safety and Health Services No. 33 Noise and vibration in working environment, ILO office, 1976.
6. www.sengpielaudio.com/calculator-soundlevel.htm
7. <http://www.hse.gov.uk/pubns/indg362.pdf>

Annex 1: Specimen Raw Noise Data

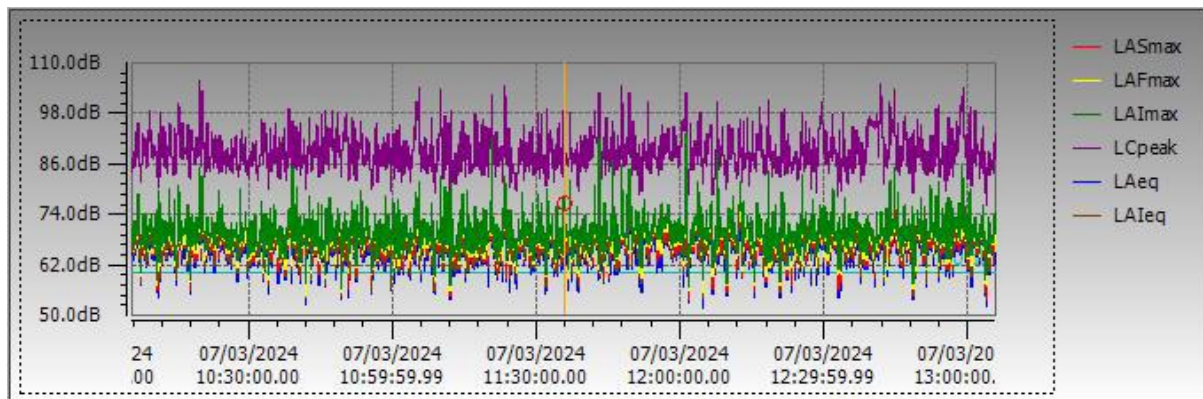
Site one: Lenana

Serial Number	0442237	LAlmin with Time	37.5 dB (3/7/2024 9:16:08 AM)
Start Date & Time	3/7/2024 6:27:37 AM	LZeq	74.0 dB
Duration HH:MM:SS	03:00:32	LCeq	72.9 dB
Notes		LCeq-LAeq	11.4 dB
LAeq	61.5 dB	LAleq	64.0 dB
LCpeak with Time	107.0 dB (3/7/2024 8:07:13 AM)	LAE	101.8 dB
Lepd(Projected)	61.5 dB	Response	Free Field
Lex8h(Projected)	61.5 dB	End Date & Time	3/7/2024 9:28:09 AM
LAfmax with Time	90.2 dB (3/7/2024 7:02:09 AM)	Pause Duration HH:MM:SS	00:00:00
LAlmax with Time	90.7 dB (3/7/2024 7:02:09 AM)	Overload	Yes
LAfmin with Time	35.0 dB (3/7/2024 8:12:38 AM)	Battery Low	Yes
		Result	Period Result



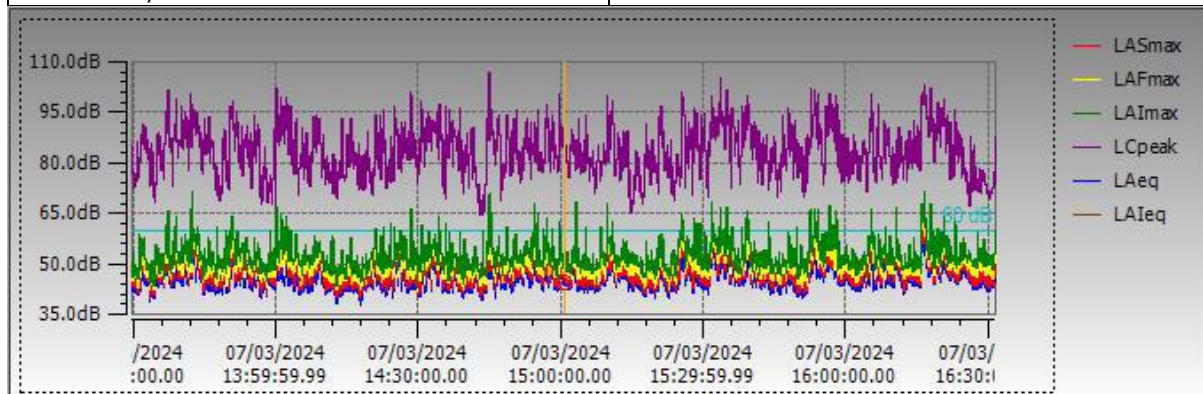
Site Two: Karen

Serial Number	0442237	LAlmin with Time	48.8 dB (3/7/2024 1:03:56 PM)
Start Date & Time	3/7/2024 10:05:47 AM	LZeq	80.2 dB
Duration HH:MM:SS	03:00:07	LCeq	78.5 dB
Notes		LCeq-LAeq	10.7 dB
LAeq	67.8 dB	LAleq	69.2 dB
LCpeak with Time	105.7 dB (3/7/2024 10:19:56 AM)	LAE	108.1 dB
Lepd(Projected)	67.8 dB	Response	Free Field
Lex8h(Projected)	67.8 dB	End Date & Time	3/7/2024 1:05:54 PM
LAfmax with Time	91.5 dB (3/7/2024 12:01:18 PM)	Pause Duration HH:MM:SS	00:00:00
LAlmax with Time	93.1 dB (3/7/2024 12:01:18 PM)	Overload	Yes
LAfmin with Time	47.5 dB (3/7/2024 1:03:56 PM)	Battery Low	Yes
		Result	Period Result



