Kenya Railways Corporation

China Communications Construction Company (CCCC)

Naivasha Inland Container Depot (ICD)
(Nakuru County)

Environmental and Social Impact Assessment Study for Naivasha Inland Container Deport (ICD)
ESIA STUDY REPORT

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Project Name: Naivasha Inland Container Depot (ICD) (Nakuru County)

Assignment: Environmental and Social Impact Assessment Study for Naivasha Inland Container Deport (ICD)

Report Title: ESIA Study Report

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Acronyms

CCCC	China Communications Construction Company
CCTV	Closed Circuit Television
C-EMP	Construction Environmental Management Plan
CFC	Chlorofluorocarbons
CIDP	County Integrated Development Plan
COMESA	Common Market for East and South Africa
CSR	Corporate Social Responsibility
DOSH	Directorate of Safety and Health
EA	Environmental Audits
EAC	East Africa Community
EHS	Environmental Health and Safety
EMC	Environmental Management and Coordination
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EPZ	Export Processing Zone
ESHS	Environmental and Social Health and Safety Management
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMoP	Environment and Social Monitoring Plan
GPS	Global Position System
GRM	Grievance Redress Mechanisms
HCFC	Hydro-chlorofluorocarbons
HIV/AIDs	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
ICD	Inland Container Deport
IMDG	International Maritime Dangerous Goods
KNBS	Kenya National Bureau of Statistics
KPC	Kenya Pipeline Company
KRC	Kenya Railways Corporation
KWS	Kenya Wildlife Service
LPG	Liquefied Petroleum Gas
NCTTA	Northern Corridor Transit and Transport Agreement
NEMA	National Environmental Management Authority
NGO	Non-Governmental Organization
NNSGR	Nairobi – Naivasha Standard Gauge Railway
NSEZ	Naivasha Special Economic Zone
PGH	Provincial General Hospital
PLWD	People Living with Disability
PLWHIV	People Living With HIV
PPE	Personal Protective Equipment
PRO	Public Relations Officer
SEA	Strategic Environmental Assessment
SGR	Standard Gauge Railway
STIs	Sexually Transmitted Infections
ToR	Terms of Reference
WRA	Water Resource Authority

Non-Technical Summary

Introduction

In keeping with its mandate, Kenya Railways 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. This commenced with the completion of Mombasa – Nairobi SGR in Phase 1 and Phase 2A from Nairobi to Naivasha. The proposed ICD is proposed to constitute part of Phase 2A of SGR.

The Standard Gauge Railway (SGR) is touted as a revolutionary endeavor in the history of Kenya`s infrastructure development. It is expected to not only revolutionize the movem3ent of persons but also facilitate faster movement of cargo, thereby improving trade effects on the economy of Kenya and also the East African region and beyond. For the SGR to serve its revolutionary role in cargo movement there is need to improve related cargo facilities such as the Inland Container Depot in Mai Mahiu in Naivasha Constituency.

The Inland Container Depot (ICD) plays a key role in the clearance of cargo and container handling. The proposed ICD in Naivasha will act as the main transshipment point between the SGR and road for freight traffic that is destined for western Kenya and beyond. The construction of this project will improve the efficiency of container mobilization and ease the pressure on ICD operations in Mombasa seaport and Nairobi. Containers destined beyond Nairobi, especially to other East African countries such as Uganda and others will not need to go through time consuming customs clearance and other procedures at the Port of Mombasa and Nairobi ICD.

Project Justification

The proposed ICD in Naivasha will act as the main transhipment point between the SGR and Road for freight traffic that is destined for areas within Naivasha and beyond. In the interim, the station will serve freight destined for Uganda, Southern Sudan, Democratic Republic of Congo, Rwanda and Burundi as Mombasa – Nairobi – Malaba SGR project is being implemented to completion. The proposed freight terminus – Naivasha ICD will supplement and reduce congestion along Nairobi – Malaba highway (A104/A8) and Nairobi Inland Container Depot (ICD) which is currently in operation.

ESIA Objectives

The ESIA Study Report was undertaken in accordance with the EMCA (Environmental Impact Assessment and Audit) Regulations of June 2003 (Amendments 2019) established under Environmental and Management and Coordination Act (EMCA), 1999 (Amendment 2015). The objective of the study was to carry out an Environmental and Social Impact Assessment for proposed Naivasha ICD development and associated infrastructure including access road, power supply, water supply sanitation reticulation and drainage among others.

The scope of the ESIA, therefore, is development of Environment and Social Impact Assessment (ESIA) Study Report that includes detailed analysis of the project concepts, evaluation of impacts on the environment and social aspects, results from public and stakeholders' consultations as well as recommendations on appropriate mitigation measures. The Study Report will also present a comprehensive Environment and Social Management Plan (ESMP).

In liaison with the Kenya Railways Corporation (KRC), the Contractor, local leadership, engagement of the stakeholders will be organized to identify the perceived impacts and benefits resulting from the proposed project. Among the areas of engagement include linkages to the natural drainage systems, sharing of water supply, increasing population and human settlements, prevailing land use practices, public safety, services and public amenities social and economic 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 Environmental Management and Coordination Act (EMCA), 1999 (Amendment 2015) section 58 requires that all new projects falling under the second schedule of the Act must undergo comprehensive environmental and social impact assessment studies. ESIA study should also comply with the EIA Regulations of 2003 (Amendments 2016) on the minimum and other convectional Environmental Guidelines.

General Findings

Naivasha ICD sits on a land area of about 17.5 hectares of land within Kedong Ranch which lies between Mai Mahiu and Suswa areas. The type of soils around the project area are largely influenced by volcanic activities. The soils, varies from volcanic ashes to Pumice which are underlain by volcanic outwash. With an elevation of 1,638m above sea level the area is surrounded by rocky and rolling hills from Nachu area, Mt. Longonot and Mt. Suswa, and extensive range land spanning between Mai Mahiu to the north and Suswa town to the south.

Drainage within the project site is a challenge due to a combination of land terrain (fairly flat), nature of surface soil (loose and un-cohesive) as well as surface drainage disruptions from human activities. The existing natural waterways are overwhelmed by storm water generated from the surrounding catchments (mainly the Mt. Longonot and Nachu highlands). As a result, the project area experiences flooding and erosion during heavy rains.

The project area is characterized by scattered settlements (mainly Masai Manyattas) and a few modern homes which are mainly influenced by the ecology and the changing land use patterns in the area as well as the rising number of social and economic activities including sand harvesting and settlements that also attracts services (power supply).

The project site is currently a range land with livestock grazing and limited transiting wild animals. Vegetation cover comprise of grass, shrubs and scattered acacia tree species influenced by the weather conditions and soil types. The project site is currently a range land with livestock and wild animals grazing freely. Vegetation cover comprise of grass, shrubs and scattered acacia tree species.

The soils, varies from volcanic ashes to Pumice which are underlain by volcanic outwash. Sand harvesting and quarrying is rampant and is a major source of income to the youths around the project area as witnessed by the availability of many sand harvesters and quarry sites.

Anticipated Environmental and Social Impacts

This economic setting justifies the proposed ICD facility development as a component of the larger Naivasha Special Economic Zone. This implies the benefits will not only focus on Nakuru County but the larger Rift Valley, Western Kenya and the neighbouring Sates (Uganda, Rwanda, Burundi and Southern Sudan). The project, however, will also impart negative impacts that will require to be addressed through the construction and operation phases. The positive and negative impacts may be viewed from the environment, social and economic perspectives.

In view of the above observations, the study will focus on the following impact factors;

(i) The extent of vegetation losses and associated secondary implications in and around the ICD project areas,
(ii) Implications of the development to the surface drainage systems and measures necessary for mitigation,
(iii) Potential interactions with the limited wildlife species that may migrate into the project areas and collaborate with relevant authorities in drawing appropriate mitigation measures
(iv) The influence of the ICD development and operations in land use changes including commercial, settlements, institutional and other potential activities. Appropriate collaborative interventions will be developed for adoption by the relevant agencies,
(v) Establish potential pressure and intervention actions in natural resources in and around the ICD including land, water, energy sources as well as human workforce.
(vi) The role of the ICD development and operations in environmental conservation of the larger areas as well as enhancing social integrity of the communities living in the areas, including the workers serving in the facility.

Positive Impacts

The proposed Inland Container Depot project development will have benefits to the general socio-economic and environment of Naivasha Sub-County and its neighbouring Counties. Positive impacts will be realized during both construction and operation phases. Some of the positive impacts to the proposed project development are highlighted hereunder:

Construction Phase

Positive impacts that shall be specific to the construction phase include the following:

(i) The communities will get employment opportunities to the project development improving their income and also enhancing ownership of the ICD and subsequent operations. It is expected that upto 60% of the labour force during construction will be drawn locally while indirect employment will also be quantified progressively,
(ii) Land owners in the County and the adjacent areas will get an opportunity to supply construction materials directly or indirectly adding to the economic value,
(iii) Demand for housing facilities, food supply, fuel, recreation and other requirements by the labour force will translate to economic benefits to the local investors and landowners.,
(iv) Transfer of knowledge and skills to the community you through direct and indirect employment

Operational Phase

The positive impacts that are anticipated from the operations of the ICD include the following:

(i) The ICD operations will greatly improve the cargo handling especially efficiency and cost of cargo transfer to western Kenya and neighbouring countries including Uganda, Rwanda, Southern Sudan and Burundi,
(ii) ICD Naivasha is expected to contribute in decongesting the ICD Mombasa and Nairobi ICD,
(iii) The Standard Gauge Railway (SGR) linking the ICD yard and Mombasa through Nairobi is an important facilitating infrastructure for efficiency of ICD Naivasha. This is especially in terms of collection of produce from the production areas of Rift Valley,
(iv) Improved trade among East African countries through timely delivery of goods and improved customer clearance services,
(v) Employment opportunities for skilled, semi-skilled and unskilled labour force anticipated to work in the ICD. There should be equal opportunity in employment regardless of gender and people living with disabilities should be included in employment.
(vi) Improvement and construction of existing access roads and linkage to Maai Mahiu – Narok Road will ease movement of local goods and people.
(vii) Appreciation in land values in the area will be highly influenced by the project and the greater Naivasha Special Economic Zone.
(i) pressure on public utilities such as water supply

Negative Impacts

The negative impacts draw much attention in order to ensure integration of appropriate prevention actions through the construction and operations for enhanced environmentally and socially acceptability and sustainability. The following impact factors and associated mitigation measures have been outlined in this report for consideration. Note that while the mitigation measures are conceptual, the development of the Construction Environment and Social Management Plan (C-ESMP) will provide actual actions.

Impact Factors during Construction Phase

(i) Waste management
(ii) Liquid waste
(iii) Surface drainage
(iv) Air quality
(v) Noise and vibration
(vi) Health and safety
(vii) Vegetation clearing and soil loss
(viii) HIV and AIDS and other sexually transmitted infections
(ix) Vehicular traffic
(x) Public disruptions
(xi) Construction material sites
(xii) Construction camp site

Impacts Factors during Operation Phase

(i) Drainage management
(ii) Road accidents
(iii) Noise levels
(iv) Aerial emissions
(v) Demand on water resources
(vi) Wastewater generation
(vii) Solid waste generation
(viii) Hazardous materials and oil spills
(ix) Possible encroachment
(x) Dangerous goods

Environmental and Social Management Plan (ESMP)

An Overview

The Environmental Social and Management plan has been developed to bring home the key findings of the environmental impact assessment; recommending necessary mitigation actions, defining roles, monitoring indicators and the estimated cost. The Contractor will also be required to prepare a separate and specific ESMP for their works in order to control construction impacts and ensure compliance with applicable environmental and health and safety legislation and standards. The ICD Operator will ultimately be responsible for ensuring that the ESMP is implemented on site via reviewing the Contractor's ESMP and ensuring its implementation on site via audits.

Management Plan Principles

This projects goal is to enhance improved sanitation around ICD as described in the Project Design concept. The project should observe environmental protection requirements in accordance with the established laws and regulations to ensure sustainability. To realize this goal, acceptability by a majority of the beneficiaries and minimal effects to the physical environment will require to be integrated in the project through constant consultations, evaluations and review of the design aspects throughout the project coverage.

Specific Management Issues

In order to ensure the sound development and effective implementation of the management plan, it will be necessary to recommended that a supervisor is identified to oversee environment and management aspects. The supervisor would also be expected to co-ordinate and monitor environmental management during construction and provide monitoring schedules during operations.

Construction Environment and Social Management Plan (C-ESMP)

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 action 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.

Code of Conduct for the Contractors

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 Company Code of Conduct, Managers Code of Conduct and Individual Code of Conduct.

Conclusions

Construction of Naivasha ICD facility will improve the efficiency of container operations and ease the pressure on freight operations in Mombasa seaport and Nairobi. Cargo destined beyond Nairobi, especially to other East African countries including Uganda, Rwanda and Burundi will processed at ICD Naivasha. The scaling up of infrastructure will lead to stimulation of economic growth through efficient handling and movements of goods.

The location of the ICD yard next to the SGR corridor (a short distance from Maai Mahiu Station) and within the proposed Naivasha Special Economic Zone is an indicator of its importance in the movement of goods and materials for the local economic and serving the neighbouring states (Uganda, Rwanda, Burundi and South Sudan among other destinations). It is notable that moving goods from the Port of Mombasa through Nairobi to ICD Naivasha will be facilitated through SGR, effectively also raising the value of the SGR to the country and the region.

The primary objective of this ESIA was to fulfil the legal requirements as stipulated under EMCA 1999 (Amendment 2015) and the Environmental Impact Assessment and Audits regulations,

2003 (Amendment 2019). This was achieved through the identification of the ICD development activities, associated impacts and mitigation or preventive measures and development of a management plan. This will be the basis for licensing and subsequently compliance through the project cycle.

Specific Conclusions are as follows;

1. Construction and operations of Naivasha ICD has potential linkages to the environment and social settings of the area and beyond. It is for this reason that an Environmental and Social Management Plan (ESMP) has been developed to provide a policy direction on compliance. This ESMP is to be adopted with necessary amendments throughout the project cycle,

2. The ICD location falls within a low-lying flat area right through the flow path of a runoff from a large catchment in the north and northwest. The area is prone to flooding but due to the well-drained soils local flooding is not experienced. However, the project development has a notable drainage conflict as it obstructs parts of the surface runoff,

3. The project is located within a tectonic area with a history of volcanic activities. For this reason, the soils are generally volcanic ashes characterized with loose and uncohesive structure that are well drained that is also easily eroded. This is evidenced by the deep gullies created by eroding surface runoff through the project areas,

4. In addition to 2 above, the ICD yard pavement constitutes a large catchment for runoff during the rains. It is also a point source of pollution to the runoff and subsequently to the downstream receiving environment. This is perhaps would be one of the main challenges that will face the yard during the operations,
5. The area between Maai Mahiu and Suswa towns as well as the surrounding areas are basically ranching with livestock grazing as the main activities but low population density and households (mainly Masai Manyattas). However, the nature of housing structures is slowly changing to modern houses and land use practices including limited agriculture,

6. The wider project area is also within the neighbourhoods of ecological conservation zone including Kendong Ranch, Akira Ranch and Mt. Suswa Ranch. The conservation areas feature mainly grazers including zebra, giraffes, buffalo, Thomson gazelle, grant's gazelles and a few canines (hyenas and leopards). The wildlife is influenced by larger systems including Masai Mara far to the south, Lake Nakuru National Park and Lake Naivasha ecosystem,

7. Like any typical ICD yard, wastes generated is characterized by the nature and type of good received and handled at the facility. In this regard, it can be concluded that waste management (solid wastes, liquid wastes, hazardous/toxic materials) will constitute among the most important operational support functions at the Naivasha ICD facility,

8. Following on the above, safety and health is also critical in the operation of any ICD operations. It can also be concluded that safety and health is an important function for integration into the Naivasha ICD operations,

9. Naivasha ICD (and the long term the proposed Naivasha Special Economic Zone) will have a strong influence on the land use practices and patterns around the site as well as the nearby urban areas including Mai Mahiu and Suswa towns. This is potentially a situation of unplanned development and land use patterns unless appropriate interventions are considered as part of the long-term ICD and the economic zone development,

10. It has been established that Naivasha ICD development will have a social linkage due to the nature of the locality. The facility will be expected to interact and co-existence with the neighbouring communities, especially considering the anticipated growth in population density upon operations commencement. It can, therefore, be concluded that a social function will be an important component of the ICD management structure.

Recommendations:

1. The Contractor should adopt the Environment and Social Management Plan (ESMP) in this ESIA Study Report and prepare a Construction Environment and Social Management Plan (C-ESMP) reflecting realities of the project implementation to form the main compliance reference material. The document will be shared with and supervised by the Supervision Consultant and as well as the Client,

2. The C-ESMP should include among other actions;
   - ✓ Materials sites identification, approvals, landowners' consents and restoration plans
   - ✓ Construction waste management plans
   - ✓ Construction safety and health aspects
   - ✓ Rehabilitation and restoration after construction
   - ✓ Project completion report

3. Due to the drainage challenges and nature of top soils in the area, the project construction should consider Isolating the site from catchment runoff by a cut-off drain and orient runoff drains appropriately to the SGR culverts in consultation with the Operators. It will also be necessary to align the site drainage layout with the larger proposed Naivasha Special Economic Zone.

4. Upon completion and commissioning of the ICD facility, a comprehensive Drainage Management Plan will require to be prepared to address among other aspects pollutant retention at point sources, pollution retention mechanisms at the outfalls, drainage outfall downstream management and monitoring. Among the feature would include oil/grease interceptors and grit traps.

5. It is noted that the ICD facility has a notable interaction with ecological areas and conservation ranches. In order to ensure a long-term co-existence, consultations with KWS and Conservation Players (including the Ranches Operators) as well as the County Governments of Nakuru and Narok would be necessary to draw an appropriate collaborative Management Plan, especially with respect to wildlife movement on the available dispersal areas and routes,

6. A properly designed junction with the Maai Mahiu – Narok (B3) should be provided taking into consideration road safety measures. Appropriate road signage should be provided on approaches to the junction, at the junction and along the access road section. Motorists and truck operators be sensitized on traffic safety at the location. Provide traffic marshals to help control movement of vehicles, especially at the B3 junction,

7. To ensure free flow of traffic in and out of the ICD site as well as on the access road, the project design should provide for adequate truck turning circle, acceleration and deceleration lanes as well as traffic calming measures such as (bumps and road safety signage),

8. It is expected that once the ICD is operational, many trucks will access the area for dropping of loading. If appropriate parking area is not provided, instances of trucks being parked on the road side will be experienced which can lead to traffic inconveniences, safety incidents and social conflicts. For this reason, it is recommended that an adequate lorry parking be established on the space outside the gate. The parking space should also be provided with appropriate drainage system, markings and signage,

9. The ICD is expected to influence demand of land in the area which will lead to changes in land use practices and settlement patterns among others. In order to avoid haphazard development in the area and also in the nearby towns (Maai Mahiu and Suswa), it is recommended that the County Governments of Nakuru and Narok in conjunction with the Central Government to consider drawing a comprehensive land use zoning and control plan,

10. Upon commissioning of the ICD facility, various social issues will emerge that require management strategies for sustainability. In this regard, the following tools will be required;
    - ✓ A worker's welfare guideline
    - ✓ A public and stakeholders engagement plan
    - ✓ A Grievance Redress Mechanism (GRM)
    - ✓ Safety and health plan
    - ✓ Labour compliance plan

11. Waste management for the yard will also be important during the operations. As part of the larger Naivasha Special Economic Zone, it will be important that the ICD waste

management system should be in line with the waste management plan under the Naivasha Special Economic Zone (NSEZ) master plan. For operational purposes, a comprehensive waste management plan will be required such as to address the following;

- ✓ Waste collection at sources with appropriate segregation
- ✓ Provision of strategic waste collection points based on functional zones of the yard
- ✓ Provision of waste transfer station for removals to external disposal
- ✓ Isolation of hazardous and toxic waste materials for specialized handling
- ✓ Define requirements for the contracted waste handlers (who should also be licensed by NEMA)

12. In compliance with EMCA 1999 (Amendments 2015) and other best practices requirements, Naivasha ICD Management will need to observe the following requirements;
    - ✓ Undertake an initial Environmental Audit upon commissioning
    - ✓ Undertake annual environmental self-audit
    - ✓ Undertake environmental monitoring, preferably on annual basis, including air quality, noise levels, water quality, wastewater quality and soil quality,
    - ✓ Safety audits
    - ✓ Energy audits.

Chapter 1: Introduction

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 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. This commenced with the completion of Mombasa – Nairobi SGR in Phase 1 and Phase 2A from Nairobi to Naivasha. The proposed ICD is proposed to constitute part of Phase 2A of SGR.

The Standard Gauge Railway (SGR) is touted as a revolutionary endeavor in the history of Kenya`s infrastructure development. It is expected to not only revolutionize the movement of persons but also facilitate faster movement of cargo, thereby improving trade effects on the economy of Kenya and also the East African region and beyond. For the SGR to serve its revolutionary role in cargo movement there is need to improve related cargo facilities such as the Inland Container Depot in Maai Mahiu in Naivasha Constituency.

The Inland Container Depot (ICD) plays a key role in the clearance of cargo and container handling. The proposed ICD in Naivasha will act as the main transshipment point between the SGR and road for freight traffic that is destined for western Kenya and beyond. The construction of this project will improve the efficiency of container mobilization and ease the pressure on ICD operations in Mombasa seaport and Nairobi. Containers destined beyond Nairobi, especially to other East African countries such as Uganda and others will not need to go through time consuming customs clearance and other procedures at the Port of Mombasa and Nairobi ICD.

The Environmental Management and Coordination Act 1999 (Amendment 2015) it is compulsory that such a project undergoes an Environmental and Social Impact Assessment (ESIA) study process to evaluate the potential positive and negative impacts in accordance with the Environmental (Impact Assessment and Audit) Regulations, 2003 (Amendments 2019).

1.2 ESIA Justification

The proposed ICD in Naivasha will act as the main transhipment point between the SGR and Road for freight traffic that is destined for areas within Naivasha and beyond. In the interim, the

station will serve freight destined for Uganda, Southern Sudan, Democratic Republic of Congo, Rwanda and Burundi as Mombasa – Nairobi – Malaba SGR project is being implemented to completion. The proposed freight terminus-Naivasha ICD will supplement and reduce congestion along Nairobi – Malaba highway (A104/A8) and Nairobi Inland Container Depot (ICD) which is currently in operation.

Naivasha ICD will spur industrial and economic growth in the area, through the following:

(i) Naivasha ICD will act as the Freight Terminal Point for north bound cargo before full implementation of Mombasa – Nairobi – Malaba SGR Project.
(ii) Providing reliable transport and accessibility to the existing horticultural establishments (Importation of farm inputs e.g. Fertilizer, Agro-Chemicals and Farm Machinery etc.).
(iii) Providing incentives for processing of Agricultural Products for the export market. This will also serve the surrounding rich agricultural areas like Kinangop, Nakuru, Nyandarua, Narok etc. Potential industries include Meat processing, Grains, Vegetable Processing, etc.
(iv) Development of new Industries, Warehouses and Freight Handling establishments in Naivasha.
(v) Development of an Export Processing Zone (EPZ) that will leverage on proximity to the SGR and Geothermal Power Plant (Affordable energy and residual steam from Geothermal Power Plants).
(vi) Naivasha ICD will spur Industrial growth in the area and is projected to generate additional Freight volumes of 90,000 tons by the year 2025, 120,000 tons by 2030 and 160,000 tons by the year 2040.

1.3 ESIA Study

Due to environmental and social challenges associated with ICD 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. According to the Environmental Management and Coordination Act (EMCA), 1999 (Amendment 2015) section 58 requires that all new projects falling under the second schedule of the Act must undergo comprehensive environmental and social impact assessment studies. ESIA study should also comply with the EIA Regulations of 2003 (Amendments 2019) on the minimum and other convectional Environmental Guidelines

1.3.1 Study Objectives

The ESIA Study Report was undertaken in accordance with the EMCA (Environmental Impact Assessment and Audit) Regulations of June 2003 (Amendments 2019) established under Environmental and Management and Coordination Act (EMCA), 1999 (Amendment 2015). The objective of the study was to carry out an Environmental and Social Impact Assessment for

proposed Naivasha ICD development and associated infrastructure including access road, power supply, water supply sanitation reticulation and drainage among others.

Naivasha ICD is located within a rural setting local and external interactions with environmental but limited social aspects in its operations. In accordance with the EIA Regulations of 2003 (Amendments 2019), Section 2(7)(k), Inland Container Depot (ICD) may be considered a storage of warehouse yard and falls under the Medium Risks Projects but has been subjected to an ESIA Study Report level due to its nature.

1.3.2 ESIA Scope

The scope of the ESIA, therefore, is development of Environment and Social Impact Assessment (ESIA) Study Report that includes detailed analysis of the project concepts, evaluation of impacts on the environment and social aspects, results from public and stakeholders' consultations as well as recommendations on appropriate mitigation measures. The Study Report will also present a comprehensive Environment and Social Management Plan (ESMP).