Site Three

Serial Number	0442237	LAlmin with Time	37.1 dB (3/7/2024 2:17:34 PM)
Start Date & Time	3/7/2024 1:29:43 PM	LZeq	82.9 dB
Duration HH:MM:SS	03:01:54	LCeq	74.5 dB
Notes		LCeq-LAeq	27.1 dB
LAeq	47.4 dB	LAeq	51.6 dB
LCpeak with Time	106.7 dB (3/7/2024 2:44:59 PM)	LAE	87.8 dB
Lepd(Projected)	47.4 dB	Response	Free Field
Lex8h(Projected)	47.4 dB	End Date & Time	3/7/2024 4:31:37 PM
LA Fmax with Time	69.0 dB (3/7/2024 2:45:17 PM)	Pause Duration HH:MM:SS	00:00:00
LA Imax with Time	71.7 dB (3/7/2024 4:16:37 PM)	Overload	Yes
LA Fmin with Time	35.9 dB (3/7/2024 2:17:39 PM)	Battery Low	Yes
		Result	Period Result



Annex 2: Calibration certificate of noise equipment

Certificate of Calibration

Instrument Type Sound Level Meter
Model CEL 633A1
Serial Number 8442237
Certificate Number 1558/8442237
Date August 24, 2023

NoiseMeters

97 Brighton Road
Surbiton
England
Tel: 0845 680 0312
Fax: 0845 680 0316
Email:
accounts@noisemeters.com

Applicable Standards

IEC 61672:2002 (Electroacoustics-Sound Level Meters)
IEC 60651:1979 (Sound Level Meters)
ANSI S1.4:1983 (Specifications for Sound Meters)

Test Summary

Self Generated Noise Test
Electrical Signal Test of Frequency Weightings
Frequency & Time weightings
Level Linearity On The Reference level Range
Toneburst Response Test
Overload Indication
Acoustic Tests

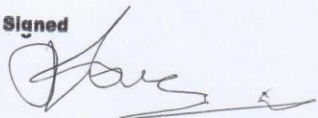
All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass
All Tests Pass

Test equipment and acoustic working standards used for conformance testing are subject to periodic calibration, traceable to national standards.

Declaration of Conformity

This certificate confirms that the instrument specified above has been produced and tested to comply with the manufacturer's published specifications and the relevant European community directives.

Signed



Date: August 24, 2023

Annex 8: Scanned Informant Questionnaires

CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY (ESIA)

PUBLIC PARTICIPATION FORM

The Government of Kenya through its implementing agency Kenya Railways Corporation (KRC) proposes to construct 12.5 km railway line and associated components from Riruta/Lenana to Ngong town as part of the Nairobi Commuter railway services project to reduce road congestion by creating an efficient and affordable mass rapid transit transport system in line with Vision 2030. The project commences at Riruta/Lenana traversing through the towns of Karen, Embulbul and terminates at Ngong Town within VET farm. The proposed project traverses through both Nairobi and Kajiado Counties.

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1. Are you aware of the planned **Commuter Railway** project?

YES

2. What are the current challenges you encounter in terms of transportation in your area?

TRAFFIC JUMP / CONGESTION TO ^{EL FRO} NAIROBI CITY.

3. What challenges are you likely to experience during the implementation of the project?

- (i) ROAD-RAIL TRAFFIC
- (ii) HUMAN-RAIL TRAFFIC
- (iii) ANIMAL-RAIL TRAFFIC

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

- (i) ADHERING TO THE Laid Down Rules As set up by the QUALIFIED ENGINEERS
 - (ii) RESPECTING THE PUBLIC OPINION AND REDESIGNING ACCORDINGLY
- By the contractor & KRC.

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

THE RESIDENTS because when the construction destructs the water source, drainage systems and the people houses and pieces of land the expected project that would have helped the people they becomes hectic as such.
Solution is on No. 4.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

- Existing property along the road that will be affected by the project.
- To reduce the immanent problems, compensating the victims, I think, will be very fair to the affected.

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- (i) Deforestation - solution is planting more trees along the affected side
- (ii) Soil Erosion - Ensure that any bare ground is planted grass along the railway immediately after the construction.

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- (i) Job creation
- (ii) Social growth.
- (iii) Urbanisation of Ngong town
- (iv) Traffic ease within the metropolitan zone.

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

Emergence of social diseases eg HIV/AIDS may occur, Therefore it's better to create awareness in order to help the residents.

10. Give any other comments or suggestions (related to the project).

It is better to consider the locals for the job opportunities.
The contractor to embrace quality of the work and not

Name of Contact Person: NOBERT KIPTOO
 Sub-Location: KERARAPON. Location: EM BOL BOL
 Occupation: Medical Eng. Approximate Distance from Project Site: 3 Kms
 Address: Telephone: 0707 029 541 Email:
 Signature: [Signature] ID No.: 29378274.