In liaison with the Kenya Railways Corporation (KRC), the Contractor, local leadership, engagement of the stakeholders will be organized to identify the perceived impacts and benefits resulting from the proposed project. Among the areas of engagement include linkages to the natural drainage systems, sharing of water supply, increasing population and human settlements, prevailing land use practices, public safety, services and public amenities social and economic activities.

Following is the scope for the environmental impact assessment Study Report;

(i) A comprehensive description of the proposed project including its objectives, preliminary design concepts, project phasing and anticipated impacts,
(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 ICD operations,
(iii) Analysis of policy, legal and institutional framework governing aviation operations,
(iv) Establish linkages between the proposed ICD project and the anticipated impacts focused on the physical environment, social status and general benefits to the national economy,
(v) Social and economic implications of the project through structured stakeholders and public participation addressing government officials, community groups, farmers, land owners, public institutions, opinion leaders, etc.,
(vi) Developing an Environment and Social Management Plan (ESMP) and Environment and Social Monitoring Plan (ESMoP) for adoption through the project implementation,

In liaison with the Kenya Railways Corporation (KRC), the Contractor, local leadership and the administration consultations and engagements with stakeholders are being organized to identify the perceived impacts and benefits resulting from the proposed project. Among the areas of

engagement include linkages to the natural drainage systems, sharing of water supply, increasing population and human settlements, prevailing land use practices, public safety, services and public amenities social and economic activities.

1.4 ESIA Study Approach

1.4.1 Approach Principles

This ESIA study adopted an integrated approach where documentary review, intensive field investigations was undertaken, however, rapid interviews and discussions with the stakeholders and communities will follow thereafter. The study was designed to ascertain the relationship between the Inland Depot project and the environmental and social setting. Identification of anticipated impacts was determined on the basis of the baseline conditions established and information obtained from the documents reviewed and field investigations.

Due to environmental and social challenges associated with Inland Container Depot 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.

According to the Environmental Management and Coordination Act (EMCA), 1999 (Amendment 2015) section 58 requires that all new projects falling under the second schedule of the Act must undergo comprehensive environmental and social impact assessment studies. ESIA study should also comply with the EIA Regulations of 2003 (Amendments 2016) on the minimum and other convectional Environmental Guidelines.

1.4.2 ESIA Study Activities

The ESIA study has a series of activities undertaken in close liaison with the Client and associated Stakeholders. Effective evaluation of the baseline status through physical inspection of the entire project area. The current status (baseline environmental conditions) provides the starting point for the impact's predictions and benchmark for the mitigation measures. Key outputs by activity are outlined in the sub-sections below;

1.4.2.1 Reconnaissance Visit

The environmental and social baseline of the project area is being undertaken through physical assessments and observations, interactions with the stakeholders, public and institutions. In addition, it is also appreciated that operations effects may go beyond the ICD grounds as well as the safety implications directly and indirectly impacts on the adjacent land use activities. The extent of the impact zones outside the ICD is being identified in consultations with the Design

Engineers. A reconnaissance site visit has already been undertaken lead by the Project Design Team where discussions were conducted on site including the following;

(i) Appreciating diversity on physical environment, demographic trends around the ICD project area,
(ii) Indication of the design criteria and project phasing,
(iii) Appreciating of social and economic setting around the project area,
(iv) Share experiences on environmental resources and social issues in the area with regard to economic activities,
(v) ESIA general study plan

1.4.2.2 Documentary Review

Various relevant documents are being reviewed for an understanding of the terms of reference, environmental status, data on demographic characteristics of the project area, land use practices, development strategies and plans (local and national) as well as the policy and legal documents. In summary, among the documents being reviewed include;

(i) The Terms of Reference,
(ii) Project background documents
(iii) County Integrated Development Plan for Nakuru County and the neighbouring Counties,
(iv) ICD design concepts,
(v) Latest state of environment report,
(vi) Policy documents governing the economic sector,
(vii) Environmental legislations,
(viii) Other documents as may be identified.

1.4.2.3 Field Assessments

A comprehensive physical evaluation of the project area is planned to be carried out taking into consideration physical and biological environmental status, human settlement and socio-economic activities.

1.4.2.4 Stakeholders and Public Consultations

Field visits to also involve interviews of selected persons, groups of persons or institutional officials in collaboration with the Nakuru County Commissioner's Office. A questionnaire and other information collection tools have been prepared for application on stakeholders during the meetings. The consultations are meant to obtain available information and data. Interviews are arranged with among others the offices and officers to be interviewed include;

(i) Briefing to the County Government Office (Nakuru)
(ii) Briefing to the County Commissioner (Nakuru)
(iii) Briefing to the key County Leaders

(iv) NEMA County Director of Environment (Nakuru)
(v) Other Stakeholders and Public (To follow thereafter)

1.4.2.5 Reporting

The process of report writing involved participation of the team members through analysis of respective data and information. This translated into findings and anticipated impacts and also provides a basis for development of mitigation measures and an Environment Management Plan for incorporation into the project implementation.

The following deliverables will be realized as outlined under the Terms of Reference

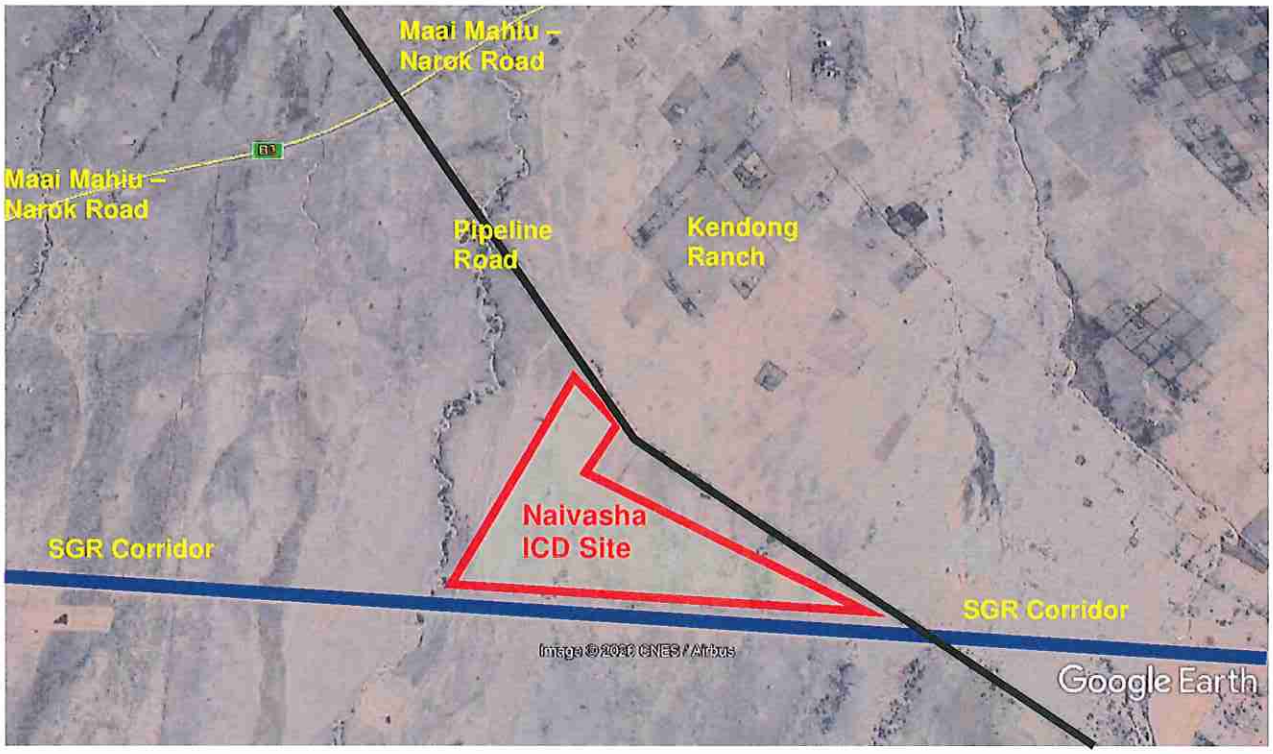
(i) Terms of Reference
(ii) Draft ESIA Study Report
(iii) Final ESIA Study Report

Chapter 2: The Project Description

2.1 The Project Location

The Naivasha Inland Container Deport (ICD) Project area within Kedong Ranch in Maai Mahiu ward, Naivasha Sub-county of Nakuru County. The Project site is located approximately 12Km from Mai Mahiu town to the north and 17km from Suswa town on the south. The ground lies within approximate GPS coordinates 1° 2'36.40"S, 36°29'11.90"E. It lies between the SGR, Mai Mahiu – Narok Road (B3) and Kenya Pipeline Road. The project site measures 17.5 hectares with a gently sloping topography at the bed of the Great Rift Valley.

Figure 1: Project Site Location Map



2.2 Site Status

Naivasha ICD sits on a land area of about 17.5 hectares of land within Kedong Ranch which lies between Maai Mahiu and Suswa areas. The type of soils around the project area are largely influenced by volcanic activities. The soils, varies from volcanic ashes to Pumice which are underlain by volcanic outwash. With an elevation of 1,638m above sea level the area is surrounded by rocky and rolling hills from Nachu area, Mt. Longonot and Mt. Suswa, and extensive range land spanning between Maai Mahiu to the north and Suswa town to the south. Drainage within the project site is a challenge due to a combination of land terrain (fairly flat), nature of surface soil (loose and un-cohesive) as well as surface drainage disruptions from human activities. The existing natural waterways are overwhelmed by storm water generated from the surrounding catchments

(mainly the Mt. Longonot and Nachu highlands). As a result, the project area experiences flooding and erosion during heavy rains.

The project area is characterized by scattered settlements (mainly Masai Manyattas) and a few modern homes which are mainly influenced by the ecology and the changing land use patterns in the area as well as the rising number of social and economic activities including sand harvesting and settlements that also attracts services (power supply).

The project site is currently a range land with livestock grazing and limited transiting wild animals. Vegetation cover comprise of grass, shrubs and scattered acacia tree species influenced by the weather conditions and soil types.

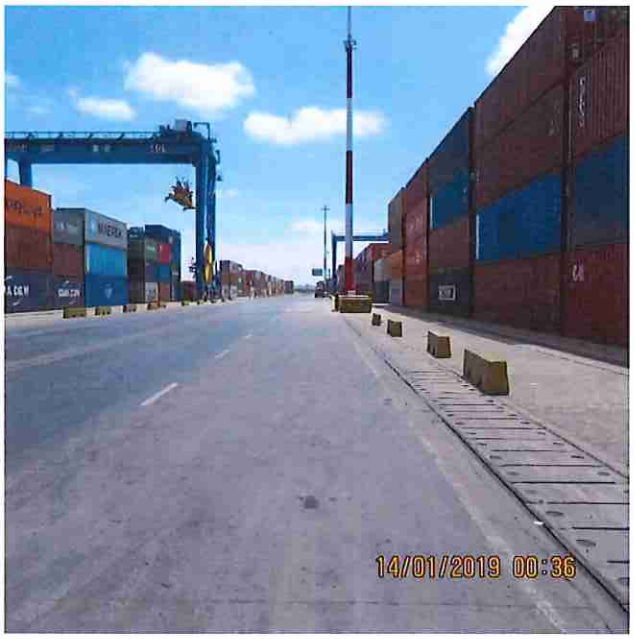
2.3 Project Components

The major components of the ICD under construction are:

(i) Construction of the access Road linking the site from Maai Mahiu – Narok road (B3) about 2.7km to the northwest of the site gate. This access road coincides with the existing Pipeline road that will be upgraded up to the site location,
(ii) Provision of ICD yard roads that will be the internal passages for use in deliveries and removals of containers
(iii) The ICD yard is the large space, with concrete or other hard surfaces for holding heavy containers and other goods as delivered to the site.
(iv) The access road crosses one of the main drainage channels transmitting runoff from the catchments and running along the western side of the site. This will require a bridge to ensure free flow of storm water and safety of the road and users,
(v) Culverts will also be installed on notable surface drainage sections along the access road as well as within the yard to avoid potential flooding scenarios,
(vi) A siding track will be extended from the adjacent SGR line for ease of goods deliveries and evacuations,
(vii) It is also noted that communication, Signalling and electrical works are necessary installations for the facilities for purposes of internal and external coordination of operations,
(viii) Construction of buildings and associated structures comprising of administration, operations management, security, storage and other needs.

A typical illustration of an ICD setting is shown in the figure below taken at Nairobi ICD.

Figure 2: Sections of ICD Nairobi



2.4 Plant Design Concepts

2.4.1 Access Road

Branching off from Maai Mahiu – Narok Road (B3) into to ICD stretching 2.637km. The design specifications are;

(i) 3.5m x 2 (7m) 2-way single carriageway,
(ii) Concrete Pavement (260mm thick concrete surface with GCS base 2-200mm thick)

2.4.2 Main Entrance

The main ICD entrance comprises of security house, weighbridge and entrance structure with gates and sensors. The pavement is a concrete base with GCS surface top. The design specifications to include;

(i) Auxiliary yard-Type 3- Pavement
- 150mm Gravel sub-base
- 450mm concrete slab
- 300mm GCS surface top

(ii) Main Container yard Type 3-Pavement
- 150mm Gravel sub-base
- 450mm Concrete slab
- 300mm GCS

(iii) Yard drainage with a Load bearing ditch Inter line ditch

2.4.3 Buildings

There are 9No. building blocks to be utilized for various functions during the operations. The buildings types include the following;

(i) Access gate facility
(ii) Integrated functions building
(iii) Police post building
(iv) Overhaul Shop
(v) Pump House
(vi) 1No. Toilet
(vii) 2No. External Toilet
(viii) Signal Building
(ix) Guard house

2.4.4 The Container Yard

This constitutes the main area of focus for the ICD operations. The yard comprises the following;

(i) Auxiliary yard-Type 3- Pavement
- 150mm gravel sub-base
- 450mm concrete slab
- 300mm GCS surface top

(ii) Main Container Yard-Type 3-Pavement
- 150mm gravel sub-base
- 450mm concrete slab
- 300mm GCS surface top

(iii) Yard drainage with a Load bearing ditch Inter line ditch

2.4.5 Drainage Facilities

The project will involve construction of one bridge as well as a network of internal surface drainage network. The bridge is to be installed on one of the major natural drainage channels across the access road into the yard at 930m from Maai Mahiu – Narok road. The bridge is a 2x20m Prestressed hollow concrete slab.

Figure 3: The Aerial and Phot of the Bridge Location

2.4.6 Siding Track

This is installation of the main link of the ICD yard into SGR for offloading and loading of containers. The SGR contact sidings will run for approximately 2.1km with the specifications below;

(i) 2.11Km long siding rail line
(ii) Main track rail density of 60kg/m with each measuring 25m long
(iii) Track gauge 1,435mm (or 1.435m wide that describes the Standard Gauge Railway).
(iv) Prestressed concrete sleepers' new type II with 1,760 pieces laid per kilometer.

Figure 4: A Section of SGR Line Running next to the Site

2.4.7 Communication and Information

This is a critical system for ICD that will comprise the following components;

(i) Communication cable laying and trench excavation involving cable laying and trench excavation and backfilling works,
(ii) Cable pipes and manholes construction
(iii) CCTV Monitoring system with 3No. outdoor cameras installed (2No. upstream and 1No. downstream areas).
(iv) Installation of communication equipment in the signal building

2.4.8 Access Gate

The key components at the access gate will include;

(i) Traffic control and ticketing
- Installation and wiring of traffic lights and gate barriers
- Installation of ticketing booths and gate access control cabinets
- Installation of ticketing booth and gate access control equipment

(ii) Vehicle inspection system

- Installation and testing of CCTV camera array
- Installation of truck scale equipment

(iii) Lighting Installation and electrical wiring of LED lights along ceiling

2.4.9 Integrated Building

This building will comprise the following;

(i) Data Center Room
- Installation of false floor, earthing grid and lightning protection
- Communication and Information cables lead-in works through wall and ceiling cable trays
- Installation 2 No. server cabinets
- Installation of ICT equipment in respective cabinets
- Equipment and cabinet labelling

(ii) Central Control Room
- Installation of false floor, earthing grid and lightning protection
- Communication and Information cables lead-in works through wall and ceiling cable trays
- Installation of server cabinets
- Installation of ICT equipment in respective cabinets
- Equipment and cabinet labelling

(iii) Indoor CCTV surveillance installation works

2.5 Project Activities

The following are anticipated project works activities that determines the extent of impacts,

2.5.1 Site Preparation

Establishment of construction camp sites, materials holding yards, parking yards for the contractor's vehicles and machineries, areas required for the ICD pavements and drainage channeling. The main vegetation within the project area is mainly grass cover and scattered acacia trees. In addition to the clearance of vegetation, the site clearance will also involve excavations and earth moving for appropriate sub-grade foundation of the pavements and buildings. It is also observed that a few scattered manyattas also feature the project area.

2.5.2 Waste Management

It is anticipated that works will generate notable volumes of waste materials including construction debris, spoil earth materials, dry vegetation matter and other construction residuals. The works will require appropriate waste management plans to avoid local environmental and social conflicts.

2.5.3 Material Sourcing

Construction materials will be obtained from suitable sources that will include hard stone quarries, gravel borrow areas, sand, cement and steel among other materials. Material sites for gravel, hard stone aggregate, sand and water extraction have to obtain appropriate approvals and permits before commencement of the activities.

2.5.4 Restoration Activities

Upon completion of the project, it will be necessary to restore all sections damaged by the construction outside the main yard including material sites and construction camp sites. Other areas to be restored include material sources and spoil disposal areas. Open spaces around the yard will also require landscaping through re-vegetation (ground cover vegetation) for aesthetic purposes as well as conservation of the environment.

2.5.5 Project Commissioning

Project commissioning will be the formal hand-over and operationalization of the ICD facility upon completion. Before project commissioning, the client and contractor will ensure there are no unresolved social and environmental concerns so as to ensure project acceptability by the locals and avoidance of conflicts during operations. To achieve this, the facility will be completed based on the design specifications as well as operation of associated components.

In addition, affected project sites (material and campsites) should be rehabilitated almost to their original state. In addition to the paper work, there will be a physical evaluation of the facility that will involve the contractor, KRC, relevant National and Nakuru County Government departments and the design consultant. The inspection of the facility will ensure all the issues of the ICD yard are adequately considered and all the structures are operationally ready and approved to function as planned.

2.6 Construction Plan

The project will be implemented over a period of 7 months from date of commencement. This plan however will be determined by other influencing factors including; Mobilization of equipment and workmanship, land acquisition, design reviews and acquisition of relevant statutory documents.

2.7 Project Cost Estimates

The construction of Naivasha Inland Container Depot (ICD) and its facilities is estimated to cost **KShs. 6.9 billion (Kenya Shillings Six Billion, Nine Hundred Million)**

Chapter 3: Policy and Legislation Framework

3.1 Overview

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 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.

3.2 Policy Framework

3.2.1 The Constitution of Kenya 2010

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 matters affecting the environment, establishing 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.

3.2.2 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

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"

3.2.3 The Land Policy

In section 3.2, land policy is linked to constitutional reforms. Regulation of property rights is vested in the government by the Constitution with powers to regulate how private land is used in order to protect the public interest. The Government exercises these powers through compulsory acquisition and development control. Compulsory acquisition is the power of the State to take over land owned privately for a public purpose. However, the Government must make prompt payment of compensation.

Section 3.6, under land issues requiring special intervention, asserts that "Land rights of minority communities shall be protected through a law to be passed specifically to secure their rights as individuals and groups and recognition of their resource management systems to ensure sustainability." It further states, "Land rights of vulnerable groups (namely subsistence farmers, pastoralists, hunters and gatherers, agricultural labourers, unskilled workers, unemployed youth, persons with disabilities, persons living with HIV/AIDS, orphans, slum and street dwellers and the aged) shall be addressed by creating a system for identifying, monitoring and assessment, resettling them, facilitating their participation in decision making over land and land based resources, and protecting their land rights "regulations and laws dealing with these resources shall be harmonized with the framework established by the Environmental Management and Coordination Act (EMCA),1999 and EMCA (Amendment) 2015.

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.

3.2.4 Integrated Transport Policy, 2009

The policy aims 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.

The policy acknowledges that sustainable environmental policies have not been adequately incorporated in Kenyan road transport infrastructure management policies resulting in pollution and environmental degradation. Factors such as soil erosion, management of gravel pits and road run-off, noise pollution and gaseous emissions by road motor vehicles have not been adequately

3.2.5 National Environmental Policy 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

3.2.6 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.

3.3 Regulatory Framework

Provisions of the national regulations on environmental management and conservation implies that the Kenya Railways Corporation has a legal duty and responsibility to operate the airport sustainably and to comply with the established environment management regulations and should not compromise on the environmental health and safety requirements. This position enhances the importance of this ESIA and subsequent implementation of the ESMP developed therefrom. The key national laws that govern the management of environmental resources in the country will also

be integrated throughout the construction and subsequent operations. Note that wherever any of the laws contradict each other, the Environmental Management and Coordination Act 1999 prevails.

3.3.1 The Environmental Management and Coordination Act, 1999 (Amendment 2015)

The Environmental Management and Coordination Act (EMCA), 1999 being the principle law shall be read alongside the Environmental Management and Coordination (Amendment) Act 2015. The latter provides amendments to the Principal Act on section by section basis. 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.

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. Section 9 of the Act provides for voluntary environmental conservation practices through natural resources conservancies, easements, leases, payments for ecosystem services and other instruments. Guidelines in this regard are to be formulated through relevant Agency collaborations.

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.

3.3.2 EMC (EIA/EA) Regulations, 2003 (Amendment 2019)

The EIA and Audit Regulations state in Regulation 3 that "the regulations should apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Environment Management and Coordination (Amended) Act, 2015. Part II of the Regulations indicates the procedures to be taken during preparation, submission and approval of the full ESIA study report.

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 local 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. Appropriate management measures would be necessary throughout the project phases.

3.3.3 EMC (Waste Management) Regulation, 2006

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 local 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. Appropriate management measures would be necessary throughout the project phases.

3.3.4 EMC (Water Quality) Regulation, 2006

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. There are potential linkages during construction and use though mainly internal.

3.3.5 EMC (Noise and Excessive Vibrations Pollution Control) Regulations, 2009

Part II section 3(I) 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.

Section 13(1) states that except for the purposes specified in sub-Regulation (2) hereunder, no person shall operate construction equipment (including but not limited to any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist) or perform any outside construction or repair work so as to emit noise in excess of the permissible levels as set out in the Second Schedule to these Regulations. These purposes include emergencies, those of a domestic nature and /or public utility construction.

Section 14 relates to noise, excessive vibrations from construction, demolition, mining or quarrying sites, and states that: where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority may impose requirements on how the work is to be carried out including but not limited to requirements regarding machinery that may be used and the permitted levels of noise as stipulated in the Second and Third Schedules to these Regulations.

3.3.6 EMC (Air Quality) Regulation, 2014

The government has gazetted the air quality regulations standards the Environmental Management and Co-Ordination (air quality Regulations). Under the general prohibitions (Part II), section 5 states that no person shall act in a way that directly or indirectly causes immediate or subsequent air pollution. The regulation has provisions with prohibitions of priority air pollutants associated with machine operations and burning activities (general sources, mobile sources and Greenhouse gasses) outlined under the second schedule of the regulations.

Tolerable air quality limits are provided under the first schedule of the regulation while lists specific limited for emissions from controlled and non-controlled facilities by sector. Odours are also prohibited under section 9 of the regulations (offensive emissions). Emitting activities expected to meet the established minimum levels in the air, particularly in areas habited by human being as well as protected areas. An operator of a site or equipment is required to obtain a license under the regulations and stipulated regulations. A compliance is also required as part of the emission license.

3.3.7 EMC (Controlled Substances) Regulation, 2007

This regulation controls the production, consumption and export and import of controlled substances. The materials are traditionally used as refrigerants and air conditioning purposes. According to the First Schedule of the Regulations, Controlled Substances are defined as various species of halogenated organic gases (methane, ethane and propane) that have been scientifically proved to deplete the ozone layer with irreversible effects to the earth components.

Section 4 of the Regulations requires that no person shall be allowed to keep, sell or package for transportation any of the Controlled Substances if there are risks of leakage or unprofessional handling. The Regulation further requires that any manufacture, importation and handling shall only be done by persons who have been provided with appropriate permits and licenses (Part III of the Regulation). CFCs and HCFCs were prohibited through the Montreal Protocol (1987) and are currently regulated under the Controlled Substances Regulations in Kenya.

3.3.8 EMC (Fossil Fuel Emission Control) Regulations, 2006

This Regulation aims at eliminating or reducing emissions generated by internal combustion engines to acceptable standards. The regulation provides guidelines on use of clean fuels, use of catalysts and inspection procedures for engines and generators. This regulation is triggered as the proponent would use vehicles and equipment that depend on fossil fuel as their source of energy. It is recommended the requirements of the regulation be implemented in order to eliminate or reduce negative air quality impacts. This would be relevant for construction equipment and vehicles and operations within the airstrip thereafter, and particularly with respect to aviation activities.

3.3.9 Occupational Safety and Health Act No. 15 of 2007

This is an Act of Parliament to provide for the safety, health and welfare of all workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. It applies to all workplaces where any person is at work, whether temporarily or permanently. The purpose of this Act is to:

(i) Secure the safety, health and welfare of persons at work;
(ii) Protect persons other than persons at work against safety and health arising out of, or in connection with the activities of persons at work.

Every premise shall be provided with maintenance, readily accessible means for extinguishing fire and persons trained in the correct use of such means shall be present during all working periods. Regular individual examination or surveys of health conditions of industrial medicine and hygiene must be performed and the cost will be met by the employer. This will ensure that the examination can take place without any loss of earnings for the employees and if possible, within normal working hours. The Occupational Safety and Health Act provides for development and maintenance of an effective programme of collection, compilation and analysis of occupational safety. This will ensure that health statistics, which shall cover injuries and illness including disabling during working hours, are adhered.

3.3.10 The Water Act 2016

The Water Act 2016 provides for the management, conservation, use and control of water resources and for acquisition and regulation of rights to use water; to provide for the regulation and management of water supply and sewerage services. Section 143 of the Act makes it an offence to obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction. It also prohibits anyone to throw or convey or cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive or unwholesome matter or thing into or near to water resource in such a manner as to cause, or be likely to cause, pollution of the water resource.

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 the 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.

3.3.11 Land Act 2012 revised 2016

This is an Act of Parliament intended to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land-based resources, and for connected purposes.

3.3.12 Public Health Act (Cap 286)

This is an Act of Parliament that makes provision for securing and maintaining health. Section 115 of this Act prohibits causing nuisance or other condition liable to be injurious or dangerous to health. Section 118 provides a list of nuisances which includes any noxious matter or waste water, flowing or discharged from any premises, wherever situated, into any public street, or into the gutter or side channel of any watercourse, irrigation channel or bed thereof not approved for the reception of such discharge.

3.3.13 Physical and Land Use Planning Act 2019

The Physical and Land Use Planning Act, 2019 came into force on 5 August 2019 to govern matters relating to planning, use, regulation and development of land in Kenya. Part II Physical and Land Use Planning Institutions state the functions of the County Physical and Land Use Planning Consultative Forum shall be to provide a forum for consultation on County and Inter-County Physical and Land Use Development Plans and promote effective coordination and integration of physical and land use development and sector planning.

The National Physical and Land Use Development Plan defines strategic policies for the determination of the general direction and trends of physical and sectoral development in Kenya and provide a framework for the use and development of land. According to Section 27(1) the planning authorities shall base the preparation of inter-county physical and land use development plans, integrated county physical and land use development plans, city physical and land use development plans, urban area physical and land use development plans and sectoral plans on the National Physical and Land Use Development Plan.

Section 45(1) states that a county government shall prepare a local physical and land use development plan in respect of a city, municipality, town or unclassified urban area as the case may be. Section 46 states that a county government shall prepare a local physical and land use development plan for;

(i) zoning, urban renewal, or redevelopment;
(ii) Guiding and coordinating the development of infrastructure;
(iii) Regulating the land use and land development;
(iv) Providing a framework and guidelines on building and works development in the city, municipality, urban area, or other smaller urban centers including local centers, and market centers.

Section 57(1) States that a person shall not carry out development within a county without a development permission granted by the respective county executive committee member. Under Part 3, a county executive committee member shall require a person who has commenced a development without obtaining development permission to restore the land on which the development is taking place to its original condition or as near to its original condition.

Section 58 Part (2) states that an applicant for development permission shall provide documents, plans and particulars as may be required by the respective county executive committee member to indicate the purposes of the proposed development. Part (3) further states that An applicant for development permission shall indicate the proposed uses to which the land shall be put, the population density to which that land shall be subjected and the portion of the land the applicant shall provide for easements as a consequence of the applicant's proposed development. Part (7) states that a person applying for development permission shall also notify the public of the development project.

Section 59 (1) indicates that A person applying for development permission shall ensure that any documents, plans and particulars that are provided to the respective county executive committee member while applying for development permission have been prepared by the relevant qualified, registered and licensed professionals. Section 71-Part (2) requires all physical and land use development plans take into account and record all heritage sites declared or deemed to have been declared under the National Museums and Heritage Act, 2006.

3.3.14 HIV/AIDS Prevention and Control Act

This Act commenced in March of 2009. It is an Act of Parliament to provide measures for the prevention, management and control of HIV and AIDS, to provide for the protection and promotion of public health and for the appropriate treatment, counselling, support and care of persons infected or at risk of HIV and AIDS infection and for connected purposes. The provisions of the Act should be integrated into the project implementation plan as well the airstrip operations procedures, thereafter.

3.3.15 Labour Institutions Act No. 12 of 2007

The purpose of the Act is to establish labour institutions and to provide for their function, powers and duties. The Act provides for the establishment of National Labour Board, which provides advice to the Minister on all matters concerning employment and labour.

3.3.16 Work Injury Compensation 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 while operations will be blended with the normal airport procedures.

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 mis-conduct 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.

The Contractor shall be prevailed upon to ensure prevention measures but where injuries occur, the law shall be applied accordingly. The same shall apply to the facility operator upon commissioning.

3.3.17 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:
(iv) (Basic minimum conditions of employment in terms of contracts and agreements;
(v) Hours of work
(vi) Entitlement to leave including sick leave
(vii) Provision of medical attention
(viii) 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

3.3.18 National Gender and Equality Commission Act, 2011

Act has given power to the National Gender and Equality Commission to perform various functions. For instance, section 8 (a) of the Act gives the right to the commission to promote gender equality and freedom from discrimination in accordance with Article 27 of the Constitution. Item (d) requires the Commission to mainstream gender in all aspects of development. and item (c) requires the commission to act as the principal organ of the State in ensuring compliance with all treaties and conventions ratified by Kenya relating to issues of equality and freedom from discrimination and relating to special interest groups including minorities and marginalized persons, women, persons with disabilities, and children;

3.3.19 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

3.3.20 Special Economic Zones Act 2015

The Act of Special Economic Zones to provide for the establishment of special economic zones; the promotion and facilitation of global and local investors; the development and management of enabling environment for such investments, and for connected purposes. The object and purpose of this Act is to provide for;

(i) An enabling environment for the development of all aspects of special economic zones including; development of integrated infrastructure facilities;
(ii) Creation of incentives for economic and business activities in areas designated as special economic zones;
(iii) Removal of impediments to economic or business activities that generate profit for enterprises in areas designated as special economic zones; and
(iv) The regulation and administration of activities within the special economic zones with due regard to the principles of openness, competitiveness and transparency.

3.3.21 Wildlife (Conservation and Management Act 2013, (Cap 376)

The ACT is to provide for the protection, conservation, sustainable use and management of wildlife in Kenya and for connected purposes. Section 33 (c): Supporting the establishment of wildlife Development Fund for development of conservation areas 68 :(4): Preventing development in a National Park without approved management plans. Section 30 of part VI: Prevention of adverse effects on the environment, including the seepage of toxic waste into streams, rivers, lakes and wetlands.

3.4 Institutional Capacity

3.4.1 Kenya Railways Corporation Act, 1978 (Amendment 2005) Cap 397

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.

3.4.2 National Environment Management Authority (NEMA)

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 is subsequent stages of construction environmental management and annual audits review.

3.4.3 International Finance Corporation (IFC) Environmental, Health and Safety Guidelines)

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

The EHS Guidelines for Railways are applicable to activities typically conducted by rail infrastructure operators dedicated to passenger and freight transport. The EHS document for

Railways is organized into two main areas, namely rail operations, covering construction and maintenance of rail infrastructure as well as operation of rolling stock, such as locomotives and rail cars; and, locomotive maintenance activities, including engine services, and other mechanical repair and maintenance of locomotives and railcars. This can be illustrated according to the following sections:

3.5 Treaties

3.5.1 The Northern Corridor Transit Agreement 1985 Revised 2007

The Northern Corridor Transit and Transport Agreement (NCTTA) is a multilateral treaty established in 1985 and later revised in 2007 in order, to facilitate transit cargo between the Kenyan Port of Mombasa and the hinterland of Member States namely Burundi, Democratic Republic of Congo, Rwanda, Uganda and South Sudan.

Section 2 Article 5(ii) Member state to grant to citizens of the respective contracting parties engaged in trade, free movement within their territories and the right of transit through each other's territories under the conditions specified in the Agreement and its protocols. Part (iii) requires that member states should put in place facilities enabling the free movement and transit of persons, vehicles and goods within and between their territories.

Section 6 Article 17 states that contracting parties shall provide or shall make provision for third parties to provide adequate facilities to enable the expedition clearance of interstate traffic and traffic in transit at their respective designated frontier points. Section 7 Article 21 states that the contracting parties undertake to expedite, within their territories, customs inspections, periods of compulsory stays in parking areas including periods of inspections of goods and documents.

Section 9 Article 36 (a) states that the contracting parties agreed that rail transport should be developed and that existing network rehabilitated, modernized and extended with the main objective of reducing transport costs and speeding up movement of cargo and providing competitive services, with private sectors participation and Section 9 Article 42 (a) states that the contracting parties undertake to apply the provisions of international regulations relating to the transport and storage of dangerous goods.

3.5.2 Common Market for Eastern and Southern Africa 1994

The Common Market for Eastern and Southern Africa (COMESA) is a free trade area, COMESA was formed in December 1994, replacing a Preferential Trade Area which had existed since 1981. The treaty was established 'as an organization of free independent sovereign states which have agreed to co-operate in developing their natural and human resources for the good of all their people'.

Article 4 Section 2(a) In the field of transport and communications member states should foster such co-operation among themselves as would facilitate the production of goods and facilitate trade

in goods and services and the movement of persons. Make regulations for facilitating transit trade within.

Section 11 Article 84 s on common transport and communication policies states that the Member States undertake to evolve coordinated and complementary transport and communications policies, to improve and expand the existing links and establish new ones as a means of furthering the physical cohesion of the Member States, so as to facilitate movement of inter-State traffic and to promote greater movement of persons, goods and services within the Common Market. To this end the Member States shall take all necessary steps to:

(i) Maintain, upgrade, and rehabilitate the roads, railways, airports and harbours in their territories.
(ii) Review and redesign their intermodal transport systems and develop new inter-territorial routes of the common market to link and to cater for the types of goods and services produced in the member states.
(iii) Maintain, expand and upgrade communications
(iv) Provide security and protection to transport systems to ensure the smooth movement of goods and persons within the Common Market.

Section 11 Article 86 (1) states that the Member States agree to the establishment of an efficient and coordinated railway services which would interlink Member States within the Common Market, the connection of different railway gauges and the construction of required additional railway links. Part 2 (C) states that the member state in whose territory's railway are operated shall, in particular adopt common safety rules, regulations and requirements with regard to signs, signals, rolling stock and the transport of dangerous substances.

Section 88 on Maritime Transport and ports part (k) states that the member states shall: install and maintain efficient cargo handling equipment, cargo storage facilities and general operations and train related manpower.

3.5.3 The East African Community 1999

The East African Community (EAC) is the regional intergovernmental organization. The Treaty for Establishment of the East African Community was signed on 30th November 1999 and entered into force on 7th July 2000, following its ratification by the Original 3 Partner States – Kenya, Uganda and Tanzania and it was later amended in 2006 and 2007.

Section 2 Article 2 (2) states that the Contracting Parties shall establish an East African Customs Union and a Common Market as transitional stages to and integral parts of the Community. Further Article 7 part 1 (c) states that there will be the establishment of an export-oriented economy for the Partner States in which there shall be free movement of goods, persons, labour, services, capital, information and technology.

Section 11 Article 89 of the treaty states that in order to promote the achievement of the objectives of the Community as set out in Article 5 of this Treaty, the Partner States undertake to evolve coordinated, harmonized and complementary transport and communications policies; improve and expand the existing transport and communication links; and establish new ones as a means of furthering the physical cohesion of the Partner States, so as to facilitate and promote the movement of traffic within the Community. To this end, the Partner States shall take steps, inter alia, to states.

Article 93 part (j) states that members shall agree to allocate space on board their ships for goods consigned to or from the territories of other Partner States; Article 94 part (b) install and maintain efficient cargo handling equipment, cargo storage facilities and general operations and train related manpower resources and where possible shall undertake these jointly; also part (g) states that members should agree to provide space without discrimination on board vessels registered in their territories for goods consigned to and from their territories;

Other treaties that govern trade in Kenya.

(i) Constitution of the Association of African Trade Promotion Organizations
(ii) World Trade Organization 1995
(iii) Agreement on Trade-related Investment Measures 1994
(iv) Agreement on Implementation of Article VII of The General Agreement On Tariffs And Trade 1994

Chapter 4: Baseline Conditions

4.1 Overview

The Naivasha ICD Project area is situated along the edge of Kedong Ranch between Mai Mahiu town to the north and Suswa Town on the south within the Rift Valley in Nakuru County, Kenya. The Project consists of a railway siding branching from the main Standard Gauge Railway (SGR) line approximately 80km from Nairobi and about 5km from Mai Mahiu SGR Railway Station. The project is accessed from Mai Mahiu – Narok Road (B3) through a 2.7km section of the existing earth surfaced Pipeline Road to be upgraded to Bitumen Road forms part of the ICD project. The ICD will constitute part of the proposed Naivasha Special Economic Zone.

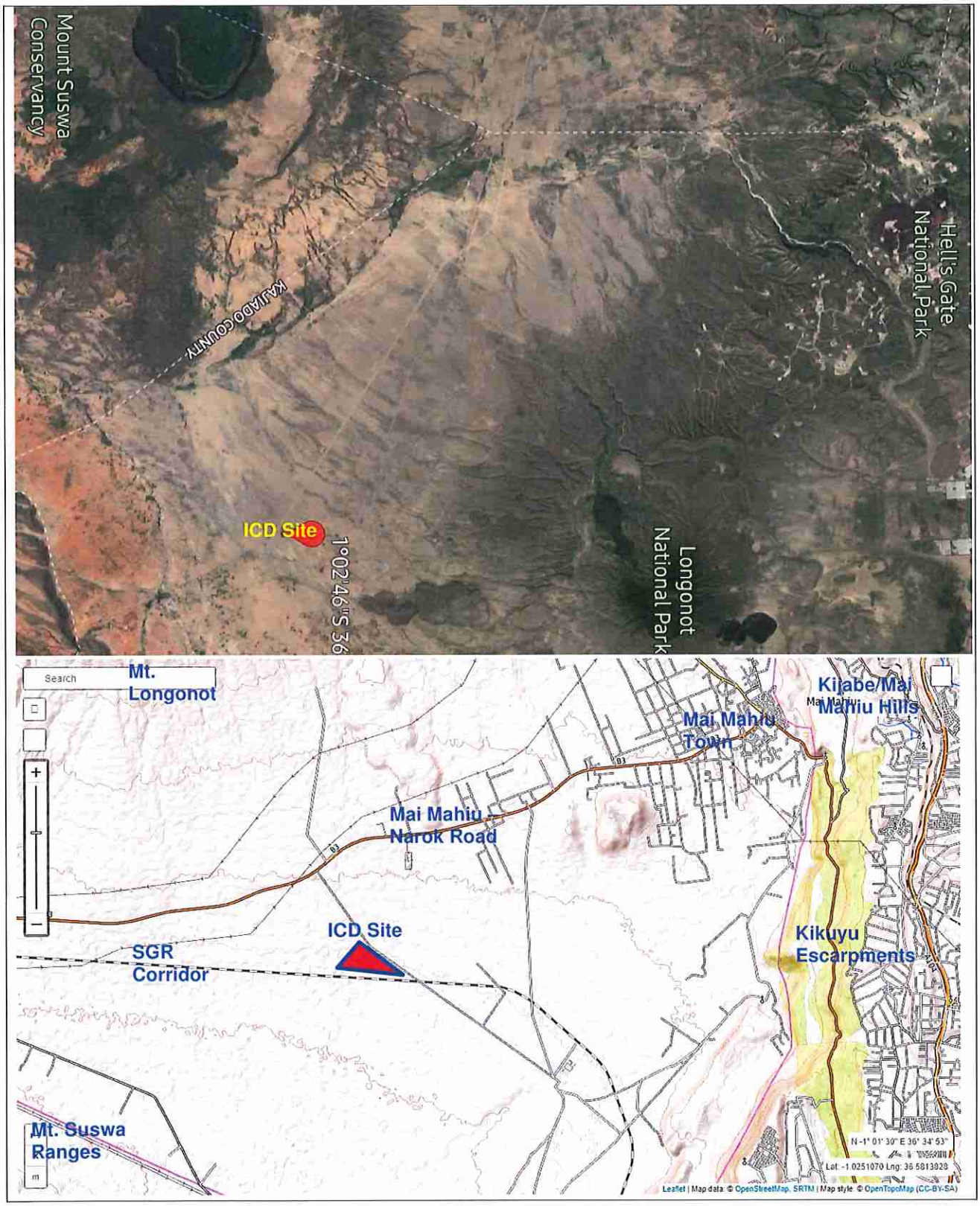
4.2 Topography

Kedong Ranch is located at an elevation of 1,638m above sea level and lies within the Rift Valley floor. The project area is mainly characterized by flat terrain with a general slight slope towards the southeast. The physiography is generally influenced by the highlands to the north (Mt. Longonot and the Kijabe hills) and west (the rift valley escarpment from Nachu and Kikuyu ranges). There are notable volcanic features with in the vicinity of the project area including Mt. Longonot to the north of the site and Mt. Suswa on the south of the project location.

Local social and economic activities such as mining and quarrying activities, have affected localized terrain outlook in the area with artificial depressions and ground cuttings. Disruption of surface drains by human activities including settlements and infrastructure (including the SGR) has led to channelized surface drain becoming deep gullies.

Figure 5: General Topography of Kedong Valley

Figure 6: Topography Influencing Features



4.3 Drainage and Hydrology

4.3.1 Drainage

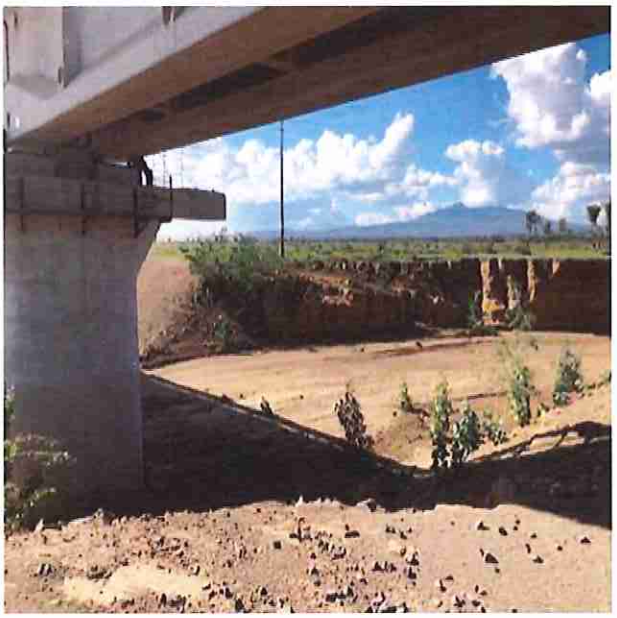
The drainage of the project area is influenced by the elevated catchments in the north and east of the site Mt. Longonot and the ranges spanning Mai Mahiu towards Kijabe and Kikuyu escarpments generates significant runoff that has to discharge to the south through project area. Due to the flat terrain, the natural drainage is generally sheet flow unless channelized in some areas. The un-loose cohesive nature of the top soils (comprising of volcanic ash), surface drainage is also improved due to the enhanced vertical infiltration. The Rift Valley, is a tectonic block that that also characterizes the geological feature of Central Eastern Africa. The Rift Valley system also has several faults with a variety of orientations that notable influences vertical drainage of the project area. The area, therefore, hardly experience flooding conditions.

Arising from the loose nature of the surface soils, heavy runoff has created various deep gullies running north – south. The situation in this regard is being enhanced as more social and economic activities increase in the area among the notable features being the SGR corridor, human settlements, institutional establishments and expanding market centres, extraction of construction materials. This is illustrated in the figure below.

Figure 7: Illustration of Drainage Characteristics

Typical Surface Drainage Channels. Note the Erosion Features due to Non-Cohesive Soils

One of SGR Culverts Targeted for Drainage Outfall from ICD



One of SGR Bridges in Proximity of the Site

4.3.2 Hydrology

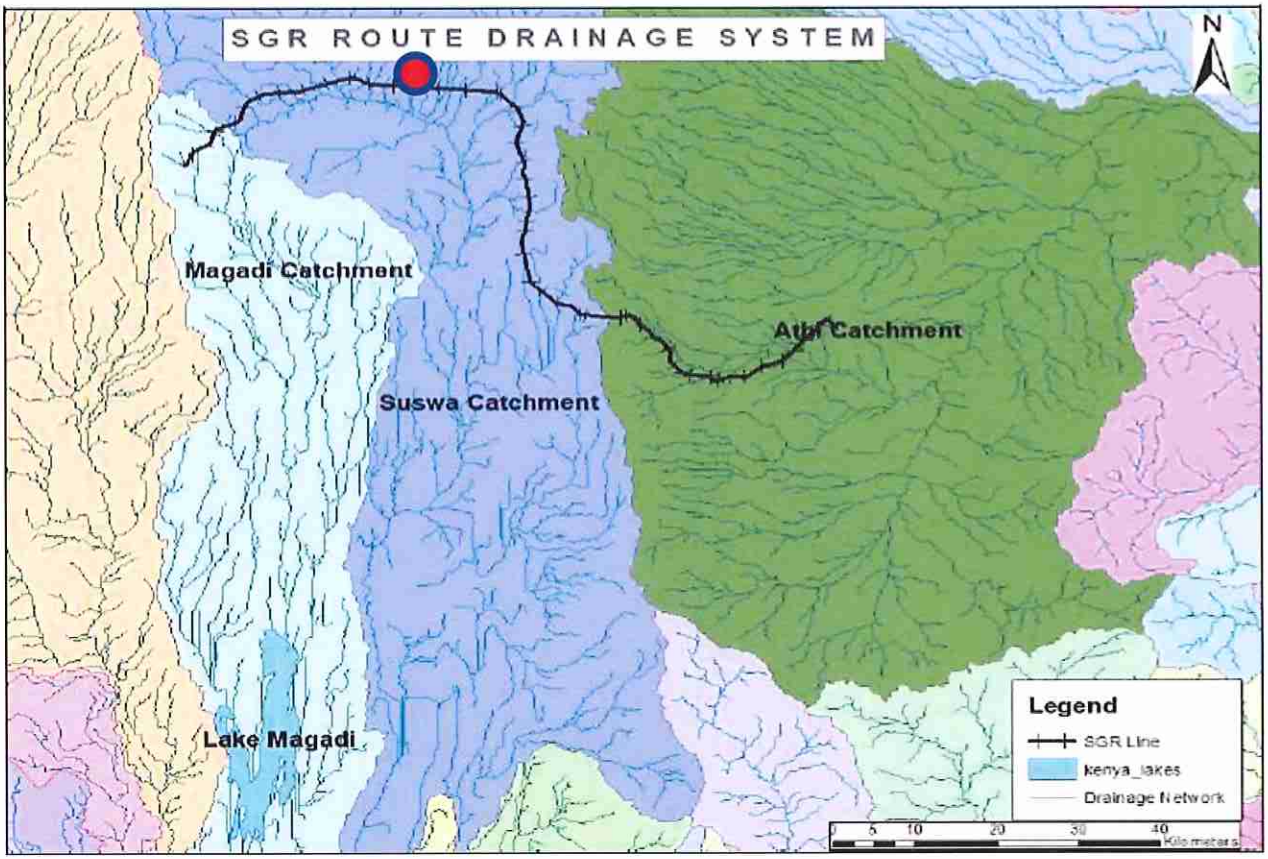
The project area lacks fresh surface water sources and is characterized by seasonal streams from the precipitation in the catchments. The catchment physiography influences two main drainage sub-basins namely Magadi Sub-Basin and Suswa Sub-Basin with the ICD project site situated on the latter with the characteristics below and also illustrated in the figure below.