Thanks for your honest views

(Disclaimer: The information collected will be used for the purpose of the Riruta - Ngong MGR commuter project ESIA study and may form part of or be quoted in the study related reports)

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1. Are you aware of the planned **Commuter Railway** project? *Yes, during the launching by the President.*
2. What are the current challenges you encounter in terms of transportation in your area?
No, but we get traffic Jam from Karen to NGONGTOWN.
3. What challenges are you likely to experience during the implementation of the project?
 - security; since people from other areas will live with us ~~there~~ *you* normally employ strangers.
 - Restless - Since there will be noise from the drilling & the rest
 - Transport: the big ~~trucks~~ *cars* spoil roads and bring traffic
4. How could the above-mentioned challenges be addressed/mitigated and by whom?
⇒ Yes
⇒ I don't know.
5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?
Youth - Before there pay to be taught on saving and diceses brought by the access of lots of money flow.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

- Electricity
- water
- Deforestation
- Death of wild life.

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- Deforestation
- Death of wildlife
- displacement.

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- no corruption.
- Employment
- ~~accessibility of other DPPs~~

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

NOISE POLLUTION.
DUST

10. Give any other comments or suggestions (related to the project).


Jobs opportunity to be given to the representative of the area and must know everybody and future of the area thus benefit the community

Name of Contact Person: Dorcas Wang

Sub-Location: Location: Olusua

Occupation: B/Lady Approximate Distance from Project Site: 20-30min walk.

Address: Telephone: 0729 602624 Email: dorcaswang50@gmail.com

Signature:  ID No.: 32432626

Thanks for your honest views

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1. Are you aware of the planned **Commuter Railway** project? *YES*
2. What are the current challenges you encounter in terms of transportation in your area?
*OVERCROWDED.
TRAFFIC JAM*
3. What challenges are you likely to experience during the implementation of the project?
*- RELOCATION
- ELECTRICITY
- WATER*
4. How could the above-mentioned challenges be addressed/mitigated and by whom?
I HAVE NO IDEA
5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?
*YOUTH
ELDERLY
KIDS*

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

- WATER
- TRANSPORT
- ELECTRICITY

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- DEFORESTATION
- TRANSPORTATION
- DEATH OF ANIMALS (VET FARM)
- RELOCATION

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- EMPLOYMENT
- EASY LOCOMOTION

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

- NOISE POLLUTION
- DEFORESTATION

10. Give any other comments or suggestions (related to the project).

After project please make roads unlike the other one we have no bridges and good roads left.

Name of Contact Person: REGINA WAMBUI

Sub-Location: NAONG Location: GLODUA

Occupation: HOUSE WIFE Approximate Distance from Project Site: 20 MIN WALK

Address: Telephone: 0729 028 233 Email: reginabw@gmail.com

Signature: ID No.: 21234898

Thanks for your honest views

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YES

2. What are the current challenges you encounter in terms of transportation in your area?

More hike
inconveniences of time due to jam.

3. What challenges are you likely to experience during the implementation of the project?

- lack of employment
- interruption of water pipes

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

- If the project above is well planned for
And also involvement of different stakeholders during
implementation.

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

of the community involved since they are the immediate
Ppl.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?
7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?
8. What are the likely project benefits to you and the neighbourhood during and after implementation?
9. What are the likely social challenges related to the project after implementation and how could they be addressed?
10. Give any other comments or suggestions (related to the project).

- forms of Committee for a smooth running

Name of Contact Person: HANNAH WAMBU

Sub-Location: EMBUL-BUL Location: BUL-BUL

Occupation: Casual Approximate Distance from Project Site:

Address: Telephone: 079 63 84347 Email: hannah.wambu@84347@gmail.com

Signature: [Signature] ID No.: 28426904

Thanks for your honest views

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1. Are you aware of the planned **Commuter Railway** project?

Yes

2. What are the current challenges you encounter in terms of transportation in your area?

Traffic Jam-morning & Evening (Peak)

3. What challenges are you likely to experience during the implementation of the project?

Our property is neighbouring the proposed Railway line at the KBC to Embulbul Station - Storm water/drainage.

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

Kerarapon Drive was never a public Road and this has affected us negatively - having had the drainage directed to our property.

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

- Immediate neighbouring Properties.
- Meeting with the property owners to better understand their grievances/fears, and concerns.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Transport - Kerarapon Drive
 7 Provide alternative route to Ngong & Nairobi

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

> Storm water from KBC
 > Storm water, from Kerarapon.
 > Improve drainage
 >

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

offering alternative mode of transport

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

Efficiency and time
 Speed & efficiency of the locomotives/trans bus

10. Give any other comments or suggestions (related to the project).

Have hourly intervals - to & from Ngong.

Name of Contact Person: Sylvia Nyokabi Kamau

Sub-Location: Kerarapon Location: Olukua

Occupation: Retired Approximate Distance from Project Site: Not sure (immediate)

Address: box 24321 - 00502 Telephone: 0726829395 Email: Sylvia.kiarie@yahoo.com

Signature: Sylvia ID No.: 1820970

Thanks for your honest views

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1. Are you aware of the planned **Commuter Railway** project?

YES, BUT UNAWARE OF THE PROJECT'S ALIGNMENT

2. What are the current challenges you encounter in terms of transportation in your area?

TRAFFIC JAM MORNING AND EVENING DAILY.

3. What challenges are you likely to experience during the implementation of the project?

1 - NOISE POLLUTION AND INTERRUPTIONS IN WATER AND ELECTRICITY SUPPLY.

2 - DRAINAGE OF STORM WATER WHICH IS ALREADY A PROBLEM

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

KERA SHOULD IMPROVE ON DRAINAGE PASSING THROUGH NGONG ROAD. FROM VETINARY TO KAREN ONLY THREE CULVERTS/BRIDGES TO ALLOW WATER TO FLOW TOWARDS OLLOLUA FRES.

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

- ROUTE MAP WILL DETERMINE HOUSEHOLDS TO BE MOST AFFECTED AND HAS NOT BEEN AVAILABLE UP TO NOW.

- NOISE POLLUTION AND STORM WATER DRAINAGE ISSUES

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

10. Give any other comments or suggestions (related to the project).

Name of Contact Person: JOHN PATRICK KARANJA

Sub-Location: KERARAPON Location: OLODUYA

Occupation: TECHNICIAN MECH. Approximate Distance from Project Site:

Address: Box 24321-00502 NBI Telephone: 0722369864 Email: jp.karanja.2000@yahoo.co

Signature: [Signature] ID No.: 6854672

Thanks for your honest views

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1. Are you aware of the planned **Commuter Railway** project?

YES

2. What are the current challenges you encounter in terms of transportation in your area?

JAM

3. What challenges are you likely to experience during the implementation of the project?

Nothing.

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

Committee.

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

Those who the railway is going to pass on
their land.

To talk to them before and ¹compensate them
as quickly as possible to avoid any
inconvenience.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Houses and Shamba's

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

Dumping of material; Make sure the environment should stay the way for find it

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

It will make my transportation easier and cheap and it will change our economy

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

It should be addressed in well manner

10. Give any other comments or suggestions (related to the project).

We are happy about the project cause it will help us to save money and time.

Name of Contact Person: HAWA ISSA MOHAMMED

Sub-Location: EMBU-BUL Location: DLOOLU

Occupation: h/wife Approximate Distance from Project Site: 5 Km.

Address: 116 NGONG Telephone: 0740139923 Email: Hawa.issa.926@gmail.com

Signature: [Signature] ID No.: 21450309

Thanks for your honest views

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1. Are you aware of the planned Commuter Railway project?

Yes

2. What are the current challenges you encounter in terms of transportation in your area?

- Traffic jam.
- costly.

3. What challenges are you likely to experience during the implementation of the project?

- Environment degradation.
- Diseases eruption.

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

- Proper ESIA implementation.
- Social awareness.

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

1. Locals
2. Environment.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Roads network - Building of underpass / overpass.

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- Cutting down of indigenous trees.
- Interference of water quays.

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- Employment creation.

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

Security issues -

10. Give any other comments or suggestions (related to the project).

- Build a modern MGR.

Name of Contact Person: Francis

Sub-Location: Nsong Location: Nsong

Occupation: Resident Approximate Distance from Project Site: 2 Km

Address: C-9 Telephone: 0721978897 Email: francisn1911@gmail.com

Signature: [Signature] ID No.:

Thanks for your honest views

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1. Are you aware of the planned **Commuter Railway** project?

yes

2. What are the current challenges you encounter in terms of transportation in your area?

poor road network / drainages are poor

3. What challenges are you likely to experience during the implementation of the project?

*poor disposal of wastages i.e dust
Dust, noise, and emission of fumes i.e air pollution*

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

*construction of drainage channels
contain dust and noise*

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

*our community
giving back to our community by constructing roads
and water supplies.*

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Soil erosions

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

Construct road for the community as giving back to the community services

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

convenient transport means and efficient

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

*create awareness to the public
provide services to the community*

10. Give any other comments or suggestions (related to the project).

Give a job opportunities to community around.

Name of Contact Person: *William M. Mafaka*

Sub-Location: *Oloolua* Location: *Ngungu*

Occupation: *Business Analyst* Approximate Distance from Project Site: *1 km*

Address: *448 Ngungu* Telephone: Email: *williammafaka@gmail.com*

Signature: *[Signature]* ID No.: *27653064*

Thanks for your honest views

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1. Are you aware of the planned Commuter Railway project?

YES

2. What are the current challenges you encounter in terms of transportation in your area?

- Traffic jams along Ngong Road especially from Karen to Ngong Town.

3. What challenges are you likely to experience during the implementation of the project?

- Traffic jams/ congestions during construction
- Noise pollution
- Possible road accidents

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

- Have diversion routes
- Traffic marshals to control traffic
- Use well serviced & sound proofed equipment
- Signages should be installed.

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

All road users - motorists, pedestrians & cyclists as well as people residing along the corridor. Also, key agencies like KRS, KPHC, NCWSC etc.
- Undertake wide open consultations with all stakeholders & take their views/comments seriously.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

- Water, power, sewerage & internet services;
- Transport services (movement from one point to another).
- Prior relocation of services before project commencement

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- Dust pollution, tree harvesting, noise pollution
- Frequent watering of excavated services to curb dust emission; undertake landscaping; use covered/enclosed equipments.

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- Ease in traffic jams
- Cheap/reliable mode of transport via MGR
- Employment of locals
- Improved business sales opportunities.