Table 1: Flood Estimation for Suswa Sub-Basin Area

Suswa Sub-Basin Areas	Catchment Area (Km^2)	Stream Length (Km)	Channel Slope	Area Reduction Factor	Q2 (m^3/s)	Q5 (m^3/s)	Q10 (m^3/s)	Q25 (m^3/s)	Q50 (m^3/s)
1	10.82	6.39	0.003	0.93	7.54	15.19	21.92	32.55	46.35
2	7.49	5.5	0.007	0.94	5.77	.49	16.48	24.33	34.47
3	2.47	0.93	0.021	0.96	2.09	4.28	5.95	8.03	10.64
4	0.94	0.68	0.324	0.98	0.61	1.23	1.71	2.30	3.04
5	0.56	0.59	0.341	0.98	0.36	0.73	1.01	1.36	1.80
6	49.33	8.87	0.059	0.86	20.39	42.07	58.64	79.28	105.19
7	7.92	1.69	0.047	0.94	5.51	11.27	15.66	21.12	27.97
8	13.09	6.30	0.064	0.92	6.81	14.05	19.58	26.48	35.15

Source: Hydro-Geological Baseline Survey & Impact Assessment Report on the SGR Phase 2a Project (2018)

Figure 8: Hydrological System of the Project Area



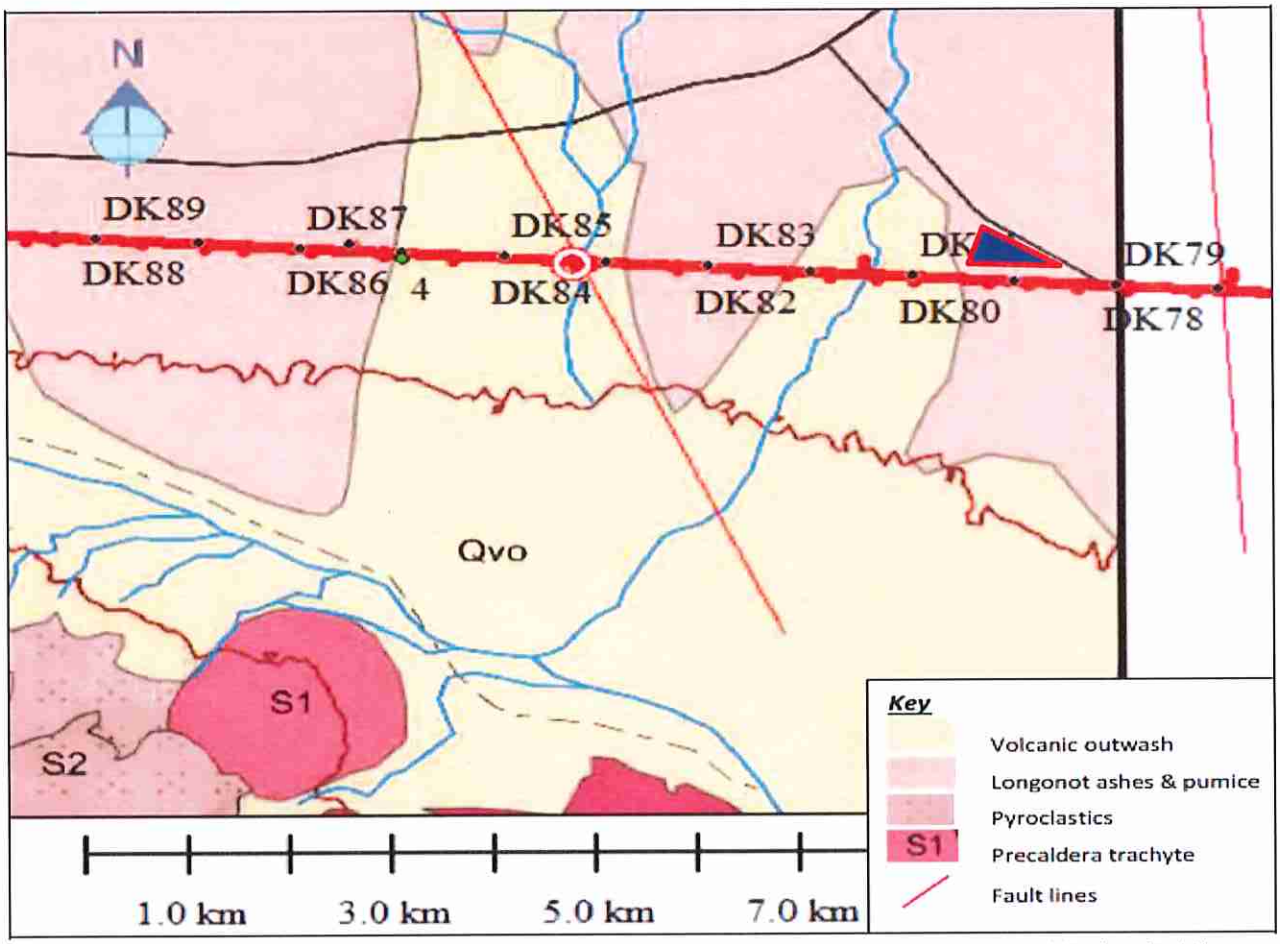
Source: Hydro-Geological Baseline Survey & Impact Assessment Report on the SGR Phase 2a Project (2018)

4.4 Geology and Soils

The Rift Valley is a major tectonic feature with notable seismic activity and some fault lines were observed to have opened up in the Mai Mahiu – Suswa region in late 2017. The rifting resulted to faults extending to the east, but it is difficult to determine the actual locations of the fault lines as they are well masked by material that has been eroded off the escarpments and showers of ash from the volcanic activities. Erosion of these ashes by surface runoff and percolating groundwater opens up these faults, causing raptures on the land surface. Two notable fault lines have been identified adjacent to the SGR corridor.

The ashes and pumice in this locality have been reworked into the Kedong sediments comprising of grey volcanic sand, reddish-brown clays and conglomerate. There is little grading in these sediments and it is assumed that they resulted from rapid deposition. The sediments are generally over 20 meters thick in this area. The lack of grading makes them especially susceptible to piping, tunnel erosion and sediment transport (Odero 2018). The top soils in the project areas are ashes and pumice influenced by the volcanic Mt. Longonot with the lower zones covered with the volcanic outwash. This is illustrated in the below Figure.

Figure 9: Geological Map of the Project Area



Source: Hydro-Geological Baseline Survey and Impact Assessment Report on the SGR Phase 2A Project (2018)

Figure 10: Illustration of Surface Geological Profile of the Area

4.5 Water Resources

The main sources of water for Nakuru County are surface water and ground water. Surface water is mainly sourced from permanent and seasonal rivers, dams, water pans. The major rivers are, Malewa, Nderit, Turasha (discharging into Lake Naivasha), Molo, Igwamiti, and Njoro (discharging into Lake Nakuru). Ground water is sourced from boreholes, springs and shallow wells. Water supplies are managed by various schemes which include public water companies, community water supply schemes and private water vendors. The Nakuru County Integrated Development Plan

estimates 63% of the population in Nakuru County have access to improved treated water which is either piped systems, rain water harvesting, boreholes, protected wells and springs.

Water resource management and regulatory services under the Water Resources Authority (WRA) and Rift Valley Water Works Development Agency respectively. Further there are three County owned water service providers namely, Naivasha Water Sewerage and Sanitation Co. Ltd (NAIVAWASS), Nakuru Water Sewerage and Sanitation Co. Ltd (NAWASSCO) and Nakuru Rural Water and Sanitation Co. Ltd. (NARUWASSCO). Other water supply schemes are managed by the community through their selected representatives (Nakuru County Integrated Development Plan (2018 – 2022).

Rift Valley Waterworks Development Agency plans to undertake a Sh1.2 Billion project to supply water at the proposed Naivasha Industrial Park. The water treatment project is to be located in Naivasha town and will pump upto 8 million litres of water daily to the proposed Naivasha Special Economic Zone (where the Naivasha ICD is also located.

4.6 Ecological Setting

According to Ojwang' et al (2017), Kedong Ranch forms part of the southern portion of the Greater Lakes Nakuru, Elmentaita, Naivasha and Eburu Forest Ecosystem. There are established conservancies in the area of Kedong Ranch (and vicinity of Naivasha ICD) which include Akira Ranch, Kedong Ewaso and Mt. Suswa Conservancies. The ecological species found in this area are influenced by the adjoining ecosystems including the Lake Nakuru National Park, Hells Gate Reserve, Mt. Longonot Park and the Masai Mara National Reserve. These have been identified at the national level as areas of ecological significance.

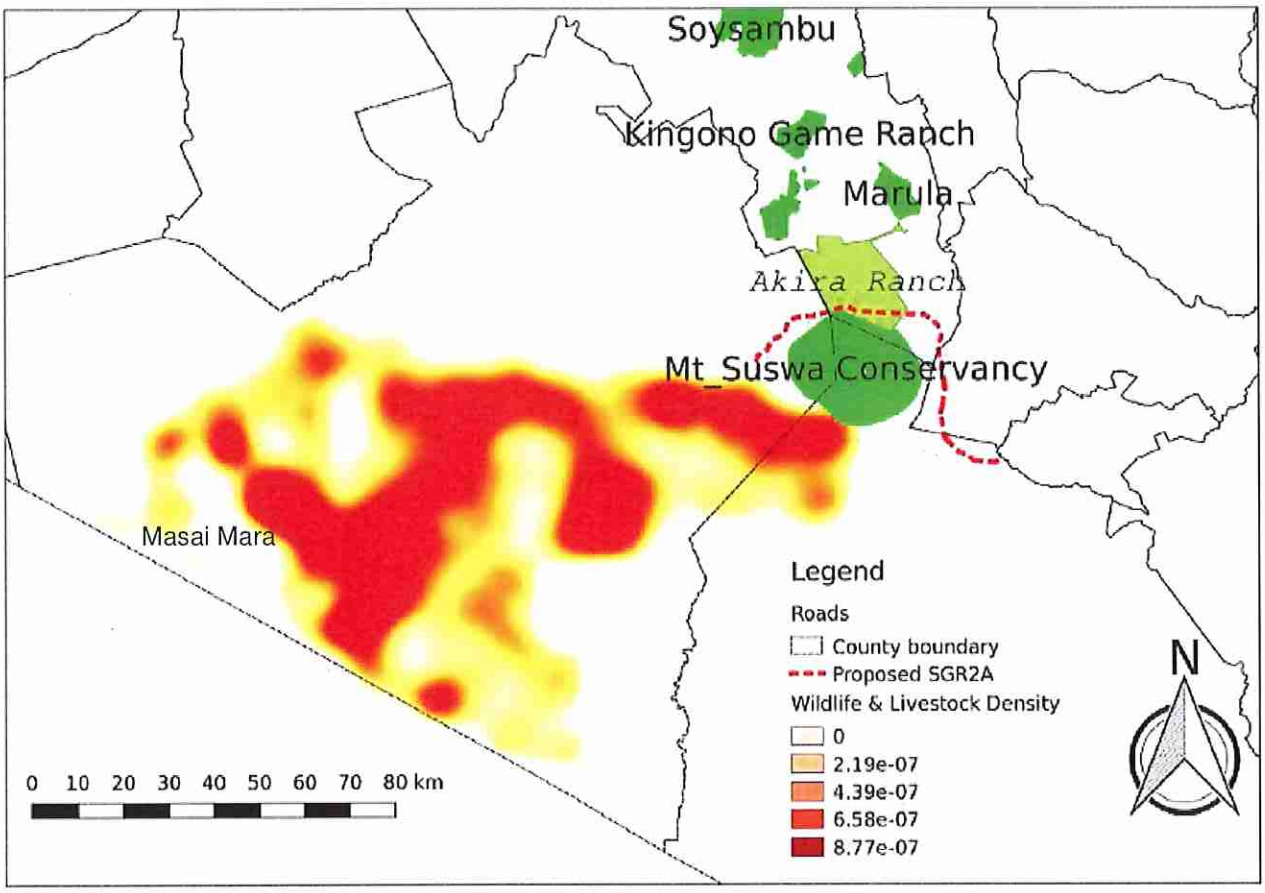
The current ecological outlook of the project is described in the following sub-sections.

4.6.1 Fauna

Kedong Ranch which is divided into Kedong Longonot and Kedong Akira sections hosts a number of wildlife species including zebra, giraffe, impalas, kongoni and waterbuck amongst others. Buffaloes are mainly found in the Kedong Longonot section. The adjacent Mt. Suswa Conservancy is also characterized by a number of wildlife species such as zebra, giraffes, buffalo, thomson gazelle, grant's gazelle as well as some canine species such as leopard and hyena.

It has been observed that in order to sustain the wildlife population and movement in and out of Hell's Gate National Park, Mt. Longonot National Park and the other neighbouring ranches and conservancies, it will be necessary to keep the Kedong Ranch ecosystem open for wildlife dispersal to the extent possible. The 2017 Masai Mara Aerial Census illustrates that wildlife densities are decreasing westwards of Kedong Valley, the area close to the Naivasha ICD project site with livestock grazing taking over.

Figure 11: Density Distribution of Wildlife and Livestock (2017)



4.6.2 Flora

Vegetation in Kedong Valley is characterized by open bushland, shrublands and scattered arbor dominated by Acacia drepanolobium, Commiphora africana, Tarconanthus camporatus, Acacia

mellifera, Acacia seyal, Combretum spp, Ficus lutea and Acacia xanthophloea in the riverine environments. The grass species include Cynadon dactylon, Digitaria scalarum, Themeda triandra and Eragrostis tenuifolia (Muteti et al., 2017).

Figure 12: Typical Vegetation Cover around the Site Location

4.7 Waste Management

According to the Nakuru County Integrated Development Plan (2018 – 2022), there are three County designated solid waste disposal sites situated in Naivasha, Nakuru and Mai Mahiu towns. These sites are few and do not meet the ever-growing needs of the county's population. The County Government plans to manage solid waste through rehabilitation of the existing disposal sites, acquisition of land for transfer stations, landfills and new dumpsites. Sewage management in the county is as well limited, with 76.9% of households disposing human waste through pit latrine, and only 15.3% (located mostly in Nakuru and Naivasha Town) are connected to the main sewer.

Therefore, to ease pressure on the existing County waste management systems, the Naivasha ICD facility will require to establish its own waste management system for solids, sewage and other effluence in line with the guidelines outlined in the enclosed EMP of this ESIA. Due to the nature of ICD operations, special waste handling system for toxic and hazardous waste will as well need to be incorporated. Establishment of appropriate waste management system should be done in consultation with the Nakuru County Government, and other relevant stakeholders.

4.8 Climatic Conditions

Equatorial climate prevails in Kenya, with distinct rainfall patterns and slight temperature variations throughout the year that vary with altitude. Wet, rainy seasons are experienced from April to June ('short' rains) and from October to November ('long' rains), with the other months characterized as dry seasons. From December – March, northeast wind prevails and the weather is clear and warm;

whereas from June to October, southeast humid monsoon wind prevails and the weather is usually dark and cloudy. In the Rift Valley, average temperatures decrease from about 29°C in the north to just over 16°C around Lakes Nakuru and Naivasha in the south. The floor of the Rift Valley is generally dry, while the highland areas receive more than 760mm of rain per year.

In relation to the Naivasha ICD project, the following Table illustrates the average climatic conditions experienced in the Kedong Valley area of the Rift Valley as compiled by Qiwei (2017) using the Transport Road and Rail Laboratory East Africa Hydrological Model.

Table 2: Climatic Conditions for Kedong Valley

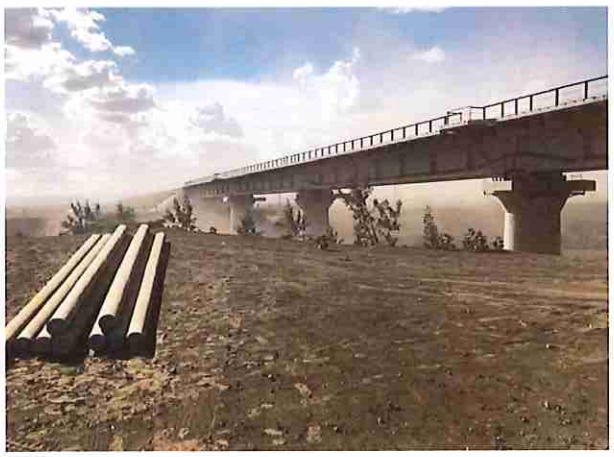
Kedong Valley (Rift Valley)	Precipitation (mm)	Maximum	1,400mm
		Minimum	800mm
	Evaporation Capacity (mm)	Maximum	2,200mm
		Minimum	1,450mm
	Temperature (°C)	Maximum	20°C – 22°C
		Minimum	8°C – 10°C
		Average	14°C – 16°C

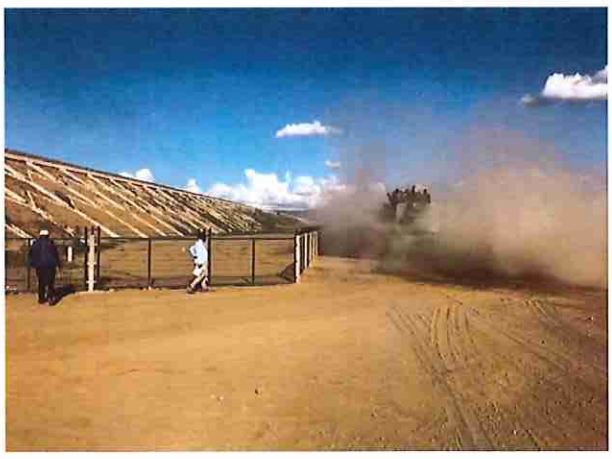
Source: Qiwei (2017)

4.9 Air Quality

Emissions and pollutants are very minimal in the project area as it is sparsely settled with majority of the area being natural ground. There is as well limited motorized transport utilized in the area, mainly motorbikes and some trucks used by sand harvesters, as most of the residents rely on non-motorized transport (on-foot, donkey cart, and bicycle). However, the air is rampant with thick, natural dust due to the prevailing winds blowing up the loose, ashy volcanic soil. In addition, anthropogenic and fauna movements, and mining and quarrying activities in Kedong Ranch, lead to dust build-up in the air.

Figure 13: Dust Build-up near the Project Area





Chapter 5: Social and Economic Baseline

5.1 Administrative Setting

Administratively Nakuru county is divided into nine sub-counties namely; Naivasha, Gilgil, Nakuru, Rongai, Nakuru North, Subukia, Njoro, Molo and Kuresoi. These are further sub-Divided into 31No. administrative divisions, 106No. Locations and 219No. Sub-Locations. Politically, Nakuru County is divided into 11No. constituencies and 55No. electoral wards. The project is located in Satellite Sub-Location, Maai Mahiu Ward/Location, Naivasha Constituency, Naivasha Sub-County, Nakuru County. The ICD project is largely situated in Kedong Ranch which is in between Maai Mahiu and Suswa Townships. The Project site is accessed through a branch road from Maai Mahiu – Narok B3 road which service the existing Kenya Pipeline Company (KPC) pumping station No. 22.

5.2 Population

According to 2019 Kenya Population and Housing Census Nakuru County with a total population of 2,162,202 million, comprising of 1,077,272 males and 1,084,835 females. The county covers an area of 7,462.4km^2, with a population density of 290 persons/km^2 and annual growth rate of 3.05%. The population is estimated to increase to 2.4 million by 2022.

Naivasha Sub-County where the project is located with a total population of 355,383 which comprising of 179,222 males, 176,132 females, with an area of 1,958.4km^2 and a density of 17 persons/km^2. Large populations densities are concentrated near town center's such as Naivasha, Mai-Mahiu and Suswa among others which can be attributed due to improved access roads, business opportunities, employment as well as proximity to shopping and commercial centers. While small population densities are found in area such as Satellite sub-location with a total of 10,013 people as shown in the table below.

Table 3: Population Trends by Administrative Locations

Administrative Area	Name	Total Population	Male	Female	Density (Persons per Km^2)	Households
Sub-County	Naivasha	355,383	179,222	176,132	181	111,493
Location	Maai-Mahiu	48,245	24,415	23,824	109	13,788
Sub-location	Kijabe	38,232	19,044	19,182	358	11,881
	Satelite	10,013	5,371	4,642	30	1,907

Source: KNBS (2019)

5.3 Settlement Patterns and Housing Characteristics

Human settlement in Naivasha sub-county is mainly influenced by development of urban areas with high clustered settlement found near urban towns such as Maai-Mahiu, and Suswa towns. Along the commercial centers, people are attracted by availability of employment and provision of basic amenities.

In the project area, settlement patterns are concentrated at the commercial centers but sparsely distributed as you move away from the centers. This can also be attributed to land tenure around the project area which is characterized by land owners who do not live in the area as well as ranching in the area. Establishment of Inland Container depot and related transportation hub infrastructures are likely to make the land in the nearby area desirable attracting human settlement in the area in the long run.

The housing structures in the area consist of sparsely distributed Manyattas made of cow dung/mud-walled and grass-thatched type attributed to the community`s cultural way of construction as well as houses largely made of iron sheets walls. Permanent houses are also visible especially in areas under small scale farming. It is important to note that availability of materials, costs, weather and cultural conditions have a major influence on the type of materials used.

5.4 Land Ownership and Land Use

Land ownership in the project area is largely ancestral acquired through inheritance while others acquired the land by buying from the original owners. Most of the land parcels are private, individually and scheme owned with title deeds and other documentations as a proof of ownership. For the locals living around the project area, their social - economic activities and livelihoods largely depends on land which further influence their social-Economic aspects. The ICD-Naivasha project is located entirely within Kedong ranch owned by Kedong Ranch Holding

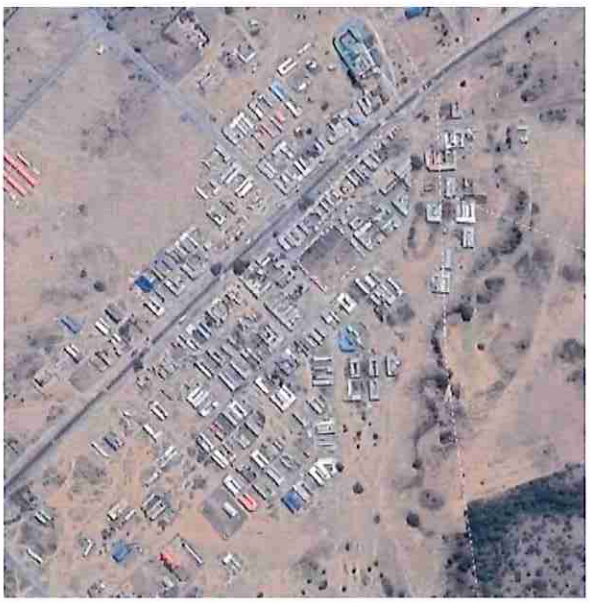
The area around the ICD Naivasha Project mainly falls under small scale agriculture and ranching. The agricultural activities in the area consist of subsistence farming of crops such as legumes, maize and potatoes among others. Large portions of land around the project area are not utilized making them prime grazing areas for pastoralist community around the area. Kedong ranch is mainly used for wildlife conservancy as it falls within key dispersal area for Hells gate, Mt. Longonot and Mt. Suswa conservancy.

The Land use types and ownership in the project area could be summarized as follows: -

(i) Grazing grounds mainly for the pastoralists
(ii) Large farms and ranches such as Kedong and Utheri wa Lari that are privately and individually owned respectively
(iii) Institutions such as Kenya Pipeline Cooperation
(iv) Government land

Figure 14: Mixed Urban and Commercial in Mai Mahiu and Suswa Markets

Mai Mahiu Town



Suswa Market

5.5 Labour Force

The active labor force is between 18 and 60 years as per the universal standards, who are actively engaged in the productive activities. The youth between the ages of 23 and 35 years who are the majority of the residents lack the necessary skills for meaningful employment or capital to start their own businesses, therefore experiencing high levels of unemployment or underemployment.

In the project area, the men attend to their livestock and a small number of the resident's work in their small parcels of land, while others are employed in the local formal and informal businesses. Majority of the youths in the area work as casual laborers mainly in sand harvesting and quarries which is rampant in the area. Employment opportunities in the project area are limited, with many young people seeking for employment opportunities within Naivasha, Suswa and Mai Mahiu towns.

5.6 Economic Activities

5.6.1 Agriculture

According to the Nakuru County Integrated Development Plan (2018 – 2022), approximately 70% of total area of Nakuru County is agriculturally productive with majority of the households in the county depending on agriculture as their main economic activity. However, the project site is located in an area with small scale agricultural activities due to the fact that the area is entirely under ranching and therefore very few people have settled in the area.

The agricultural activities in the area consist of subsistence farming of crops such as legumes, maize and potatoes among others. The Maasai community which dominate the area rarely practice crop farming and hence minimal farming in the area.

5.6.2 Livestock Keeping

Nakuru County is also known for its high capacity of livestock production for dairy and meat. The main livestock reared around the project area include cattle, sheep and goats. Most of the livestock keepers in the area sell their animals in the nearby Suswa and Ewuaso livestock markets. The livestock markets have a large customer base from nearby towns and neighboring counties such as Narok, Kajiado, Kiambu and also Nairobi. These livestock markets are further complimented by the availability of abattoir at Suswa market which also serve meat traders from as far as Nairobi and Naivasha town.

5.6.3 Quarrying and Sand Harvesting

Sand harvesting and quarrying is rampant around the project area as witnessed by the availability of many sand harvesters and quarry sites. This kind of mining is a major source of employment for many youths especially from nearby towns such as Mai Mahiu and Suswa.

Rapid growth of construction industry and residential development in nearby counties such Kiambu, Narok and Nairobi among others has led to the increased demand for building materials such as sand and ballast which are sourced around the project area.