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

- Access from one station to another or reaching the stations * HIV/AIDS, early pregnancies etc.
- Possible encroachment on the road/railway reserves

10. Give any other comments or suggestions (related to the project).

- Employ unskilled/semi-skilled labourers from the project area.
- Implement project within the stipulated timeframe.

Name of Contact Person: JOSIAH MWANGI

Sub-Location: KIBIKO Location: KIBIKO

Occupation: Security Guard Approximate Distance from Project Site: 4 Kms

Address: 10/818-00101, NBI Telephone: 0721 611120 Email: jwanda@kenya.go.ke

Signature: [Signature] ID No.: 13299909

Thanks for your honest views

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CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY (ESIA)

PUBLIC PARTICIPATION FORM

The Government of Kenya through its implementing agency Kenya Railways Corporation (KRC) proposes to construct 12.5 km railway line and associated components from Riruta/Lenana to Ngong town as part of the Nairobi Commuter railway services project to reduce road congestion by creating an efficient and affordable mass rapid transit transport system in line with Vision 2030. The project commences at Riruta/Lenana traversing through the towns of Karen, Embulbul and terminates at Ngong Town within VET farm. The proposed project traverses through both Nairobi and Kajiado Counties.

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1. Are you aware of the planned **Commuter Railway** project?

Yes

2. What are the current challenges you encounter in terms of transportation in your area?

Traffic Congestion along Ngong Road.

3. What challenges are you likely to experience during the implementation of the project?

Unemployment, Noise Pollution, ~~Disruption~~ Destruction of primary water services

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

Kenya Railways should Make sure the Roads they destroy are built and well Maintained

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

Residents & others be it in employment opportunities
destruction of Public Amenities i.e water sources, electricity
and roads
Engage local Communities when building the road project in regards
to the effects of the project.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Ngong Road could be affected as huge traffic losses will be using the road

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

Destruction of Public Amenities i.e. water sources, electricity fibre Network

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

Ease of Transport, employment opportunities

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

Water ways will be destroyed, traffic congestion will be increased

10. Give any other comments or suggestions (related to the project).

Name of Contact Person: Karouli Ntachi
 Sub-Location: Embabul Location: embabul
 Occupation: Accountant Approximate Distance from Project Site: 1km
 Address: Embabul Telephone: 0730 603 099 Email:
 Signature: ID No.: 218422015

Thanks for your honest views

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CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

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1. Are you aware of the planned **Commuter Railway** project?

yes

2. What are the current challenges you encounter in terms of transportation in your area?

Heavy Traffic, leading to delays of good and services

3. What challenges are you likely to experience during the implementation of the project?

Environmental impacts (Negative)

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

Having the project will give alternatives to transport

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

The Residence

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Roads, Water sources

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

Noise pollution; Environmental challenges and changes.

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

Job vacancy, and Opportunities

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

emerging diseases, insecurity and environmental - conflict - connecting on the residence, protecting the environment and ensuring that security starts with us.

10. Give any other comments or suggestions (related to the project).

Let the project be a beneficial to the community from the employment, environmental impact and other related.

Name of Contact Person: Clinton Atuti

Sub-Location: OLOLUA Location: OLDUAT

Occupation: (H/A / procurement) Approximate Distance from Project Site: 1.5 km

Address: 6743 - 00100 Telephone: 0700700968 Email: clintonbrandman@gmail

Signature: [Signature] ID No.: 27695818

Thanks for your honest views

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CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

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PUBLIC PARTICIPATION FORM

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1. Are you aware of the planned **Commuter Railway** project?

YES

2. What are the current challenges you encounter in terms of transportation in your area?

Jam

3. What challenges are you likely to experience during the implementation of the project?

Nothing

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

Committee

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

Person who will be affected are farmers
and person land where the Railway is passing
To talk to them early and compensate
them as early as possible.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

farming and rental houses if there is any on the way

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

Dumping of the waste material

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

We are going to save and our economy will grow

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

It should addressed in a manner way

10. Give any other comments or suggestions (related to the project).

our economy will grow
it will save our time

Name of Contact Person: HASSAN Abdi Hassan
Sub-Location: Bul Bul Location: Entoto
Occupation: huote Approximate Distance from Project Site: m. 2.5
Address: 116 Ngong Telephone: 0757077899 Email:
Signature: hassan ID No.: 25895324

Thanks for your honest views

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CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

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PUBLIC PARTICIPATION FORM

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1. Are you aware of the planned **Commuter Railway** project?

YBS

2. What are the current challenges you encounter in terms of transportation in your area?

* Traffic Jam
* Expensive transport services
* Lack of spacious motorbikes for services

3. What challenges are you likely to experience during the implementation of the project?

* Job employment complications
* Destruction of water pipes across the proposed route.