Land degradation in the area has been attributed to uncontrolled and unsustainable sand harvesting and quarrying activities with the impacts resulting to siltation witnessed in far areas downstream which has affected natural resources such as Lake Magadi.

5.6.4 Tourism

Nakuru County is one of the counties with a variety of tourist attraction sites and related activities in the country that include Nakuru National Park, Hells Gate, Lake Naivasha, Mt. Longonot as well as the Conservancy Ranches namely Kendong Ranch, Kingomo Game Ranch, Marula Ranch, Akira Ranch and Mt. Suswa Ranch. The project area is also along the access road towards the world famous Masai Mara National Reserve in Narok County.

5.6.5 Trade and Finance

The project area is characterized by various types of trading activities as well as availability of financial institutions ranging from banks to micro finance institutions. The trading activities consist of wholesale, retail as well as hawking. Wholesale trading is mainly found in the nearby towns of Mai Mahiu and Suswa which also host various retail outlets such as shops, kiosks, canteens, hawking and fruit vendors among others.

The project area is also host to open air markets which are located in Suswa and Maai Mahiu area. Suswa town is one of the major markets that is accessed by the residents around the project area. In Suswa town trading activities consist of retail shops, motorcycle business (Boda Boda), hoteliers and nyama choma eateries among others. Trade in Suswa market mainly takes place during the open market days such as Wednesday and Saturday with primary commodities on sale being livestock such as cattle, goats and sheep, food stuff such as potatoes, maize, beans and different vegetables, housewares and clothes.

The Project area is also well served by financial institutions such as commercial banks and microfinance institutions, which provide financial services to the residents. Most of the major commercial banks are located in nearby towns such as Maai Mahiu and Naivasha. The availability of mobile banking services in townships such as Suswa, Duka Moja and Maai Mahiu markets (and Narok Town) has further improved financial services in the area.

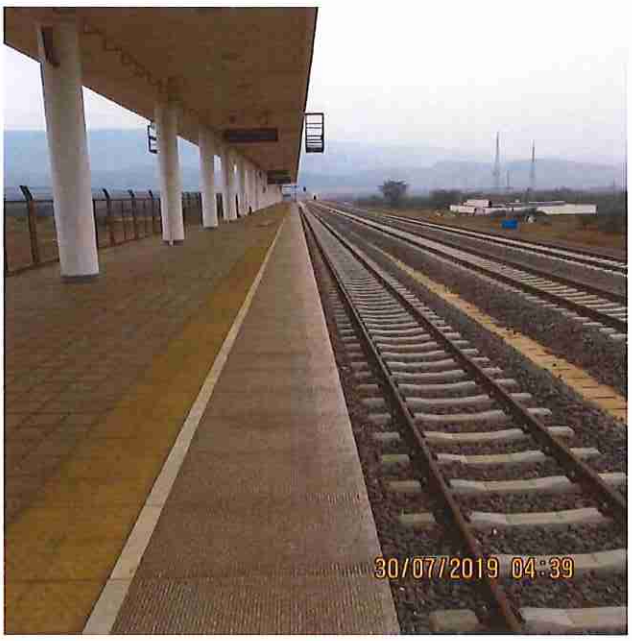
The ICD and indeed the large Naivasha Special Economic Zone will have a high potential to attract and influence new economic activities in the immediate surroundings and the nearby markets as well as other driving factors including tourist attractions, institutional development and other transit functions requiring mega support and transport.

5.6.6 Transport

The project area can be accessed by various modes of transport such as road and railway. The Project site is easily accessed through a branch road from Mai Mahiu – Narok B3 road which service the existing Kenya Pipeline Company (KPA) pumping station No. 22. Use of motorcycles (Boda Bodas) and personal cars is rampant in the area which enables the locals to access areas with poor road network near the project area and hinterland.

The newly completed Nairobi – Naivasha Standard Gauge Railway (SGR) passes on the edge of the project area with passenger stations located at Mai Mahiu and Suswa. Railway sidings will be laid from the main Nairobi – Naivasha SGR line to enable delivery of cargo into the ICD Naivasha. This is one of the driving factors for the location of the ICD and the overall Naivasha Special Economic Zone.

Figure 15: Maai Mahiu Station near the ICD Location



5.7 Social Welfare Indicators

5.7.1 Education

Nakuru County is an important educational Centre. It is the home of Egerton University, a large public university situated near Njoro town, Kabarak University (a private university), Rift Valley Institute of Technology, Kenya Industrial Training Institute (KITI) and many other institutions of higher learning.

Education is one of the key development agendas in the county and is also in the county and constituency. The project area interacts directly and indirectly with schools as a number of them are in close proximity to the ICD like Nyakinyua which has a total of 400 students, while others area further away but will be influenced in one way or the other by the ICD. The children have to walk long distances to go to school while others use transport means. The project site falls within one of the routes that some of the children pass on their way to and from school.

5.7.2 Health

There are about 459No. health facilities spread across Nakuru County. The County has one level 5 hospitals which is Nakuru Provincial General Hospital (PGH) that serves Nakuru, Baringo, Nyandarua and Laikipia counties. There are 14No. level 4No. hospitals, 22No. health centers, 187No. dispensaries and 249No. community units offering level-one health services. The total establishment of health personnel is about 2,486. Major cases are referred to Naivasha Sub-County Hospital and Nakuru Level Five Hospital. The five most common diseases in the county are; upper respiratory infection with a prevalence rate of 12%, skin diseases 7%, and diarrheal diseases 4%.

Key health facilities in the project area are situated in Mai Mahiu and Suswa markets while hospitals are in Naivasha and Narok Towns. Private medical facilities are also found in the urban centres and this includes the common dispensing pharmacies and chemists for easy access to the residents.

5.7.3 Sanitation and Hygiene

Waste management remains one of the critical development challenges in Nakuru County. According to a research done by Nakuru County Public Health department, it was reported that by the year 2019 at least 80% of the population has a pit latrine. This was achieved through community led total sanitation spirited campaign which was aimed at eradicating open defecation.

Waste management in nearby towns of Mai Mahiu and Suswa is inadequate with sewer connectivity only limited to the major town of Naivasha. Use of Septic tanks is the main method of sanitation especially in Mai Mahiu town. Majority of the households in the project area are not served with water sanitation systems such as piped water with majority of the residents relying on the use of pit latrines. This has resulted to sanitation and hygiene related diseases such as typhoid; diarrhea and cholera which are prevalent in the area. Animal waste in the project area is used as manure and also for the construction of manyattas.

5.7.4 Energy

According to Nakuru CIDP 2018 – 2022, electricity is the main source of energy for lighting in Nakuru County at 55% coverage, whereas firewood and charcoal are the major sources of cooking energy at about 42% and 30%. The main source of energy in the project area is electricity especially households in the urban towns of Suswa and Mai Mahiu. There is also dependency on other source of energy including firewood and kerosene for cooking and lighting especially in the temporally settlements. LPG is commonly used by majority of the businesses and residents in the urban towns around the project area due to ease of accessibility.

5.8 Cross Cutting Issues

5.8.1 Gender

Within the project area, there are a number of gender related challenges including inadequate access to credit, lack of technical skills, and multiplicity of roles for women and inadequate access to education and training. These disadvantages are however constantly being fought by the government and NGOs. The traditional delineation of labor persists with women assuming the entire responsibility for childcare, provision of food, water and firewood collection and the general maintenance of the homestead among others. The key gender issues in the project area include inadequate representation of women at all levels, prevalence of harmful cultural practices such as early and forced marriages for girls, wife inheritance, bias in employment, which tends to favor males and disallowance of women to own property especially the ancestral land.

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

5.8.2 HIV and AIDS

HIV/AIDS is a major social-economic challenge in Nakuru County and by the end of 2017 the County HIV prevalence rate was 3.4% with a total of 49,575 persons living with HIV (PLWHIV).This placed the county as one of the 20th counties that contribute to the overall HIV incidence in Kenya, with a total of 1,186 new infections by the end of 2017. Children with HIV/AIDS constitute of about 7.1% of those living with HIV and 374 new infections among the young adults. HIV/AIDS prevalence rate among Women stood at 4.8% compared to Men at 2.9%, thus indicating that women were more vulnerable to HIV infections than Men. While in Naivasha constituency HIV/AIDS prevalence rate stood at 3.8%

It is a government requirement for all projects to incorporate HIV/AIDS interventions or programs and to engage the community order to ensure zero increase. In the project area HIV/AIDS prevalence can be attributed to.

(i) High truckers at night who indulge themselves into sexual activities,
(ii) Engagement in unsafe sex practices and ignorance on HIV/AIDS information,
(iii) Lack of employment among the youth, which result to drug abuse later engage in unsafe sex practices,
(iv) Rural- urban migration which has forced families to live apart, among others

5.8.3 Poverty and Income

In Kenya, the poverty line is estimated at 2,648 Kenya shillings per adult per month for urban households (CBS, 2005). The most vulnerable groups include the unemployed youth, women, persons with disabilities, female and child headed households, and the aged, street families/children, displaced persons and HIV/AIDS orphans.

The major cause of poverty in the project area is illiteracy and the high rate of school dropout. Young girls are often forced into early marriages and denied access to education. Other causes include frequent droughts that wipe out large herds of domestic livestock, HIV/AIDs, poor road infrastructure, acute water shortages and pressure on land.

5.8.4 Culture

The project is located in a cosmopolitan area which is reflected by the diversity in ethnic composition and multiple cultural orientations originating from all parts of the country. Majority of the people speak Swahili and English, in addition to their ethnic/tribal language. Mixed cultural practices have eroded due to intermarriages and social interactions among the residents. A number of original ethnic cultural practices have been dropped by many of the residents in preference to the urban and modern cultural practices. Majority of the residents are Christians with a few others belonging to other religious faiths like Islam.

5.8.5 Noise and Vibrations

There is minimal occurrence of noise and vibration in the Project area, which is mainly attributed to natural causes such as, animal movements and noises, wind, and at times tectonic movement and seismic activity. The area is sparsely settled and anthropogenic noise and vibration may occur from the limited use of motorised transport, and some mining and quarrying activities in Kedong Ranch.

Chapter 6: Stakeholders Consultations

6.1 Overview

It is mandatory under the EMCA, 1999 (Amendments 2015) that all environmental assessment process in Kenya incorporate Public Consultation to ensure that all stakeholder interests are identified and incorporated in project development, implementation and operation. Of necessity, stakeholder consultations should take place alongside project design and implementation to ensure that the project puts in place measures to cater for stakeholder concerns in all project phases. The core stakeholders comprised people to be directly impacted by the proposed project as well as the residents along the project neighbourhood, institution administration, leaders and government administrators, and the political leadership among others.

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

The consultant intended to engage the participants and key informants through the project design; environmental and social issues, expected impacts and proposed mitigation measures. Thereafter, they were to identify their fundamental concerns and suggestions. A structured questionnaire was also issued for the participants to give their views and opinions towards ensuring the project poses as low impacts as possible to the people and their surroundings while indicating desired benefits.

6.2 Interviews with Key Informants

The key informants were identified and meetings scheduled. Their opinion in regard to the project design, impacts and on the proposed mitigation measures were sought. Key informants were issued with the structured questionnaires in order to document their opinions and they can be category as follows: -

(i) Project area residents and opinion leaders,
(ii) Institutional administrators or leadership, churches, health facilities and local schools
(iii) Government agencies including KWS, KPC and KeNHA
(iv) Service providers
(v) Neighbouring landowners including Ranch Owners

6.3 Public Consultative Meeting

During the various consultative and engagement meeting, the project design, and environmental and social impacts were disclosed to the community. Emphases were put on the negative environmental and socioeconomic impact in relation to the project. The client would be present to clarify on issues raised by the members of the public in relation to the project design. The meetings were done at various date as different stakeholders were engaged at different venues or locations as summarized below: -

(i) Engagement with local leadership and the administrators, especially the ministry of interior and coordination of national government, the local MP's office and the MCA in the project area,
(ii) Engagement with members of the public, opinion leaders and local institution administrators within the project area,
(iii) Engagement with Conservancies operating in the project region and more so Kendong Conservancy.
(iv) The Standard Gauge Railway Operator

6.4 Public and Stakeholders Concerns and Opinions

The following would form the basic outline brief from the Stakeholders and Public Consultations

(i) Environmental Concerns
(ii) Socio-Economic Concerns
(iii) Safety and Security
(iv) Design Concerns
(v) Project Implementation and Operation Concerns

For the Attention of NEMA:

Due to the prevailing controlled movements and assembly of people conditions in Kenya arising from COVID 19 management, stakeholders and public consultation forums could not be undertaken for this study. We seek guidance in the ESIA Study Report process under the prevailing circumstances.

Kenya Railways Corporation
China Communications Construction Company (CCCC)
The Consultant

Chapter 7: Anticipated Impacts and Mitigation Measures

7.1 Project Linkages

Nakuru County and its surroundings are characterized with high economic activities including horticulture, floriculture, dairy farming, tourism and general agriculture. This economic setting justifies the proposed ICD facility development as a component of the larger Naivasha Special Economic Zone. This implies the benefits will not only focus on Nakuru County but the larger Rift Valley, Western Kenya and the neighbouring Sates (Uganda, Rwanda, Burundi and Southern Sudan). The project, however, will also impart negative impacts that will require to be addressed through the construction and operation phases. The positive and negative impacts may be viewed from the environment, social and economic perspectives as outlined in the following sub-sections.

7.2 Environmental Linkages

The ICD development works has notable environmental linkages to environment arising from the physical location as a transition from the Rift Valley eastern highlands and the low-lying rift valley plains and conservation areas. This, therefore, requires an integrated and collaborative approach to the works planning to ensure minimal conflicts with environment. Among the key environmental and ecological aspects likely to be affected by the project works include:

(i) Loss of vegetation cover (grass and acacia trees),
(ii) Disruption of surface drainage system from the catchment and downstream outfalls channels during and after the construction works,
(iii) Waste disposal plans during construction including spoil dumping, dry vegetation matter, construction debris and hydrocarbon residuals,
(iv) Sharing of services and amenities with the neighbouring communities including water supply, power supply and access roads during the construction period and post construction phases arising from additional demand for the facility,
(v) Sensitive environmental areas including wildlife migratory areas and habitats,
(vi) Conflicts at the construction materials sources (damages top access roads, road safety, dust generation, noise and vibrations, land degradation, etc.),

Other environmental linkages include:

(i) Scrap oil and grease at workshops and parking areas,
(ii) Energy sources and management during and post construction phases,
(iii) Effects of increased traffic at the project site during construction and post construction
(iv) Ecological implications from wildlife movements and characteristics
(v) Drainage characteristics and interactions

7.3 Social-Economic Linkages

Among the socio-economic aspects observed include;

(i) The ICD development will attract human population through provision of labour and supply of goods and services.
(ii) The anticipated increase population in the area will exert pressure on the immediate natural resources and infrastructure,
(iii) Potential for disruption of public services and amenities including access roads, water sources and power supply,
(iv) Increased demand for accommodation provisions especially Mai Mahiu and Suswa towns.
(v) Potential high risks to safety and health arising for higher levels of noise and vibrations, dust and emissions as well as security aspects.

7.4 Land Use Linkages

There are potential land use conflicts of the ICD operations with the immediate land use activities including the emergent human settlements. The issues would include the following;

(i) Effects of ICD operations including noise and vibrations, emissions and anxiety of other risk factors will pose a challenge to the land users,
(ii) There is potential emergence of mixed land use practices influenced by the ICD operations and also by the larger Naivasha Special Economic Zone including uncontrolled expansion of Maai Mahiu Town and Suswa Market and the section between them and beyond,
(iii) Land under conservation purposes in the surrounding areas hosting limited wildlife and livestock will be affected by the development and associated emergent social and economic activities,
(iv) The operations of the ICD and the larger Naivasha Special Economic Zone will be industrial by nature and may have implications on other external land use activities such as settlements, institutional premises, religious premises and health facilities especially with regard to pollution and other implications.

7.5 Key Impact Factors

In view of then above observations, the study will focus on the following key impact factors among others;

(i) The extent of vegetation losses and associated secondary implications in and around the ICD project areas,
(ii) Implications of the development to the surface drainage systems and measures necessary for mitigation,
(iii) Potential interactions with the limited wildlife species that may migrate into the project areas and collaborate with relevant authorities in drawing appropriate mitigation measures
(iv) The influence of the ICD development and operations in land use changes including commercial, settlements, institutional and other potential activities. Appropriate collaborative interventions will be developed for adoption by the relevant agencies,

(v) Establish potential pressure and intervention actions in natural resources in and around the ICD including land, water, energy sources as well as human workforce.
(vi) The role of the ICD development and operations in environmental conservation of the larger areas as well as enhancing social integrity of the communities living in the areas, including the workers serving in the facility.

7.6 Positive Impacts

The proposed Inland Container Depot project development will have benefits to the general socio-economic and environment of Naivasha Sub-County and its neighbouring Counties. Positive impacts will be realized during both construction and operation phases. Some of the positive impacts to the proposed project development are highlighted hereunder:

7.6.1 Construction Phase

Positive impacts that shall be specific to the construction phase include the following:

(i) The communities will get employment opportunities to the project development improving their income and also enhancing ownership of the ICD and subsequent operations. It is expected that upto 60% of the labour force during construction will be drawn locally while indirect employment will also be quantified progressively,
(ii) Poverty reduction and improvement of livelihoods through increased disposable incomes realized from employment opportunities,
(iii) Land owners in the County and the adjacent areas will get an opportunity to supply construction materials directly or indirectly adding to the economic value,
(iv) Demand for housing facilities, food supply, fuel, recreation and other requirements by the labour force will translate to economic benefits to the local investors and landowners.,
(v) Construction material dealers shall have ready market for their products
(vi) The neighbouring towns (Suswa and Mai-Mahiu) shall benefit economically due to the market expanded by the construction workers for goods and services such as food, personal effects, housing and other construction requirements such as fuels,
(vii) Increased revenue for the government through payments of taxes, permits and licenses
(viii) Transfer of knowledge and skills to the community you through direct and indirect employment

7.6.2 Operational Phase

The positive impacts that are anticipated from the operations of the ICD include the following:

(i) The ICD operations will greatly improve the cargo handling especially efficiency and cost of cargo transfer to western Kenya and neighbouring countries including Uganda, Rwanda, Southern Sudan and Burundi,
(ii) ICD Naivasha is expected to contribute in decongesting the ICD Mombasa and Nairobi ICD,

(iii) The Standard Gauge Railway (SGR) linking the ICD yard and Mombasa through Nairobi is an important facilitating infrastructure for efficiency of ICD Naivasha. This is especially in terms of collection of produce from the production areas of Rift Valley,
(iv) Improved trade among East African countries through timely delivery of goods and improved customer clearance services,
(v) Employment opportunities for skilled, semi-skilled and unskilled labour force anticipated to work in the ICD. There should be equal opportunity in employment regardless of gender and people living with disabilities should be included in employment.
(vi) Improvement and construction of existing access roads and linkage to Mai Mahiu – Narok Road will ease movement of local goods and people.
(vii) Appreciation in land values in the area will be highly influenced by the project and the greater Naivasha Special Economic Zone.

7.7 Specific Negative Impacts (Construction Phase)

While appreciating the positive impacts and benefits associated with the proposed ICD project development, anticipated negative impacts during construction and operations activities should be identified and mitigated. Mitigation measures will be adopted through the project implementation to ensure that the ICD facility is acceptable to the social and ecological setting. Specific impacts and associated mitigation measures are briefly described below;

7.7.1 Waste Management

Volumes of waste will be produced during construction phase. Solid waste materials including spoil from earth works, construction debris, scrap metals, wood and packaging materials will be generated from construction activities. Oil and grease spills, engine filters, obsolete machines parts and paints are also anticipated from construction activities. In addition, domestic wastes (garbage) from food residuals will be generated at the construction camp sites and work areas. The associated impacts include the following;

(i) Clogging of the drainage systems within and around the site,
(ii) Potential pollution of environment and water resources (oil spills and organic)
(iii) Aesthetic degradation and public nuisance at spoil disposal sites
(iv) Potential breeding of vectors and pests from accumulation of solid materials (garbage) within project sites

Areas Affected

- All work areas
- Waste dumping areas (formal and illegal points),
- Spoil and waste disposal areas
- Camp sites
- Material sites (crusher, borrow pits)
- Open drains

Mitigation Measures

- ✓ *Contractor to establish a waste management plan for construction works addressing all waste types generated,*
- ✓ *All construction camp sites shall have waste management procedures and facilities,*
- ✓ *To the extent possible, the Contractor to enhance waste recycling (debris, scrap metals, timber and plastics) on site,*
- ✓ *Spoil should be disposed of appropriately to avoid environmental conflicts,*
- ✓ *All hazardous materials such as oils/grease, to be stored in a clearly marked site's store, in the contractor's yard for safe removal and disposal,*
- ✓ *Ensure waste holding points are far from surface storm water drains*

7.7.2 Liquid Waste

Liquid waste generation during construction will mainly be within the construction camp sites and work areas. Waste water generation will include sewerage and wash water from the camp site and run off from carwash at the work areas. The associated liquid waste impacts will include the following;

(i) Air quality challenges from inefficient effluent management facility leading to foul smell,
(ii) Potential ground and surface water pollution from sewerage spills and wastewater overflows
(iii) Public health challenges from sewerage spills and sewerage handling by workers

Areas Affected

- Camp sites
- Maintenance yard

Mitigation Measures

- ✓ *All wastewater will be confined within a sewerage handling facility (septic tanks) for soakage and removal of septage*
- ✓ *Septic tanks should be well managed and decommissioned after the construction works.*
- ✓ *Repair of broken sanitation systems and constant monitoring of the system,*
- ✓ *Provide wastewater handling workers with PPEs.*

7.7.3 Surface Drainage

Construction activities are anticipated to impact the general surface drainage of the area. Specifically, the impacts during the construction phase relating to drainage will include the following:

(i) Blockage of drainage channels transmitting surface run off from catchment hilly areas with potential localise flooding or overloading adjacent drainage channels,
(ii) Potential deposition of silt into the work area from the immediate catchment
(iii) Water pollution may occur on account of cumulative oil spillage washing into the recipient water body through natural drainage channels,

(iv) Increased hydraulic loading to the downstream drainage channels,
(v) Flooding during construction due to poor site management attributed to stock pile
(vi) Potential conflicts with the SGR culverts along the ICD that may be overloaded with silt from the earth works.

Areas Affected

- Natural drainage systems
- Entire project area
- Water resources

Mitigation Measures

- ✓ *The orientation of the site should be such that it does not interfere with the natural flow of the surface drainage system,*
- ✓ *Provide temporary drainage channels for run off management within and around project site*
- ✓ *Provide cut-off drains for management of surface run off emanating from the catchment*
- ✓ *Ensure maintenance and repair of machines and equipment to control lubricant spills*
- ✓ *Ensure construction materials stock piles are far and don't block natural water ways.*
- ✓ *Installation of oil/grease interceptors at drainage outfalls to minimise risk of pollution to downstream water bodies*
- ✓ *Harmonise the surface drainage layout of the yard with the drainage structures of the SGR corridor*
- ✓ *Harmonise the drainage system of the yard with the larger Naivasha Special Economic Zone,*

7.7.4 Air Quality

The proposed ICD construction has potential negative impacts to the air quality, mainly associated with the dust emissions from site clearing, earthworks, traffic movements, loading and unloading of construction materials, stock piling of materials. Other sources will include emissions from construction vehicles and machinery (hydrocarbons and particulate matter). Secondary effects to air quality will include aesthetic conditions and health issues to the workers and surrounding community. Other sources of air emissions include:

Areas Affected

- Entire project area
- Material sites
- Camp sites

Mitigation Measures

- ✓ *To supress dust emissions, undertake earthworks under damp conditions (watering), and frequent water the construction access roads*
- ✓ *Ensure construction equipment is well maintained to minimize or eliminate emissions,*
- ✓ *Timely collection of waste (solid/liquid) from waste holding receptors to reduce foul smell emissions*
- ✓ *Use of manual labour as compared to machines and equipment to the extent possible*

- ✓ *Provision of PPEs to all workers and strict adherence to their use,*
- ✓ *Limit speed for the construction trucks along the access roads to reduced dust*

7.7.5 Noise and Vibration

Construction equipment and vehicles are potential sources of limited noise. Material sites are also potentially noise sources from the extraction activities including blasting, crashing and transportation. The effects, however, will be confined to the works areas along within project site especially noting the site and potential materials sources are lowly habited at the time of the construction. However, occupational noise conditions could be significant and potentially impact the limited neighbouring communities and wildlife.