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

*

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

*

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

*

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- * Sound pollution
- * Destruction of forest and water bodies
- * poor Drainage system

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- * Enhanced Technology
- * Cheap and faster transport services

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

*

10. Give any other comments or suggestions (related to the project).

As a resident I'm so happy about the project implementation

Name of Contact Person: Joseph Nyunge M
 Sub-Location: Bul-Bul Location: Em-bul bul
 Occupation: ~~Single~~ Jobless Approximate Distance from Project Site: 1 km
 Address: Telephone: 0702180230 Email:
 Signature: ID No.:

Thanks for your honest views

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Oldgiser Water



CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY (ESIA)

PUBLIC PARTICIPATION FORM

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1. Are you aware of the planned **Commuter Railway** project? *yes*
2. What are the current challenges you encounter in terms of transportation in your area?
— consider our company's Pipes when going through
3. What challenges are you likely to experience during the implementation of the project?
*— Pipes damaged
— Water shortage*
4. How could the above-mentioned challenges be addressed/mitigated and by whom?
— When doing the report please Note that we supply water to that area
5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?
— The community that we serve water

Oldgiser water & sewerage Company.

0720748267

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

⊖ Water supply, The pipes will be destroyed. NB kindly consider

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

Easy travelling

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

To provide the damaged pipes

10. Give any other comments or suggestions (related to the project).

To consider old/larger water pipes

Name of Contact Person: Lucy metira

Sub-Location: Ngong Location:

Occupation: C.C.O. Approximate Distance from Project Site:

Address: 44 Ngong Telephone: 0720748262 Email:

Signature: Lucy metira ID No.: 22700491

Thanks for your honest views

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6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

- roads
- Use all safety measures

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- Make sure proper drainage to avoid future flooding

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- ease traffic
- create economic impact
- employment

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

- If you don't create awareness of morality will be high on the smart towns.

10. Give any other comments or suggestions (related to the project).

- give us roads.
- water (bore holes)
- make more schools on the CSR

Name of Contact Person: CAROL LEWETT

Sub-Location: KEGARAPON Location: OLOLUA

Occupation: Business Approximate Distance from Project Site: 2 km

Address: Telephone: 0722 846843 Email: Caroline.lewett@gmail.com

Signature: ID No.:

Thanks for your honest views

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CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY (ESIA)

PUBLIC PARTICIPATION FORM

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1. Are you aware of the planned **Commuter Railway** project?

Yes

2. What are the current challenges you encounter in terms of transportation in your area?

TRAFFIC JAM.

3. What challenges are you likely to experience during the implementation of the project?

Health ^{problems} & Water table interference.

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

— ~~not~~ Sink in bore holes
— make our GBR Fair

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

— The community if the project will interfere with water & health hazard issues

CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY (ESIA)

PUBLIC PARTICIPATION FORM

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1. Are you aware of the planned **Commuter Railway** project? *yes*
2. What are the current challenges you encounter in terms of transportation in your area?
Traffic Jam
3. What challenges are you likely to experience during the implementation of the project?
Dust
Noizy
4. How could the above-mentioned challenges be addressed/mitigated and by whom?
Pouring water first
By the Projectors.
5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?
Children & the old
cause they are weak.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Road transportation
fuel stations

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

Working man
Simple transportation of goods

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

End up Jobless.
Aidabit permanent workers especially young men.

10. Give any other comments or suggestions (related to the project).

Name of Contact Person: Hiram Kinganyi

Sub-Location: Embul-bul Location:

Occupation: Casual Labourer Approximate Distance from Project Site: 1 Km

Address: Telephone: 0769 007 420 Email:

Signature: [Signature] ID No.: 22414269

Thanks for your honest views

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CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

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1. Are you aware of the planned Commuter Railway project?

NO. Have just heard of it today

2. What are the current challenges you encounter in terms of transportation in your area?

Rain - cut roads.

Potholes on murram roads.

No drainage on roads

3. What challenges are you likely to experience during the implementation of the project?

- Noise

- Air Pollution.

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

- Inclusion of NEMA to the project.

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

Residents; relocation, respiratory diseases
Old & children.

Hoarding

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Transport (Road)
Water.

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

Forest destruction (Lewaia)
Air Pollution.
Noise pollution.

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

National income.
Alternative transport

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

theft.

10. Give any other comments or suggestions (related to the project).

Name of Contact Person: Ted Mwanthw

Sub-Location: ~~Ngong~~ Ngong Location: Ngany

Occupation: Student Approximate Distance from Project Site: —

Address: ~~Ngong~~ Telephone: 0702 022259 Email: —

Signature: ~~Ngong~~ ID No.: —

Thanks for your honest views

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6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

Businesses, private lands, rivers will be affected and so some of the mitigation would be to compensate anything and anyone who will be affected

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

River pollution, Noise pollution and forest destruction

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

Some of the benefits of this project are to provide cheaper means of transport

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

unemployment

10. Give any other comments or suggestions (related to the project).

as a community we need social accountability

Name of Contact Person:

Sub-Location: Location:

Occupation: Approximate Distance from Project Site:

Address: Telephone: Email:

Signature: ID No.:

Thanks for your honest views

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CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY (ESIA)

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1. Are you aware of the planned **Commuter Railway** project?
yes
2. What are the current challenges you encounter in terms of transportation in your area?
*There's a lot of traffic which consume a lot of time
transport from Ngong to town is expensive*
3. What challenges are you likely to experience during the implementation of the project?
*Climate injustice / ecological injustice
The community inclusion*
4. How could the above-mentioned challenges be addressed/mitigated and by whom?
Hold public participation in good time and have the community be included. All this is directed to Kenya railway and Nema.
5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?
women, people living with disabilities and youths are more likely to be affected.

CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

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1. Are you aware of the planned **Commuter Railway** project? *Yes*
BUT ITS GOOD TO KNOW WHETHER MY LAND IS AFFECTED
2. What are the current challenges you encounter in terms of transportation in your area?
- poor roads
- drainage
- potholes
3. What challenges are you likely to experience during the implementation of the project?
- There will be relocation of my residential house which was a bit of inconvenience if will be affected
- Difficult in looking for another land
4. How could the above-mentioned challenges be addressed/mitigated and by whom?
- if possible project to be terminated by Kenya Railway
- free and fair, full compensation of our lands and the properties within
5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?
1. Locals - losing properties, relocation is very hard
2. - Drainage - some areas will be affected
- electricity - power outage
- Transport congestion -

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

- electricity
 - Roads
 - Lands
- provision of vegetation
to be affected

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- Jobs - to be given to both skilled and unskilled workers - Choose a committee for land identification

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- Job opportunity
- Smooth transport
- Area growth

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

- Migration to new areas
- Health issues to adapt and new areas
- Loss

10. Give any other comments or suggestions (related to the project).

The project needed a valuable consideration and consultation with members we should know the lands affected should be given good time to relocate

Name of Contact Person: HELEN WAMBUI ITUD

Sub-Location: OLDOLUA WARD Location:

Occupation: BUSINESS Approximate Distance from Project Site: 2KM

Address: H/A Telephone: 0700387850 Email:

Signature: ID No.: 22357838

Thanks for your honest views

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1. Are you aware of the planned **Commuter Railway** project?

YES

2. What are the current challenges you encounter in terms of transportation in your area?

Poor Road Coverages

3. What challenges are you likely to experience during the implementation of the project?

Transport interruptions

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

Proper Planning of alternative routes like
① Kiirapara - Kayunga - Dagoretti
② Enhancement of the Nairobi Corridor

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

Residents of Ngong and move to Olusika ward
Proper Engagements with the residents that they
can air their concerns.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

- Roads / water and communication lines
- Proper Planning before the implementation of the

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

- Affecting the aquifers and the streams / rivers

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

Ease human transport from Nakobu CBN to Ngong

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

- Security

10. Give any other comments or suggestions (related to the project).

Name of Contact Person: JAMES NDUAGA NTEROGE
 Sub-Location: OLEPOT Location: OLOLUA
 Occupation: B/m Approximate Distance from Project Site: 1 Km
 Address: Telephone: 0712 786667 Email:
 Signature: [Signature] ID No.:

Thanks for your honest views

(Disclaimer: The information collected will be used for the purpose of the Riruta – Ngong MGR commuter project ESIA study and may form part of or be quoted in the study related reports)

CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY (ESIA)

PUBLIC PARTICIPATION FORM

The Government of Kenya through its implementing agency Kenya Railways Corporation (KRC) proposes to construct 12.5 km railway line and associated components from Riruta/Lenana to Ngong town as part of the Nairobi Commuter railway services project to reduce road congestion by creating an efficient and affordable mass rapid transit transport system in line with Vision 2030. The project commences at Riruta/Lenana traversing through the towns of Karen, Embulbul and terminates at Ngong Town within VET farm. The proposed project traverses through both Nairobi and Kajiado Counties.

Part of NEMA approval process involves public consultations in accordance with the Environmental Impact Assessment and Audit Regulations 2003 (Amendments 2019). This is to seek views and opinions with respect to interaction with the proposed project regarding: safety, social and environmental setting, and any other issues that you may consider pertinent.

1. Are you aware of the planned **Commuter Railway** project? *yes*
2. What are the current challenges you encounter in terms of transportation in your area?
*- There are road jams.
- Many people stay in this area.*
3. What challenges are you likely to experience during the implementation of the project?
- Distance from where I stay to the station, to railway station to Community where many people work.
4. How could the above-mentioned challenges be addressed/mitigated and by whom?
- Install a station in the Community area and also move vet station to Ngong town.
5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?
Compensate people properly and meet people's demands.

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

- water supply
- Electric supply
- Internet connections.


7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- improve transport from Ngong town to Nairobi & back.

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

10. Give any other comments or suggestions (related to the project).

Name of Contact Person: Gadfrey S. Gisorie
 Sub-Location: Ohoolu Location: Ohoolu
 Occupation: Self-employed Approximate Distance from Project Site: 5 km.
 Address: 67726-00208 Ngong Hills Telephone: 0723 626 091 Email: —
 Signature:  ID No.: 5951104

Thanks for your honest views

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CONSTRUCTION OF PROPOSED 12.5KM LONG RIRUTA – NGONG MGR COMMUTER PROJECT

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Part of NEMA approval process involves public consultations in accordance with the Environmental Impact Assessment and Audit Regulations 2003 (Amendments 2019). This is to seek views and opinions with respect to interaction with the proposed project regarding: safety, social and environmental setting, and any other issues that you may consider pertinent.

1. Are you aware of the planned **Commuter Railway** project?

Yes

2. What are the current challenges you encounter in terms of transportation in your area?

3. What challenges are you likely to experience during the implementation of the project?

Traffic

4. How could the above-mentioned challenges be addressed/mitigated and by whom?

- Alternative routes

5. Who are likely to be affected most by the project implementation processes, why and what could be done to mitigate/reduce the impacts?