Areas Affected

- The site location
- Maintenance yards
- Material sites

Mitigation Measures

- ✓ *The Contractor to ensure compliance to established noise guidelines under EMCA Regulations,*
- ✓ *Limited blasting for hard stone quarries shall only be done after approval by the relevant authorities and also effective public information,*
- ✓ *Provide all construction workers with relevant safety gear including earmuffs at all times while at work and enforce application,*
- ✓ *Timely repair and maintenance of construction machinery and equipment,*
- ✓ *Sensitise the neighbouring communities and ranch owners of the construction activities and timings*
- ✓ *Timely repair and maintenance of construction machinery/equipment and vehicles, as well as instil speed limits for construction trucks*

7.7.6 Health and Safety

Health and safety are a major concern on construction for infrastructural facilities. Construction effects on health and safety will be confined to the construction workers as well as any immediate neighbouring community (the project area was lowly habited at the time of the construction). Among the impacts include:

(i) Exposure to dust and other emissions that could lead to bronchial infections and eye problems,
(ii) Safety risks to the construction workers including accidental falling and slips,
(iii) Project drivers' and road user's safety risks associated with materials transportation and equipment operations,
(iv) Potential safety risks from fire outbreaks at the construction sites,
(v) Potential health risks from contact with hazardous and corrosive chemicals,

(vi) Potential health risks among workers from consuming contaminated water
(vii) Potential pollution risks to the general environment and neighbouring communities,
(viii) Risks of general workers' health while at work

Areas Affected

- All work areas
- Maintenance yards and workshop
- Camp and material sites
- Public road crossing points/areas

Mitigation Measures

- ✓ *All workers should be provided with appropriate safety gear and ensure application all times*
- ✓ *The contractor should ensure "driver safety "measures at all times e.g. speed limits, good driving conduct and truck maintenance,*
- ✓ *Provide safe drinking water for the construction workers acceptable sanitation and hygiene facilities and eating sheds,*
- ✓ *Ensure safe and healthy work environment for the construction workers including noise level, dust level, safe movement corridors and access to medical services*
- ✓ *The public should be kept off the construction areas for their safety.*
- ✓ *Provide necessary safety signage and information as well as isolation barriers at sections with high population and vulnerable groups,*
- ✓ *Ensure supervised removal of waste dumps where necessary for safe handling and disposal,*
  - o *Provide education and sensitization of the workers and public on the project impacts*
  - o *Provide and maintain fully stocked first aid kits on sites and provide first aid training to the key staff.*
  - o *Ensure a functional incident register that will capture any issues associated with the workers while at work*

7.7.7 Vegetation Clearing and Soil Loss

Construction activities of the ICD and associated components will clear vegetation across the entire site and loosen top soils with possibility of silt washed down into the lower areas and dry drainage channels. The project area was noted not to have drying grass and scattered shrubs.

Areas Affected

- All work areas
- Camp and material sites
- Dry drainage channels

Mitigation Measures

- ✓ *Project implementation plans should be developed such the level of disruption and restoration can be integrated*
- ✓ *Proper channels for wastewater drainage should be developed within the project site to reduce washing away of soils and other loose materials;*

- ✓ *Re-vegetation of exposed areas around the site should be carried out rapidly in order to mitigate against erosion of soil through surface water runoff and wind erosion;*

7.7.8 HIV/AIDS and Other Sexually Transmitted Infections

The HIV/AIDs prevalence case in Nakuru County is 5.3%. Immigration into the area during construction will bring in a significant population and thereby increase the chances of social delinquency and STI rates. The workers and traders who have money and are willing to spend it to attract women and men from the project and thereby create avenues for spread of HIV/AIDS and STIs. Influx of new people to the project area especially construction workers can affect the number of new cases of HIV, because they often interfere with an otherwise stable situation but the contrary can also happen where the newcomers find themselves at higher risk.

Areas Affected

Entire project area

Mitigation Measures

- ✓ *The client should incorporate HIV/AIDS prevention measures as part of the contractual requirement;*
- ✓ *The Contractor shall, through a qualified and approved HIV/AIDs service provider undertake measures to reduce the risk of the transfer of the HIV virus between and among the Contractor's Personnel and the local community;*
- ✓ *Programmes should be developed and integrated into the project implementation for sensitizing the local community and project workers on HIV/AIDS and/or other sexually transmitted diseases (STDs).*
- ✓ *Provision of Male or Female Condoms for all Site staff and labour as appropriate.*
- ✓ *Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision. Basic knowledge, attitude and practices are among the parameters to be monitored, and particularly on provision of condoms, status testing and use of ARVs*

7.7.9 Vehicular Traffic

Traffic management challenges will be experienced during the construction phase from vehicles accessing the project site for materials deliveries as well as construction equipment. Among the impacts related to this situation will include;

(i) Risks to safety of the users using access road to the site
(ii) Potential risks to road safety and potential accidents on the busy Mai Mahiu – Narok Road,
(iii) Potential conflicts with people movements along the deviation roads,
(iv) Inconveniences on efficient people movement
(v) Potential traffic jam at access points to the Highway

Areas Affected

- Project access road

- Mai Mahiu – Narok Road junction

Mitigation Measures

- ✓ *Appropriate signage and information should be provided at the junction and access road.*
- ✓ *Deploy a traffic marshal to manage traffic at the junction and entry to the site,*
- ✓ *Provide time schedule for material delivery especially when traffic is low.*
- ✓ *Construction of the 2.7km stretch of the Pipeline road to consider safety and interest of the current users (including KPC operations)*

7.7.10 Public Disruptions

There will be potential temporary disruptions of access roads and public movements including livestock grazing around the site during project construction. At the time of this study, there were no services or public amenities at the site.

Areas Affected

- Project site
- Along the access road (considering the access to KPC Pump Station)

Mitigation Measures

- ✓ *Ensure minimal disruption of the public movement and livestock grazing,*
- ✓ *Ensure no delays in restoration of the access road,*

7.7.11 Construction Material Sites

ICD construction will require large volumes of construction materials including sub-grade gravel, hard stone aggregate, sand and water. Other materials would include cement, steel bars, timber, etc. These materials are sourced from pre-identified borrow pits (for gravel) and quarry sites (for hard stone aggregate and boulders) and sand harvesting locations. Quarrying and excavation activities have notable damage to land and loss of vegetation cover. Materials sourcing also may result into disruption of top soil, dust emission, noise and vibration.

Other impacts at materials sites and delivery are safety and health to the workers as well as the public. Mobilization of materials into the site also have potential conflicts with movement of the limited wildlife and also the grazing livestock.

Areas Affected

- Quarry Sites
- Borrow Pits
- Site location (stockpiles)

Mitigation Measures

- ✓ *Obtain appropriate approvals and EIA licences from NEMA for all material sites.*
- ✓ *Prepare rehabilitation plan for material sites upon exhaustion or project completion.*

- ✓ *Ensure provisions of (PPEs) for the workers*
- ✓ *Materials haulage and storage to observe environmental control measures,*

7.7.12 Construction Camp Site

Construction camp site has potential limited but localized land degradation arising from site clearance of vegetation, spills of oil/grease, solid wastes dumping, wastewater disposal leading to environmental pollution and risks to public health.

Mitigation Measures

- ✓ *Undertake Environmental impact assessment for the construction site and prepare a restoration plan.*
- ✓ *Ensure no spillage of oil, lubricants and detergent in the storage area and it so ensure*
- ✓ *Comply with public health and sanitation regulations.*
- ✓ *Ensure proper solid waste management mechanism (3Rs) around the camp site.*

7.7.13 Wildlife Dispersal Areas

The vast rangelands within the project area offer grazing grounds not only to livestock but also wildlife. In addition, Kedong ranch neighbours other wildlife conservation ranches hence within wildlife migratory paths. As a result, potential conflict may arise between the proposed facility and wildlife movements.

Mitigation Measures

- ✓ *Collaborate with conservation ranches to define extent of wildlife zones for necessary avoidance*
- ✓ *Sensitize construction workers and materials sourcing activities from encroaching into wildlife zones.*
- ✓ *Participate in wildlife observation initiative with key players in the area*

7.8 Negative Impacts (Operation Phase)

The negative impacts anticipated during ICD operations activities have been identified and mitigation measures established as outlined under the following sections.

7.8.1 Drainage Management

The ICD yard will have its surface largely comprises with impervious pavement effectively creating a notable localized surface runoff catchment. The runoff generation will be;

(i) A source on local flooding
(ii) Transportation media for pollutants (spilt oils/grease and pavement dirt) to the downstream receiving environment,
(iii) Potential erosion for the immediate land downstream

(iv) Potential social conflict with landowners downstream and other ecological features

Mitigation Measures

- ✓ *Isolate all pollutant point sources with appropriate oil/great interceptors and grit traps from the yard drainage system,*
- ✓ *Link the entire yard pavement to the most effective outfall drainage channel*
- ✓ *Ensure none of the drainage outfalls discharges pollutants to the downstream receiving environment*
- ✓ *Establish the downstream land use and ownership for necessary conflict preventive measures.*
- ✓ *Align with the operations policies of the larger Naivasha Special Economic Zone on drainage management.*

7.8.2 Road Accidents

Once the ICD is commissioned, there will be potential rise in vehicular traffic into and out of the premises at the Mai Mahiu – Narok junction. There is expected heavy trucks exiting or entering Mai Mahiu – Narok (B3) that experiences high traffic comprising of private, public, commercial and indeed fleets of tourist vehicles towards Masai Mara. There are risks of accidents at the junction, the section into the access road and also along B3.

Mitigation Measures

- ✓ *A properly designed junction with the Mai Mahiu – Narok (B3) should be provided taking into consideration road safety measures,*
- ✓ *Appropriate road signage should be provided on approaches to the junction, at the junction and along the access road section,*
- ✓ *Motorists and truck operators be sensitized on traffic safety at the location,*
- ✓ *Provide traffic marshals to help control movement of vehicles, especially at the B3 junction*
- ✓ *Align with the operations policies of the larger Naivasha Special Economic Zone on road safety standards.*

7.8.3 Noise Levels

Major sources of noise from ICD include vehicular traffic accessing and leaving the yard, ICD machineries and equipment including standby power generators. This will be perceived as occupational safety as well public nuisance to ICD workers, users and the neighboring community.

Mitigation Measures

- ✓ *Use of natural noise buffers such as trees around the ICD yard*
- ✓ *Encourage drivers to avoid unnecessary hooting*
- ✓ *Provision and enforcement of PPE's for the workers and users,*
- ✓ *Ensure maintenance of the ICD equipment for low noise levels*
- ✓ *Install low noise stand-by power generators*

- ✓ *Align with the operations policies of the larger Naivasha Special Economic Zone on noise control measures.*

Figure 16: Critical Road Safety Area

7.8.4 Aerial Emissions

Operations of the ICD would be associated with emissions including hydrocarbons, sulphur dioxide, carbon oxide, carbon monoxides and particulate matter. The yard will also have equipment for handling dry bulk cargo which may require refrigeration or preservation and potential risks of freons and perhaps CFCs. Among the potential concerns on aerial emissions from the ICD operations is greenhouse gases (CO2) with climate change implications.

Mitigation Measures

- ✓ *Ensure all machinery and equipment are well maintained and in good working conditions,*
- ✓ *Encourage shutting down of machine engines when not in use,*
- ✓ *Ensure the proper planning of storage in the yard to minimize cargo marshalling,*
- ✓ *Trucks accessing the yard be maintained to a pre-determined level of emissions established by the Operator,*

- ✓ *Align with the operations policies of the larger Naivasha Special Economic Zone on exhaust emissions,*
- ✓ *All refrigeration storage facilities at the ICD should be operated within established Controlled substances Regulations under EMCA, 1999.*

7.8.5 Demand on Water Resources

The project area is not served with public water supply system neither is there natural surface water source. The nearest water source would be Mai Mahiu Town and Kijabe (including leased or owner groundwater sources). Alternatively, it will be necessary to sink borehole(s) within or around the proximity of the yard.

Mitigation Measures

- ✓ *Carry out a hydrogeological survey and EIA in case boreholes will be sunk*
- ✓ *Obtain necessary permits from Water Resource Authority (WRA) for any water abstraction*
- ✓ *Adopt water conservation measures such as roof catchments and storage tanks*
- ✓ *Ensure monitoring of water consumption in the facility*
- ✓ *Encourage recycling of waste water for dust mitigation measures and general cleaning purposes*

7.8.6 Wastewater Generation

The operations of the ICD will lead to increased generation of wastewater and shall require proper handling and disposal. Wastewater discharges expected from the facility will include domestic sewage from the kitchens, washrooms and general cleaning. Wastewater contaminated with oils from the maintenance yards, vehicle parking yards and storm water.

Mitigation Measures

- ✓ *Prepare and implement a wastewater management plan for the yard base on waste management regulations under EMCA, 1999,*
- ✓ *Ensure segregation of domestic wastewater from the contaminated wastewater*
- ✓ *Separate storm water from sewerage systems to avoid contamination*
- ✓ *Installation of oil, grease separator/interceptor and silt traps in all drains to minimize pollution into the outfalls*
- ✓ *Regular maintenance of the storm drains systems to avoid blockage and subsequent flooding*
- ✓ *Orient wastewater flow towards the wastewater treatment plant as proposed under the Naivasha Special Economic Zone master plan,*
- ✓ *Align with the operations policies of the larger Naivasha Special Economic Zone on waste management.*

7.8.7 Solid Waste Generation

After the completion of the ICD, there will be solid waste generated such as to include, office waste, general waste from the container handling operations

Mitigation Measures

- ✓ *Prepare and implement a waste management plan for the yard base on waste management regulations under EMCA, 1999,*
- ✓ *Provision of waste receptors at source points*
- ✓ *Consider waste segregation at the waste sources*
- ✓ *Contract registered and certified waste handlers for proper collection and disposal*
- ✓ *Align with the operations policies of the larger Naivasha Special Economic Zone on waste management.*

7.8.8 Hazardous Materials and Oil Spills

It is anticipated that once the ICD facility is operational, hazardous cargo will be handled. Spills are anticipated as a result of accidents, equipment failure and improper handling of cargo during storage and transfer.

Mitigation Measures

- ✓ *Provision of designated area for storage and handling of Hazardous materials*
- ✓ *There should be oil and grease traps installed at the vehicle and equipment maintenance sheds and have proper oil and grease handling e.g. use of drums*
- ✓ *Cargo handling equipment should be well maintained to avoid leaks*
- ✓ *Engage services of certified hazardous waste handlers to collect and dispose of used oils and grease.*

7.8.9 Possible Encroachment

After project completion, there is the possibility of encroachment by various informal businesses and hawkers along the access road and around the ICD facility. This might result to increase in traffic related accidents, insecurity, illegal dumping of waste.

Mitigation Measures

- ✓ *Provision of social welfare amenities within the ICD facility i.e. canteen/Tuck shop, kiosks*
- ✓ *Enforcement measures by county government and ICD operator*

7.8.10 Land Use Change

The proposed ICD development is part of the proposed Naivasha Special Economic zone Master Plan. The project commissioning will have far reaching effects on land use practices that need to be managed. Developments in the country are faced with challenges in physical planning hence potential conflict among different land use systems. Among the effects include mushrooming of uncontrolled and incompatible land use practices.

Mitigation Measures

- ✓ *Involve the county government in managing land use planning, regulations and approvals within the project area,*

- ✓ *Secure undeveloped adjacent land within the project site from encroachments by uncontrolled business developments,*

7.8.11 Health and Safety

The project facility operations will lead to increased traffic and potential vehicle speeding and machine/equipment operations, therefore compromising the safety of workers, drivers and neighbouring community members. Increase in the number of accidents and injuries within the facility are expected if safety measures are not put in place in advance. Pollution of water resources by waste generated within the facility is a common occurrence in infrastructure projects. There is potential immigration of business, institutions and residential premises into the area therefore increased social interactions and security challenges.

Among the potential impacts include;

(i) Potential fire risks within the facility,
(ii) Potential slips into open deep drains
(iii) Potential road accidents from careless driving
(iv) Risks of injuries (minor to serious) as a result of falling objects (containers), running of machines and accidents from vehicles
(v) Potential pollutant transportation from sources to public water bodies (rivers) with health impacts anticipated among downstream users.
(vi) Elevated noise levels to the riparian residents,

Mitigation Measures

- ✓ *Provide drainage covers on deep drains,*
- ✓ *Provision of appropriate protective gears*
- ✓ *Training of workers on OHS,*
- ✓ *Registration of workplace with DOSH,*
- ✓ *Install appropriate safety signage and information around the yard,*
- ✓ *Designate and mark fire assembly points.*

7.8.12 Population Increase

Increase in population is expected once the ICD facility is operational. People will immigrate into the area in search of employment while others due to potential business opportunities the facility will present. Potential impacts will include:

(i) Incompatible land use practices
(ii) Increased pressure on public utilities
(iii) Safety and Insecurity issues

Mitigation Measures

- ✓ *Collaboration with Nakuru County Government on land use zoning and control in the surroundings,*
- ✓ *Increase police security patrol,*
- ✓ *Influence the social management around the facility in liaison with County and National Government Authorities,*

7.8.13 Interference with Wildlife Zones and Movement Corridors

The project site neighbours wildlife conservation and within wildlife migratory corridor. Influx of workers into the area is potential source of conflict with the wildlife. Potential encroachment of wildlife conservation zones may arise from informal settlements as well as illegal parking by truck drivers. In addition, operation emissions and waste discharge into the open ground will affect the general safety and health of wildlife.

Mitigation Measures

- ✓ *Consultations with KWS and Conservation Players to assess the situation on wildlife usage on available dispersal routes,*
- ✓ *May consider influencing a joint collaborative Management Plan, especially with respect to wildlife movement on the available dispersal areas and routes in conjunction with KWS, Ranches Operators and the County Governments of Nakuru and Narok*
- ✓ *Idle ICD land should not be fence to allow controlled movement of wild animals around the area,*
- ✓ *Environmental pollution controlled (solid wastes and effluents to be confined within the yard) to the extent possible for safety of wildlife,*

7.8.14 Dangerous Goods

It is important that employees involved in transportation, storing and handling dangerous goods understand the basic concepts in order to reduce the risk related to these activities. International Maritime Dangerous Goods (IMDG) code classifies dangerous goods as follows;

(i) Class 1 (Explosives)
(ii) Class 2 (Gases)
(iii) Class 3 (Flammable liquid)
(iv) Class 4 (Radioactive Materials)
(v) Class 5 (Oxidizing substance and organic peroxides)
(vi) Class 6 (Corrosive Materials)

Mishandling of these dangerous goods may cause a chemical reaction which could cause fire from explosives, spillage, injury fatality and contamination.

Mitigation Measures

- ✓ *ICD management should implement systems for the proper screening acceptance, transport and storage of dangerous cargo based on local and international standards and regulations,*
- ✓ *Establishment of segregated and access-controlled storage areas with the means to collect or contain accidental release,*
- ✓ *Request Dangerous Goods Manifest for hazardous materials whether in transit loading or unloading, including proper shipping (technical) name hazardous class and packing group,*
- ✓ *Training staff in relevant aspects of dangerous goods management including screening and acceptance of dangerous goods at the port,*
- ✓ *Engage services of certified hazardous waste handlers to collect and dispose of used oils and grease,*
- ✓ *Incompatible hazardous substance must be adequately separated from each other during transport and storage. Improper storage or segregation of dangerous goods may result in the release of toxic fumes, spill and degradation of the product quality,*
- ✓ *Containers containing dangerous goods of different classes must not be stored above each other. Cleaning of container and portable tanks be done such as to avoid contaminating soil, waterways or sewage systems,*

In order to ensure safe cargo handling and storage of dangerous goods, areas where dangerous goods are stored should be monitored on regular basis by designated and responsible personnel to ensure possible leaks are detected and segregated.

Chapter 8: Environmental and Social Management Plan

8.1 ESMP Overview

The Environmental Social and Management plan has been developed to bring home the key findings of the environmental impact assessment; recommending necessary mitigation actions, defining roles, monitoring indicators and the estimated cost. The Contractor will also be required to prepare a separate and specific ESMP for their works in order to control construction impacts and ensure compliance with applicable environmental and health and safety legislation and standards. The ICD Operator will ultimately be responsible for ensuring that the ESMP is implemented on site via reviewing the Contractor's ESMP and ensuring its implementation on site via audits.

8.2 Management Plan Principles

This projects goal is to enhance improved sanitation around ICD as described in the Project Design concept. The project should observe environmental protection requirements in accordance with the established laws and regulations to ensure sustainability. To realize this goal, acceptability by a majority of the beneficiaries and minimal effects to the physical environment will require to be integrated in the project through constant consultations, evaluations and review of the design aspects throughout the project coverage. On the basis of the policy guidelines and development of the ESMP, among other actions recommended to be undertaken by the management in the implementation of the latter are;

(i) Preservation of the natural beauty of the immediate surrounding areas,
(ii) Enhanced integration of environmental, social and economic functions,
(iii) Incorporation of safety provisions in the premises including easy exit accessibility to the road, adequate in-house signage and information systems among others
(iv) Enhancing the contractor's performance,
(v) Realization of cordial relations among various community, economic, social and cultural groups as well as between the local community and the contractor,
(vi) Enhancing equity and maximizing social and economic benefits for the local community through income generation from employment,

8.3 Specific Management Issues

In order to ensure the sound development and effective implementation of the management plan, it will be necessary to recommended that a supervisor is identified to oversee environment and management aspects. The supervisor would also be expected to co-ordinate and monitor environmental management during construction and provide monitoring schedules during operations.

8.3.1 Management Responsibilities

In order to implement the management plan, it is recommended that a position is created for an appropriate expertise to oversee matters of environment and social management as well as enhanced safety and security measures within and around the site. The services of an environmental expert may be required to co-ordinate and monitor environmental management for the site during construction and post monitoring audits. This would be done under the responsibility of the site contractor during construction. The responsibility relationship is as follows;

(i) The Developer will be responsible for all coordination activities and liaisons, particularly in regard to issues of environment, social and safety issues,
(ii) The Project Manager is the Contactor's link with the Developer on matters of environmental and social nature and is responsible of implementing the environmental management plan established under this report,
(iii) It would also be recommended that a Public Relations Office (PRO) created on the basis of ability to directly interact with the local community for social sustainability. Upon commissioning, the Management should establish a PR office.
(iv) NEMA shall be responsible of surveillance of environmental and social aspects of the project implementation. It will be expected that their concerns be communicated to the Developer.

8.3.2 Environmental, Health and Safety (EHS) Requirements

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. Among the areas to reflect include;

Safety Issues: Collaboration with relevant environmental and health related authorities as well as appropriate experts would be necessary to provide necessary advice in this regard. At the site, appropriate safety measures would be observed, but it will also be necessary to involve the workers and neighboring communities on awareness and sensitization at all times, e.g. provision of personal protection equipment to all workers and non-interference by the neighbourhood.

Health Issues: Control emissions from the machineries as well as dusty conditions throughout the construction cycle and check operation points upon commissioning. HIV/AIDS: Regarding HIV/AIDS control, it would be recommended as follows;

(i) Review the activities of the free zone construction and operations to integrate with the HIV/AIDS campaigns,
(ii) Develop appropriate training and awareness materials for information, education and communication (IEC) on HIV/AIDS for the workers and the surrounding communities,
(iii) Identify other players on HIV/AIDS for enhanced collaboration,
(iv) Develop an intervention strategy compatible with the site construction and operations in monitoring success of the HIV/AIDS prevention and provide peer educators for sustainability in collaboration with other stakeholders,
(v) Integrate monitoring of HIV/AIDS preventive activities as part of the construction supervision in collaboration with local agencies and site operators. Basic knowledge, attitude and practices (KAP) are among the parameters that may be used for assessment,

The objective of the HIV/AIDS initiatives would be to reduce the risks of exposure to and spread of the HIV virus around the site. Major targets would be the workers, suppliers, institutions and the general members of the community, particularly the youth.

8.3.3 Construction Environment and Social Management Plan (C-ESMP)

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 action 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. The Construction Environment and Social Management Plan (C-ESMP) will cover the following key issues among others;

(i) Health and Safety Plan
(ii) Traffic Management
(iii) Stakeholders and Social Engagement Plan
(iv) Labour Influx Management Plan
(v) Gender Management Plan
(vi) Waste Management Plan (including spoil disposal)

8.4 Code of Conduct for the Contractors

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 Company Code of Conduct, Managers Code of Conduct and Individual Code of Conduct.