Surrounding residents

6. What services and facilities are likely to be affected/disrupted by the project implementation and what could be done to mitigate/reduce the impacts?

7. What are the potential environmental impacts related to the project (during implementation and operation)? How could they be mitigated/addressed?

Water Catchment Areas
- No alternative boreholes.

8. What are the likely project benefits to you and the neighbourhood during and after implementation?

- Job Creation

9. What are the likely social challenges related to the project after implementation and how could they be addressed?

10. Give any other comments or suggestions (related to the project).

Name of Contact Person: Gerald Mwangi
Sub-Location: Olupoko Location: Olodua
Occupation: Business man Approximate Distance from Project Site: 1 km
Address: Telephone: Email:
Signature: [Signature] ID No.:

Thanks for your honest views

(Disclaimer: The information collected will be used for the purpose of the Riruta – Ngong MGR commuter project ESIA study and may form part of or be quoted in the study related reports)



This is to certify that
MUHUGU ENVIRONMENTAL

has been duly registered as an

Association

Pursuant to and in accordance with Section 6 & 7 of The Micro & Small Enterprises Act, 2012, and that on the 19th day of February 2024 such name was entered in the Register of The Micro & Small Enterprises.

Given under my hand and Common Seal of the Micro and Small Enterprises, at NAIROBI

This 19th day of February 2024



.....
Simon Nyamolo
Ag. Registrar Micro & Small Enterprises

Disclaimer: This certificate is system generated, to confirm the genuineness and validity of this certificate please scan the above QR code to obtain a copy of the same document from the registrar system.

MEMO

To : The managing director

Kenya Railways Corporation.

P.O Box 30121-1100

NAIROBI , KENYA

From: Muhugu Environmental Association

Date: 12th April 2024.

Email : info@krc.co.ke

Dear sir,

RE: EXPRESSION OF CONCERNS OVER THE IMPACT OF THE PROPOSED CONSTRUCTION OF RIRUTA/ LENANA NGONG COMMUTER MGR LINE ON THE TREE NURSERIES LOCATED ALONG NGONG ROAD BETWEEN THE SOUTHERN BYPASS INTERCHANGE AND NGONG TOWN.

We write in reference to your invitation dated 9th April 2024, concerning the construction of the commuter MGR line. We the Muhugu Environmental Association registered in accordance with Section 6 and 7 of the Micro and Small Enterprises Act of 2012 and being affiliate members of the Community Forest Association (CFA) wish to express some concerns that need to be addressed before the onset of the construction.

As a community we have supported the government agenda of afforestation and re-afforestation by establishing tree nurseries along the Ngong road reserve and forest for over 15 years. Our nurseries have been of significant support to the forest ecosystem by providing ready tree seedlings for planting every rain season and thus contributing to our national forest cover.

In addition to the above we are contributors to county and government revenues by way of levies and taxes. Our Nurseries are also a source of direct livelihood to over 2000 and 30,000 people indirectly respectively.

While we are NOT opposed to the construction of the railway line, we are however alive to the adverse effect of the railway line development on the existing nurseries and the livelihoods of the nursery people. The tree nurseries space may be completely taken up by the railway line development or significantly reduced.

Therefore following are the requests that we ask to be considered before the construction:-

1. That all the affected tree nurseries be allocated alternative space for nurturing the tree seedlings along the Ngong forest on the Southern Bypass and the Road Reserve.

2. Nursery owners be compensated for the loss of income and business occasioned by the relocation of the nurseries.

3. In lieu of the above two options KRC, may consider full compensation to the nursery owners for loss of investment and livelihoods.

This memo is written without any prejudice or ill-will.

Signed by:

Sign 

Charles Karige

Chairman Muhugu Environmental Association

Cc.

1. Ngong Road Forest Association

2. Kenya Forestry Department Ngong Road Station

3. KURA

4. KENHA

Annex 9: Tree Count Report

TREE COUNTING REPORT

The exercise took place from 2nd May to 3rd May from Karen shopping center to Ngong station. The following species were identified:

1. Exotic trees:
 - Japonica
 - Kayaba
 - Bamboo (Cluster) trees
 - Silk Oak (Grevillea)
 - Eucalyptus
 - Cypress
 - Grevilia trees
2. Indigenous trees:
 - Acacia trees
 - Desert dates
 - Ficus trees (Mugumo tree- 8 Located between Karen to Ngong dairy)
 - African paddle-pod
 - Horse wood trees
 - Cape Chesnutt tree
 - Croton trees
 - Latvian tree.
 - Silver oak (Muhugu)

location	AGE	NUMBER OF TREES
KAREN TO NGONG DAIRY		
	Mature	134
	Medium	53
	young	23
NGONG DAIRY TO MBAGATHI	Mature	61
	Medium	17
	young	12
MBAGATHI RIVER TO KERARAPON ROAD	Mature	79
	Medium	20
	Young	10
KERARAPON ROAD TO SGR LINE	Mature	37
	Medium	87
	Young	23
SGR TO VET FARM	Mature	3
	medium	7
	Young	19

COMMENTS:

There is lots of grass along Railway corridor especially within the KBC area to Ngong station. Majorly Cynodon grass.