8.5 Schedule of Management Actions

The matrix below illustrates conceptual project activities and proposed actions for the anticipated issues. This will guide the project implementation throughout the project cycle (planning, construction, post-construction and decommissioning phases). The main components of the ESMP include the following;

(i) Project construction activities and Related Issues
(ii) Management Actions
(iii) Responsible Parties
(iv) Timelines and Cost estimates

Table 4: ESMP Schedule (Construction Phase)

Environmental and Social Aspects	Anticipated Issues	Management Actions	Responsibility	Cost Estimates
ESMP Implementation	A guiding tool for the implementation of this ESMP through the project cycle.	✓ Review this ESMP into a Construction ESMP (C-ESMP) reflecting the realities of the project implementation, ✓ Engage appropriate support personnel for the implementation of the C-ESMP addressing the following among others; o Materials sites identification, approvals, landowners' consents and restoration plans o Construction waste management plans o Construction safety and health aspects o Rehabilitation and restoration after construction o Project completion report	Contractor Supervision Consultant to review C-ESMP	No direct cost
Site clearance and soil loss	▪ Land acquisition and associated social issues ▪ Loss of vegetation cover ▪ Limitation of livestock grazing land ▪ Disruption and erosion of top soil profile ▪ Siltation of natural drains ▪ Potential conflict with spoil disposal sites	✓ Ensure order in relocation of people from site (to consider an Abbreviated RAP), ✓ Site Clearing activities to be confined within project site, ✓ Watering of exposed grounds to avoid dust, ✓ Protect natural drains during earthworks ✓ Ensure suitability of spoil disposal sites	Contractor Supervision Consultant	No direct costs (integrated construction costs)
Earth moving	▪ Disruption of surface drainage with potential local drainage ▪ Air pollution, ▪ Noise and vibrations ▪ Potential soil erosion	✓ Excavation to be carried out in dump conditions to the extent possible to avoid dust, ✓ Practice soil erosion control measures to avoid drainage siltation	Contractor Supervision Consultant	No direct costs (integrated construction costs)

Environmental and Social Aspects	Anticipated Issues	Management Actions	Responsibility	Cost Estimates
		✓ Soil dumping only on approved locations		
Solid Waste Management **Sources;** • Waste receptors • Construction sites and campsites • Workshops	▪ Nuisance at spoil disposal sites ▪ Potential blockage of drainage ▪ Breeding of vectors ▪ Pollution of surface water resources	✓ Prepare a waste management plan for the construction works, ✓ Provision of waste collection facilities ✓ Segregation of waste, ✓ Contract a NEMA registered waste handler, ✓ Encourage waste recycling	Contractor Supervision Consultant	Allow KShs. 200,000.00 for the whole construction period
Liquid Waste Management **Sources;** Campsites	▪ Contamination of ground water resources ▪ Public health risks from sewerage overflow ▪ Air quality challenges	✓ Provide appropriate wastewater containment system, ✓ Ensure timely exhaustion of liquid waste handling facilities	Contractor Supervision Consultant	Allow KShs. 50,000.00 for whole period
Health and Safety **Sources;** • Construction equipment • Hazardous and dangerous goods • Construction of campsites • Pollution of water from construction activities • Interaction of construction workers and community	▪ Construction related injuries (Construction employees and neighboring communities) ▪ Social ailments including communicable diseases such as HIV/AIDs ▪ Potential accidents at material borrow pit areas and quarries ▪ Environmental diseases (Bronchitis and eye problems) ▪ Accidents involving construction trucks ▪ Spread of the fatal COVID-19 virus amongst workers/personnel and neighbouring communities	✓ Facilitate safety programs for material site and working areas including Emergency response programs ✓ Safety provisions (Signage and adequate lighting) in all work areas ✓ Provision of adequate traffic signage and diversion information ✓ Awareness, prevention and training on HIV/AIDS and other social diseases ✓ Provide group medical insurance for workers ✓ Provide and enforce use of PPEs for all workers ✓ Implement COVID-19 prevention measures in line with Government of Kenya guidelines and regulations including social distancing, management	Contractor Supervision Consultant	Allow KShs. 1,500,000.00 for Occupational Safety and Health Issues

Environmental and Social Aspects	Anticipated Issues	Management Actions	Responsibility	Cost Estimates
		of symptoms, application of PPEs (masks)visual sensitization, appropriate transport and virtual meetings to the extent possible		
Traffic management **Source:** • Construction vehicles • Regular motorists • Access roads	▪ Traffic related incidences and accidents ▪ Conflicts with local motorists on the movement disruption ▪ Potential physical damage to the local access roads ▪ Safety risk to the local motorists and residents ▪ Disruption and inconvenience to movement of residents in the area ▪ Creation of traffic jam at junction of project area and Maai Mahiu-Narok B3 Road	✓ Give special attention to the junction of Pipeline Road and B3 for road safety, ✓ Installation of appropriate signage and information (including reflective barriers where necessary), ✓ Construction of the 2.7km stretch of the Pipeline road to consider safety and interest of the current users (including KPC operations), ✓ Deploy traffic marshal to control traffic at B3 junction and entrance into the construction site. ✓ Streamline usage of safety signage and information	Contractor Supervision Consultant	No direct costs
Surface drainage management	▪ Risks to the construction site from catchment runoff ▪ Risks of sub-surface erosion due to the loose soils base ▪ Potential conflicts with SGR and downstream landowners.	✓ Isolate the site from catchment runoff by a cut-off drain, ✓ Orient runoff drains appropriately to the SGR culverts in consultation with the Operators, ✓ Ensure discharge of realigned drainage channels are to existing natural drainage channels, ✓ Contain construction silt on site for safety of downstream drains, ✓ Ensure the drainage systems is aligned to the whole Naivasha Special Economic Zone,	Contractor Supervision Consultant	No direct costs (integrated into the design)

Environmental and Social Aspects	Anticipated Issues	Management Actions	Responsibility	Cost Estimates
Material sites	▪ Potential conflicts with landowners and communities at materials sites ▪ Potential environmental degradation at material sources. ▪ Solid/liquid waste generation at campsites	✓ Ensure appropriate agreements with landowners to avoid social conflicts, ✓ Obtain necessary permits and licenses from NEMA on all materials sites (undertake EIA studies as per regulations), ✓ Ensure appropriate waste management system at the campsites ✓ Prepare restoration plans for all material sites.	Contractor Supervision Consultant	Allow KShs. 250,000.00 for restoration
Wildlife Dispersal Areas	▪ Notable proximity to conservation ranches with wildlife zones ▪ Close proximity to some wildlife movements corridor (to and from Masai Mara, Nakuru National Park and other Reserves).	✓ Collaborate with conservation ranches to define extent of wildlife zones for necessary avoidance ✓ Sensitize construction workers and materials sourcing activities from encroaching into wildlife zones. ✓ Participate in wildlife observation initiative with key players in the area	Contractor Supervision Consultant	No direct costs

Table 5: ESMP Schedule (Operation Phase)

Environmental and Social Aspects	Anticipated Issues	Management Actions	Responsibility	Cost Estimates
Air Quality **Sources:** Machinery and vehicular movements, pavement dust, some stores	▪ Emissions from trucks, equipment and machineries ▪ Foul smells from various forms of emissions and waste holding areas ▪ Potential health risks to the workers and facility users	✓ Regular Maintenance of machines and equipment, ✓ Timely collection of wastes from the site, ✓ Provision of PPEs to workers (nose masks), ✓ Pavement sweeping in dump conditions,	ICD Operator Management	Allow KShs. 250,000.00 annually for air and noise sampling and measurements
Noise and Vibrations Sources; Machineries and Equipment, Operations Cargo reshuffling	Elevated occupational noise and vibrations to operators and neighboring communities	✓ Sensitize neighbouring communities on effects of noise and co-existing measures, ✓ Ensure all machineries are in good working conditions, ✓ Provision of appropriate protective gears ✓ Ensure that office blocks are sound proof.	ICD Operator Management	
Occupational Health and Safety Source: Operations	▪ Injuries to workers ▪ Risks of burns from toxic materials ▪ Fire safety risks ▪ Risks from unsafe movements ▪ Accidents caused by trucks	✓ Provision of appropriate protective gears ✓ Training of workers on OHS, ✓ Registration of workplace with DOSH, ✓ Install appropriate safety signage and information around the yard, ✓ Designate and market fire assembly points.	ICD Operator Management	Allow KShjs. 500,000.00 on Public Safety measures
Population Increase	▪ Potential influx of people (business, services providers, employees, etc.), ▪ Incompatible land use practices ▪ Increased pressure on public utilities ▪ Safety and Insecurity issues	✓ Collaboration with Nakuru County Government on land use zoning and control in the surroundings, ✓ Increase police security patrol, ✓ Influence the social management around the facility in liaison with County and National Government Authorities,	ICD Operator Management Nakuru County Government	No direct costs

Environmental and Social Aspects	Anticipated Issues	Management Actions	Responsibility	Cost Estimates
Social Interactions	▪ Potential conflicts with surrounding community's culture and welfare, ▪ Potential conflicts on shared and/or common services and utilities (water resources, power supplies, access roads, etc. ▪ Demand for employment and income generation opportunities associated with ICD operations ▪ Sharing benefits with the communities,	✓ Consider a comprehensive Public and Stakeholders Engagement Plan, ✓ Consider Corporate Social Responsibility (CSR) Strategy for involvement and co-existence with the communities – resources sharing, services extensions, employment opportunities, etc. ✓ Other social tools to include; o A worker's welfare guideline o A Grievance Redress Mechanism (GRM) o Safety and health plan o Labour compliance plan	ICD Operator Management Nakuru County Government	No direct costs. Allow a considered budget for social responsibility interventions.
Interference with Wildlife Zones and Movement Corridors	▪ Potential Human – Wildlife conflicts with influx of people into the area ▪ Encroachment into wildlife conservation zones and corridors ▪ Effects of operations emissions and discharges to wildlife safety and health	✓ Consultations with KWS and Conservation Players to assess the situation on wildlife usage on available dispersal routes, ✓ May consider influencing a joint collaborative Management Plan, especially with respect to wildlife movement on the available dispersal areas and routes in conjunction with KWS, Ranches Operators and the County Governments of Nakuru and Narok ✓ Idle ICD land should not be fence to allow controlled movement of wild animals around the area, ✓ Environmental pollution controlled (solid wastes and effluents to be confined	ICD Operator KR KWS Conservation Ranch Managers	Allow KShs. 2M per year on conservation

Environmental and Social Aspects	Anticipated Issues	Management Actions	Responsibility	Cost Estimates
		within the yard) to the extent possible for safety of wildlife,		
Land Use Issues	▪ Potential uncontrolled developments around the yard location ▪ Emergence of informal settlements in the area and also in Mai Mahiu and Suswa Towns ▪ Waste generation around the yard unrelated to the operations but affecting the surrounding environment	✓ Collaboration with appropriate county departments for sustainable land use planning, ✓ Consider development of Land Use Zoning and Control Plan, ✓ Liaise with service providers in the area to ensure the surroundings are suitably served to avoid social conflicts in future.	County Government of Nakuru	No direct costs on ICD (This is an activity for the County Government to guide)
Waste Management	▪ Potential haphazard waste collection and movement around the yard ▪ Potential safety and health to the workers and users ▪ Potential invasion by pests and rodents to parts of the yard ▪ Possible non-compliance on waste removal and final disposal.	✓ Operator to prepare a comprehensive waste management plan for the yard ✓ Provide appropriate facilities for collection and storage of waste (waste bins at sources and transfer bins) ✓ Ensure waste collection, transfer and removal follows the 3R principles with recycling options considered, ✓ Waste collection and disposal by Licensed Waste Handlers and to licensed disposal sites ✓ Hazardous and toxic wastes to be isolated for specialized handling	Operator NEMA to verify compliance	Allow KShs. 1M annually on waste management
Drainage Issues	▪ The ICD pavement constitutes a surface runoff catchment, ▪ Pollutant transport through surface runoff to downstream receiving environment, ▪ Potential local flooding within the yard with internal damages ▪ Potential downstream damages from outfalls	✓ Prepare and implement a comprehensive Drainage Management Plan for the yard with a link to the surrounding areas, ✓ Provide all drains from pollution point sources with interceptors and grit traps. Recovered materials to be handled as hazardous wastes,	ICD Operator Management	No direct costs

Environmental and Social Aspects	Anticipated Issues	Management Actions	Responsibility	Cost Estimates
		✓ Install all drainage outfalls with appropriate oil/grease interceptors and grit traps for safety of downstream recipients. ✓ Ensure no conflict with downstream receiving entities (SGR and Landowners).		
Traffic Management	▪ Increased vehicular movement ▪ Rise in the number of heavy truck movement ▪ Increase in risk of traffic accidents, especially at the ICD/ B3 Road junction	✓ A properly designed junction with the Maai Mahiu – Narok (B3) should be provided taking into consideration road safety measures, including signage and use of traffic marshals ✓ Motorists and truck operators be sensitized on traffic safety at the location ✓ Align with the operations policies of the larger Naivasha Special Economic Zone on road safety standards	ICD Operator Management	No direct costs
Continuous Improvement	Potential implications of ICD operations internally and to the neighbouring zones.	✓ Undertake initial audit upon commissioning ✓ Ensure subsequent annual self-audits of the facility, ✓ Other monitoring parameters, o Air quality, o Noise levels, o Water quality, o Wastewater quality o Soil quality, o Safety audits o Energy audits.	ICD Operator Management	No direct costs

Chapter 9: Conclusions and Recommendations

9.1 Conclusion

Construction of Naivasha ICD facility will improve the efficiency of container operations and ease the pressure on freight operations in Mombasa seaport and Nairobi. Cargo destined beyond Nairobi, especially to other East African countries including Uganda, Rwanda and Burundi will processed at ICD Naivasha. The scaling up of infrastructure will lead to stimulation of economic growth through efficient handling and movements of goods.

The location of the ICD yard next to the SGR corridor (a short distance from Maai Mahiu Station) and within the proposed Naivasha Special Economic Zone is an indicator of its importance in the movement of goods and materials for the local economic and serving the neighbouring states (Uganda, Rwanda, Burundi and South Sudan among other destinations). It is notable that moving goods from the Port of Mombasa through Nairobi to ICD Naivasha will be facilitated through SGR, effectively also raising the value of the SGR to the country and the region.

The primary objective of this ESIA was to fulfil the legal requirements as stipulated under EMCA 1999 (Amendment 2015) and the Environmental Impact Assessment and Audits regulations, 2003 (Amendment 2019). This was achieved through the identification of the ICD development activities, associated impacts and mitigation or preventive measures and development of a management plan. This will be the basis for licensing and subsequently compliance through the project cycle.

Specific Conclusions are as follows;

1. Construction and operations of Naivasha ICD has potential linkages to the environment and social settings of the area and beyond. It is for this reason that an Environmental and Social Management Plan (ESMP) has been developed to provide a policy direction on compliance. This ESMP is to be adopted with necessary amendments throughout the project cycle,

2. The ICD location falls within a low-lying flat area right through the flow path of a runoff from a large catchment in the north and northwest. The area is prone to flooding but due to the well-drained soils local flooding is not experienced. However, the project development has a notable drainage conflict as it obstructs parts of the surface runoff,

3. The project is located within a tectonic area with a history of volcanic activities. For this reason, the soils are generally volcanic ashes characterized with loose and uncohesive structure that are well drained that is also easily eroded. This is evidenced by the deep gullies created by eroding surface runoff through the project areas,

4. In addition to 2 above, the ICD yard pavement constitutes a large catchment for runoff during the rains. It is also a point source of pollution to the runoff and subsequently to the downstream receiving environment. This is perhaps would be one of the main challenges that will face the yard during the operations,

5. The area between Mai Mahiu and Suswa towns as well as the surrounding areas are basically ranching with livestock grazing as the main activities but low population density and households (mainly Masai Manyattas). However, the nature of housing structures is slowly changing to modern houses and land use practices including limited agriculture,

6. The wider project area is also within the neighbourhoods of ecological conservation zone including Kendong Ranch, Akira Ranch and Mt. Suswa Ranch. The conservation areas feature mainly grazers including zebra, giraffes, buffalo, Thomson gazelle, grant's gazelles and a few canines (hyenas and leopards). The wildlife is influenced by larger systems including Masai Mara far to the south, Lake Nakuru National Park and Lake Naivasha ecosystem,

7. Like any typical ICD yard, wastes generated is characterized by the nature and type of good received and handled at the facility. In this regard, it can be concluded that waste management (solid wastes, liquid wastes, hazardous/toxic materials) will constitute among the most important operational support functions at the Naivasha ICD facility,

8. Following on the above, safety and health is also critical in the operation of any ICD operations. It can also be concluded that safety and health is an important function for integration into the Naivasha ICD operations,

9. Naivasha ICD (and the long term the proposed Naivasha Special Economic Zone) will have a strong influence on the land use practices and patterns around the site as well as the nearby urban areas including Mai Mahiu and Suswa towns. This is potentially a situation of unplanned development and land use patterns unless appropriate interventions are considered as part of the long-term ICD and the economic zone development,

10. It has been established that Naivasha ICD development will have a social linkage due to the nature of the locality. The facility will be expected to interact and co-existence with the neighbouring communities, especially considering the anticipated growth in population density upon operations commencement. It can, therefore, be concluded that a social function will be an important component of the ICD management structure.

9.2 Recommendations:

1. The Contractor should adopt the Environment and Social Management Plan (ESMP) in this ESIA Study Report and prepare a Construction Environment and Social Management Plan (C-ESMP) reflecting realities of the project implementation to form the main compliance reference material. The document will be shared with and supervised by the Supervision Consultant and as well as the Client,

2. The C-ESMP should include among other actions;
   - ✓ Materials sites identification, approvals, landowners' consents and restoration plans
   - ✓ Construction waste management plans
   - ✓ Construction safety and health aspects

- ✓ Rehabilitation and restoration after construction
- ✓ Project completion report

3. Due to the drainage challenges and nature of top soils in the area, the project construction should consider Isolating the site from catchment runoff by a cut-off drain and orient runoff drains appropriately to the SGR culverts in consultation with the Operators. It will also be necessary to align the site drainage layout with the larger proposed Naivasha Special Economic Zone.

4. Upon completion and commissioning of the ICD facility, a comprehensive Drainage Management Plan will require to be prepared to address among other aspects pollutant retention at point sources, pollution retention mechanisms at the outfalls, drainage outfall downstream management and monitoring. Among the feature would include oil/grease interceptors and grit traps.

5. It is noted that the ICD facility has a notable interaction with ecological areas and conservation ranches. In order to ensure a long-term co-existence, consultations with KWS and Conservation Players (including the Ranches Operators) as well as the County Governments of Nakuru and Narok would be necessary to draw an appropriate collaborative Management Plan, especially with respect to wildlife movement on the available dispersal areas and routes,

6. A properly designed junction with the Maai Mahiu – Narok (B3) should be provided taking into consideration road safety measures. Appropriate road signage should be provided on approaches to the junction, at the junction and along the access road section. Motorists and truck operators be sensitized on traffic safety at the location. Provide traffic marshals to help control movement of vehicles, especially at the B3 junction,

7. To ensure free flow of traffic in and out of the ICD site as well as on the access road, the project design should provide for adequate truck turning circle, acceleration and deceleration lanes as well as traffic calming measures such as (bumps and road safety signage),

8. It is expected that once the ICD is operational, many trucks will access the area for dropping of loading. If appropriate parking area is not provided, instances of trucks being parked on the road side will be experienced which can lead to traffic inconveniences, safety incidents and social conflicts. For this reason, it is recommended that an adequate lorry parking be established on the space outside the gate. The parking space should also be provided with appropriate drainage system, markings and signage,

9. The ICD is expected to influence demand of land in the area which will lead to changes in land use practices and settlement patterns among others. In order to avoid haphazard development in the area and also in the nearby towns (Maai Mahiu and Suswa), it is recommended that the County Governments of Nakuru and Narok in conjunction with the

Central Government to consider drawing a comprehensive land use zoning and control plan,

10. Upon commissioning of the ICD facility, various social issues will emerge that require management strategies for sustainability. In this regard, the following tools will be required;
    - ✓ A worker's welfare guideline
    - ✓ A public and stakeholders engagement plan
    - ✓ A Grievance Redress Mechanism (GRM)
    - ✓ Safety and health plan
    - ✓ Labour compliance plan

11. Waste management for the yard will also be important during the operations. As part of the larger Naivasha Special Economic Zone, it will be important that the ICD waste management system should be in line with the waste management plan under the Naivasha Special Economic Zone (NSEZ) master plan. For operational purposes, a comprehensive waste management plan will be required such as to address the following;
    - ✓ Waste collection at sources with appropriate segregation
    - ✓ Provision of strategic waste collection points based on functional zones of the yard
    - ✓ Provision of waste transfer station for removals to external disposal
    - ✓ Isolation of hazardous and toxic waste materials for specialized handling
    - ✓ Define requirements for the contracted waste handlers (who should also be licensed by NEMA)

12. In compliance with EMCA 1999 (Amendments 2015) and other best practices requirements, Naivasha ICD Management will need to observe the following requirements;
    - ✓ Undertake an initial Environmental Audit upon commissioning
    - ✓ Undertake annual environmental self-audit
    - ✓ Undertake environmental monitoring, preferably on annual basis, including air quality, noise levels, water quality, wastewater quality and soil quality,
    - ✓ Safety audits
    - ✓ Energy audits.

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Annexes

Annex 1: Terms of Reference

TERMS OF REFERENCE

Introduction

The Project

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 Provide skills and technology for the railway sector, provide efficient and effective railway services, leverage our assets to grow business and promotion, facilitation and participation in national and metropolitan railway network development.

In keeping with its mandate, Kenya Railways 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. This has commenced with the completion of Mombasa – Nairobi SGR in Phase 1 and Phase 2A from Nairobi to Naivasha. The proposed ICD is proposed to constitute part of Phase 2A of SGR.

The Naivasha Inland Container Deport (ICD) Project area is situated along the edge of Kedong Ranch, in the median of Mai Mahiu and Suswa Town Centres, located within the Rift Valley in Nakuru County, Kenya. The project site is located within Mai Mahiu, Nakuru County, Rift Valley Province with GPS coordinates 1° 2'36.40"S, 36°29'11.90"E. The site lies between the SGR, Mai Mahiu – Narok Road (B3) and Kenya Pipeline Road. The site sits on a land area of approx. 45,000m^2 and topographically the area is at the bed of the Great Rift Valley.

Project Justification

The proposed ICD in Naivasha will act as the main transhipment point between the SGR and Road for freight traffic that is destined for areas within Naivasha and beyond. In the interim, the station will serve freight destined for Uganda, Southern Sudan, Democratic Republic of Congo, Rwanda and Burundi as Mombasa – Nairobi – Malaba SGR project is being implemented to completion. The proposed freight terminus-Naivasha ICD will supplement and reduce congestion along Nairobi – Malaba highway (A104/A8) and Nairobi Inland Container Depot (ICD) which is currently in operation. Naivasha ICD will spur industrial and economic growth in the area, through the following:

(i) Naivasha ICD will act as the Freight Terminal Point for north bound cargo before full implementation of Mombasa – Nairobi – Malaba SGR Project.
(ii) Providing reliable transport and accessibility to the existing horticultural establishments (Importation of farm inputs e.g. Fertilizer, Agro-Chemicals, Farm Machinery etc.).
(iii) Providing incentives for processing of Agricultural Products for the export market. This will also serve the surrounding rich agricultural areas like Kinangop, Nakuru, Nyandarua, Narok etc. Potential industries include Meat processing, Grains, Vegetable Processing etc.
(iv) Development of new Industries, Warehouses and Freight Handling establishments in Naivasha.
(v) Development of an Export Processing Zone (EPZ) that will leverage on proximity to the SGR and Geothermal Power Plant (Affordable energy and residual steam from Geothermal Power Plants).
(vi) Naivasha ICD will spur Industrial growth in the area and is projected to generate additional Freight volumes of 90,000 tons by the year 2025, 120,000 tons by 2030 and 160,000 tons by the year 2040.

The Site Components

The major components of the ICD under construction are:

(i) Construction of the access Road linking the site from Maai Mahiu – Narok road (B3) about 2.7km to the northwest of the site gate. This access road coincides with the existing Pipeline road that will be upgraded upto the site location,
(ii) Provision of ICD yard roads that will be the internal passages for use in deliveries and removals of containers
(iii) The ICD yard is the large space, with concrete or other hard surfaces for holding heavy containers and other goods as delivered to the site.
(iv) The access road crosses one of the main drainage channels transmitting runoff from the catchments and running along the western side of the site. This will require a bridge to ensure free flow of storm water and safety of the road and users,
(v) Culverts will also be installed on notable surface drainage sections along the access road as well as within the yard to avoid potential flooding scenarios,
(vi) A siding track will be extended from the adjacent SGR line for ease of goods deliveries and evacuations,
(vii) It is also noted that communication, Signaling and electrical works are necessary installations for the facilities for purposes of internal and external coordination of operations,
(viii) Construction of buildings and associated structures comprising of administration, operations management, security, storage and other needs.

Project Activities

The following are anticipated project works activities that determines the extent of impacts,

Site Preparation
Establishment of construction camp sites, materials holding yards, parking yards for the contractor's vehicles and machineries, areas required for the ICD pavements and drainage channeling. The main vegetation within the project area is mainly grass cover and scattered acacia trees. In addition to the clearance of vegetation, the site clearance will also involve excavations and earth moving for appropriate sub-grade foundation of the pavements and buildings. It is also observed that a few scattered manyattas also feature the project area.

Waste Management
It is anticipated that works will generate notable volumes of waste materials including construction debris, spoil earth materials, dry vegetation matter and other construction residuals. The works will require appropriate waste management plans to avoid local environmental and social conflicts.

Material Sourcing
Construction materials will be obtained from suitable sources that will include hard stone quarries, gravel borrow areas, sand, cement and steel among other materials. Material sites for gravel, hard stone aggregate, sand and water extraction have to obtain appropriate approvals and permits before commencement of the activities.

Restoration Activities
Upon completion of the project, it will be necessary to restore all sections damaged by the construction outside the main yard including material sites and construction camp sites. Other areas to be restored include material sources and spoil disposal areas. Open spaces around the yard will also require landscaping through re-vegetation (ground cover vegetation) for aesthetic purposes as well as conservation of the environment.

Project Commissioning

Project commissioning will be the formal hand-over and operationalization of the ICD facility upon completion. Before project commissioning, the client and contractor will ensure there are no unresolved social and environmental concerns so as to ensure project acceptability by the locals and avoidance of conflicts during operations. To achieve this, the facility will be completed based on the design specifications as well as operation of associated components.

In addition, affected project sites (material and campsites) should be rehabilitated almost to their original state. In addition to the paper work, there will be a physical evaluation of the facility that will involve the contractor, KRC, relevant National and Nakuru County Government departments and the design consultant. The inspection of the facility will ensure all the issues of the ICD yard are adequately considered and all the structures are operationally ready and approved to function as planned.

General ESIA Study Approach

ESIA Study

Due to environmental and social challenges associated with airstrip construction and rehabilitation 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. According to the Environmental Management and Coordination Act (EMCA), 1999 (Amendment 2015) section 58 requires that all new projects falling under the second schedule of the Act must undergo comprehensive environmental and social impact assessment studies. ESIA study should also comply with the EIA Regulations of 2003 (Amendments 2016) on the minimum and other convectional Environmental Guidelines

ESIA Objectives and Scope

The ESIA Study Report is being undertaken in accordance with the EMCA (Environmental Impact Assessment and Audit) Regulations of June 2003 (Amendments 2016) established under Environmental and Management and Coordination Act (EMCA), 1999 (Amendment 2015). The objective of the study is to carry out an Environmental and Social Impact Assessment for proposed Naivasha ICD development and associated infrastructure including access road, power supply, water supply sanitation reticulation and drainage among others.

Naivasha ICD is located within a rural setting local and external interactions with environmental but limited social aspects in its operations. In accordance with the EIA Regulations of 2003 (Amendments 2019), Section 2(7)(k), Inland Container Depot (ICD) may be considered a storage of warehouse yard and falls under the Medium Risks Projects. The project, therefore, is to be subjected to an ESIA Project Report level. Following is the scope for the environmental impact assessment Project Report;

(i) A comprehensive description of the proposed project including its objectives, preliminary design concepts, project phasing and anticipated impacts,
(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 ICD operations,
(iii) Analysis of policy, legal and institutional framework governing aviation operations,

(iv) Establish linkages between the proposed rehabilitation and expansion project and the anticipated impacts focused on the physical environment, social status and general benefits to the national economy,
(v) Social and economic implications of the project through structured stakeholders and public participation addressing government officials, community groups, farmers, land owners, public institutions, opinion leaders, etc.,
(vi) Developing an Environment and Social Management Plan (ESMP) and Environment and Social Monitoring Plan (ESMoP) for adoption through the project implementation,

In liaison with the Kenya Railways Corporation (KRC), the Contractor, local leadership and the administration consultations and engagements with stakeholders are being organized to identify the perceived impacts and benefits resulting from the proposed project. Among the areas of engagement include linkages to the natural drainage systems, sharing of water supply, increasing population and human settlements, prevailing land use practices, public safety, services and public amenities social and economic activities.

ESIA Study Activities

The ESIA study has a series of activities undertaken in close liaison with the Client and associated Stakeholders. Effective evaluation of the baseline status through physical inspection of the entire project area. The current status (baseline environmental conditions) provides the starting point for the impact's predictions and benchmark for the mitigation measures. Key outputs by activity are outlined in the sub-sections below;

Reconnaissance Visit

The environmental and social baseline of the project area is being undertaken through physical assessments and observations, interactions with the stakeholders, public and institutions. In addition, it is also appreciated that operations effects may go beyond the ICD grounds as well as the safety implications directly and indirectly impacts on the adjacent land use activities. The extent of the impact zones outside the ICD is being identified in consultations with the Design Engineers. A reconnaissance site visit has already been undertaken lead by the Project Design Team where discussions were conducted on site including the following;

(i) Appreciating diversity on physical environment, demographic trends around the ICD project area,
(ii) Indication of the design criteria and project phasing,
(iii) Appreciating of social and economic setting around the project area,
(iv) Share experiences on environmental resources and social issues in the area with regard to economic activities,
(v) ESIA general study plan

Documentary Review

Various relevant documents are being reviewed for an understanding of the terms of reference, environmental status, data on demographic characteristics of the project area, land use practices, development strategies and plans (local and national) as well as the policy and legal documents. In summary, among the documents being reviewed include;

(i) The Terms of Reference,
(ii) Project background documents
(iii) County Integrated Development Plan for Nakuru County and the neighbouring Counties,
(iv) ICD design concepts,
(v) Latest state of environment report,

(vi) Policy documents governing the economic sector,
(vii) Environmental legislations,
(viii) Other documents as may be identified.

Field Assessments

A comprehensive physical evaluation of the project area is planned to be carried out taking into consideration physical and biological environmental status, human settlement and socio-economic activities.

Stakeholders and Public Consultations

Field visits to also involve interviews of selected persons, groups of persons or institutional officials in collaboration with the Nakuru County Commissioner's Office. A questionnaire and other information collection tools have been prepared for application on stakeholders during the meetings. The consultations are meant to obtain available information and data. Interviews are arranged with among others the offices and officers to be interviewed include;

(i) Briefing to the County Government Office (Nakuru)
(ii) Briefing to the County Commissioner (Nakuru)
(iii) Briefing to the key County Leaders
(iv) County Director of Environment
(v) Other Stakeholders and Public.

Reporting

The following deliverables will be realized as outlined under the Terms of Reference

(i) Terms of Reference
(ii) Draft ESIA Project Report
(iii) Final ESIA Project Report

Work Plan

Study Activities

Activities	Deliverables
▪ Review of original ToR ▪ Documentary Review ▪ Prepare ToR for ESIA Study ▪ Submission of ToR to NEMA approval	Submission and approval Terms of Reference on ESIA Study
▪ Detailed field assessments ▪ Briefing to local leadership ▪ Stakeholders and public consultations process. ▪ Impacts Assessments	Draft ESIA Project Report for review by the Client
▪ Draft ESIA Project Report ▪ Presentation to the Client ▪ Integration of Client Comments ▪ Final ESIA Project Report Submission	Final ESIA Project Report submission to NEMA

Following is a schedule of key deliverables and estimated timelines commencing from the date of signing the contract (Key deliverables are shaded);

Key Deliverables

Deliverables	Remark
Commencement of the Study	Date of Commencement being the date the Contract document as received by the Consultant
Documentary Review and tools development (Questionnaires and lists of participation)	Client provided background documents
Reconnaissance Site visit	-
Terms of Reference	ToR for submission to NEMA for approval
Detailed Field Assessments	This is to pick key environmental and social features all around the project area
Planning and scheduling of Stakeholders and Public Consultation Meetings	To liaise with the Deputy County Commissioner's Office through the DCC/ACCs for appropriate venues and participation.
Stakeholders and Public Consultation Meetings (To be confirmed)	Meetings to be scheduled according to the Locations and chaired by the respective DCCs/ACCs.
Draft ESIA Project Report	To be submitted to Client. If required the Consultant may do a presentation of the findings
Final ESIA Project Report	To be delivered to Client for onward submitted to NEMA for review

Client to Provide

The Client will provide the following

(i) Site layout Plan
(ii) Proposed Design Concepts
(iii) Letter of Introduction
(iv) Design drawings

Expected Milestones

Key anticipated milestones or achievements include;

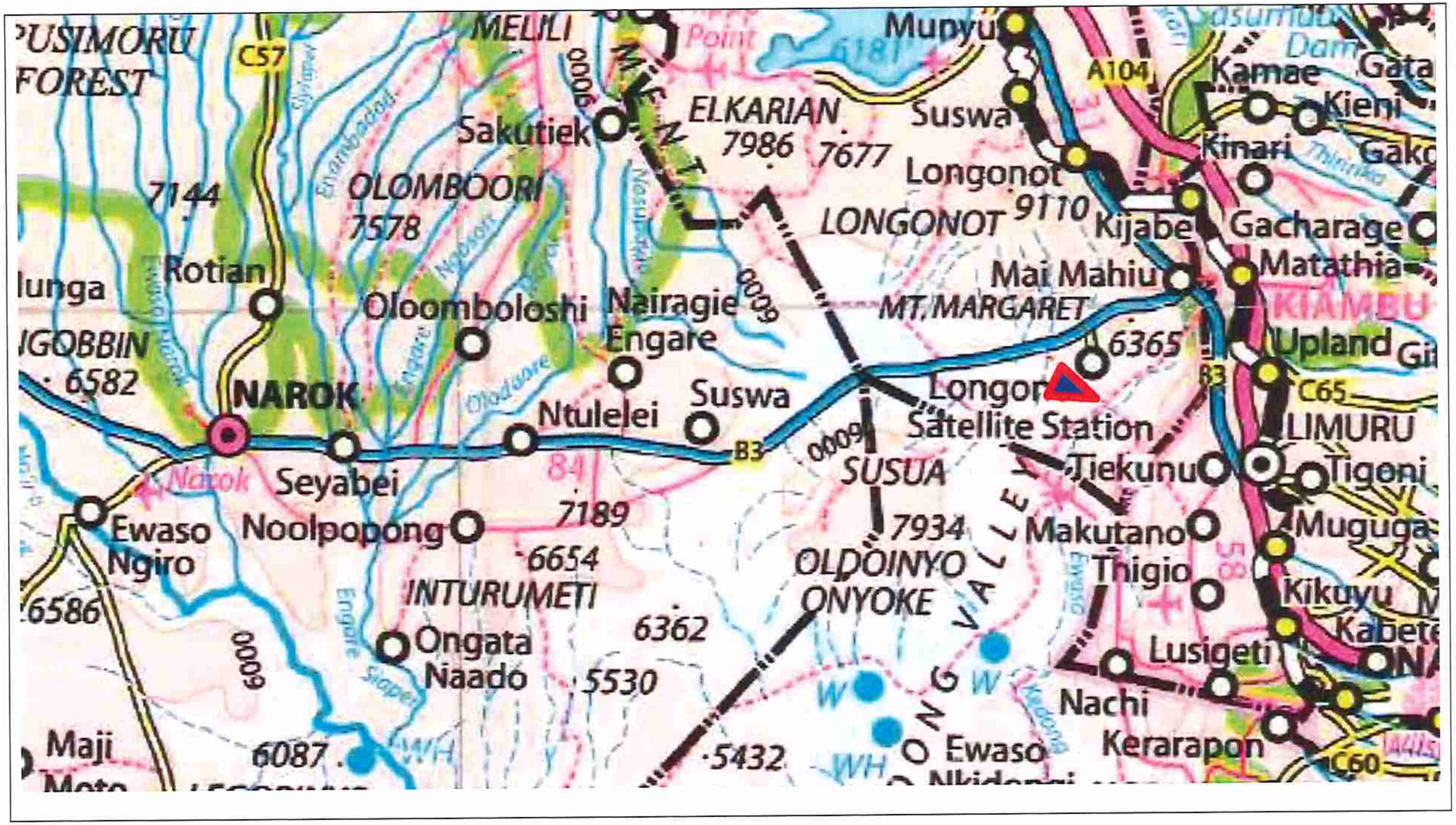
(i) Approved Terms of Reference by NEMA
(ii) Reviewed environment, social and ecological baseline conditions of the project area that will lay a basis for identification of the impacts and mitigation actions,
(iii) Views and opinions from the Stakeholders and the Public
(iv) Final ESIA Project Report

The Study Team Composition

The ESIA key study team will comprise the following;

Area of Experience	Position Assigned	Task Assigned
Environmental Resources Management	Environmentalist/ Team Leader Licensed by NEMA	▪ To oversee the entire study implementation ▪ Coordinate field activities ▪ Meetings with the Clients and stakeholders ▪ Formulation of the ESIA reports ▪ Submissions and presentation of reports
Social studies Socioeconomic studies	Sociologist	▪ Undertake socio-economic baseline survey ▪ Establish social impacts and develop mitigation measures ▪ Public and stakeholder's consultation forums
Civil Engineering	Civil Engineer	▪ Support on interpretation of the design principles for the proposed project ▪ Identify interventions
Occupational Health and Safety	Health and safety	▪ Provide guidance on health and safety aspects of project implementation ▪ Identify health and safety impacts ▪ Prescribe OSH mitigation
Ecological and Biodiversity Studies	Ecologist	▪ Provide professional opinion on the ecological linkages of the proposed project ▪ Identify ecological impacts and develop appropriate mitigation measures.

Annex 2: Site Location Maps


USIMORU FOREST
MELILI
ELKARIAN
OLOMBOORI
LONGONOT
MT. MARGARET
SUSUA
OLDOINYO ONYOKE
INTURUMETI
KIAMBU
NAROK
Rotian
Oloombolosht
Nairagie Engare
Engare
Sakutiek
Suswa
Longonot
Mai Mahiu
Kijabe
Gacharage
Matathia
Kinari
Kamae
Kieni
Upland
LIMURU
Tigoni
Tiekunu
Makutano
Thigio
Muguga
Kikuyu
Kabete
Lusigeti
Nachi
Kerarapon
Ewaso
Munyu
Satellite Station
Ntulelei
Seyabei
Noolpopong
Ongata Naado
Ewaso Ngiro
Maji
7144
7578
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6582
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6087
C57
A104
B3
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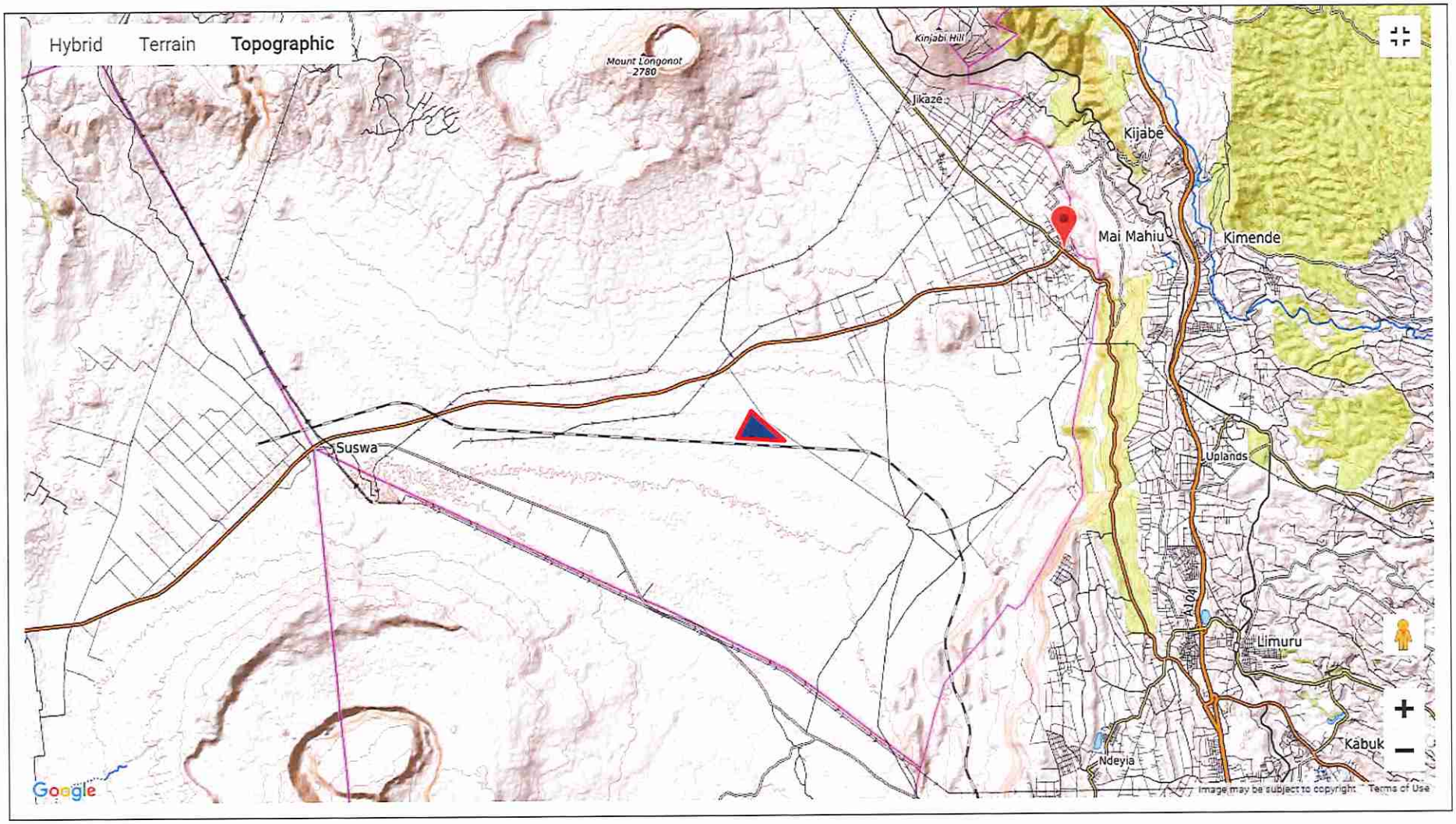
C60

Annex 3: The Proposed Naivasha Special Economic Zone Master Plan


Hybrid
Terrain
Topographic
Mount Longonot
2780
Kinjabi Hill
Jikaze
Kijabe
Mai Mahiu
Kimende
Suswa
Uplands
A104
Limuru
Kabuk
Ndeyia
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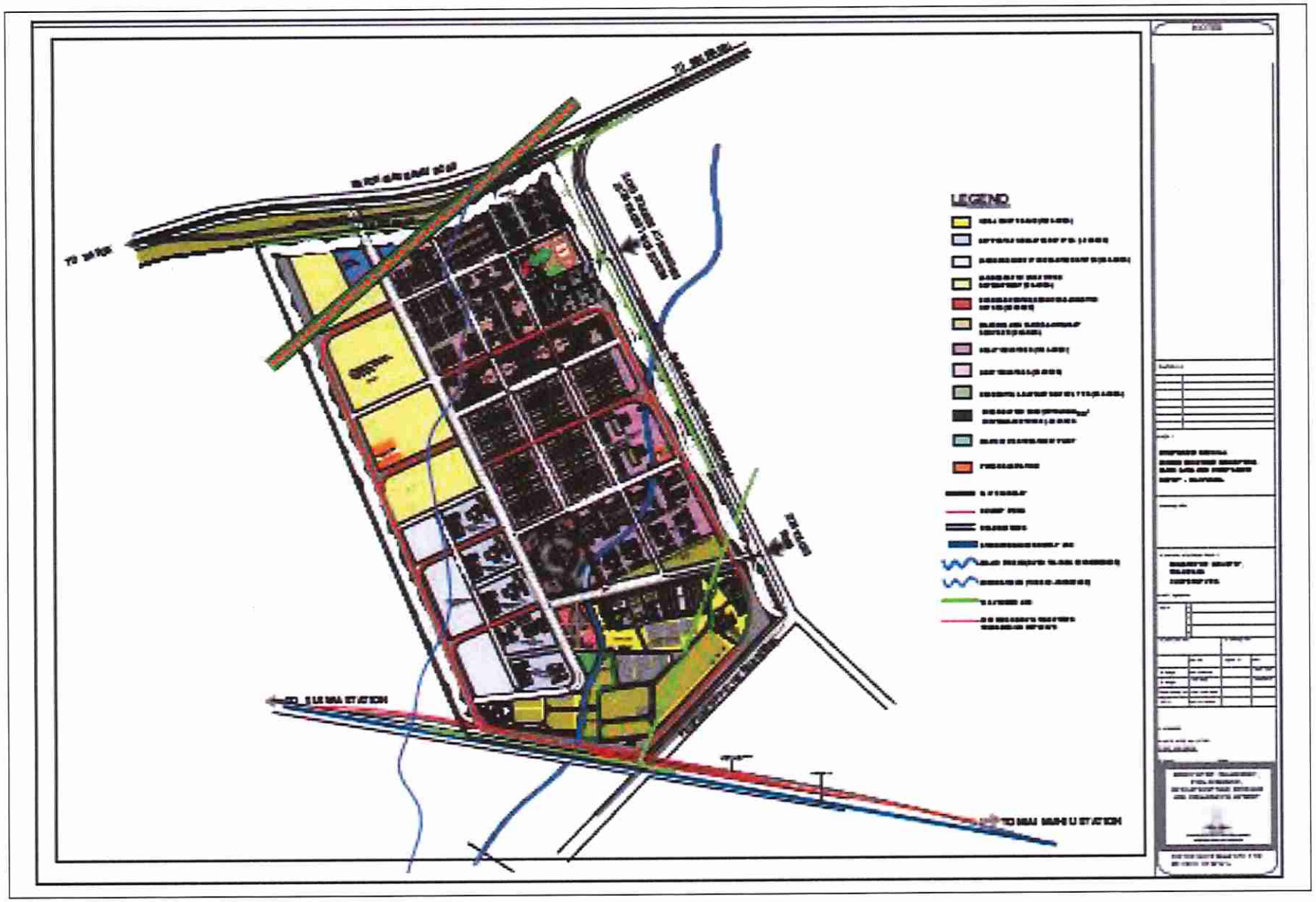
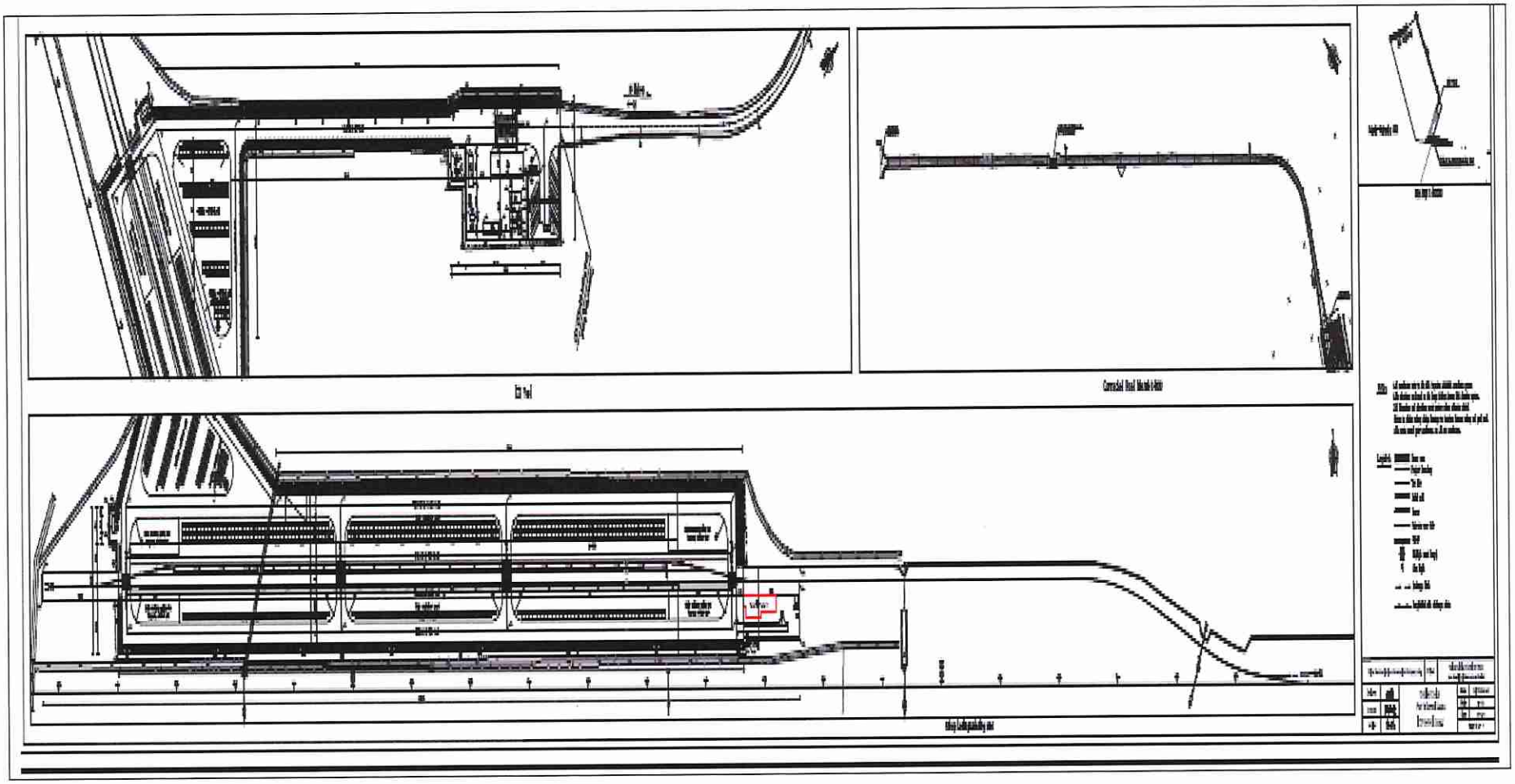
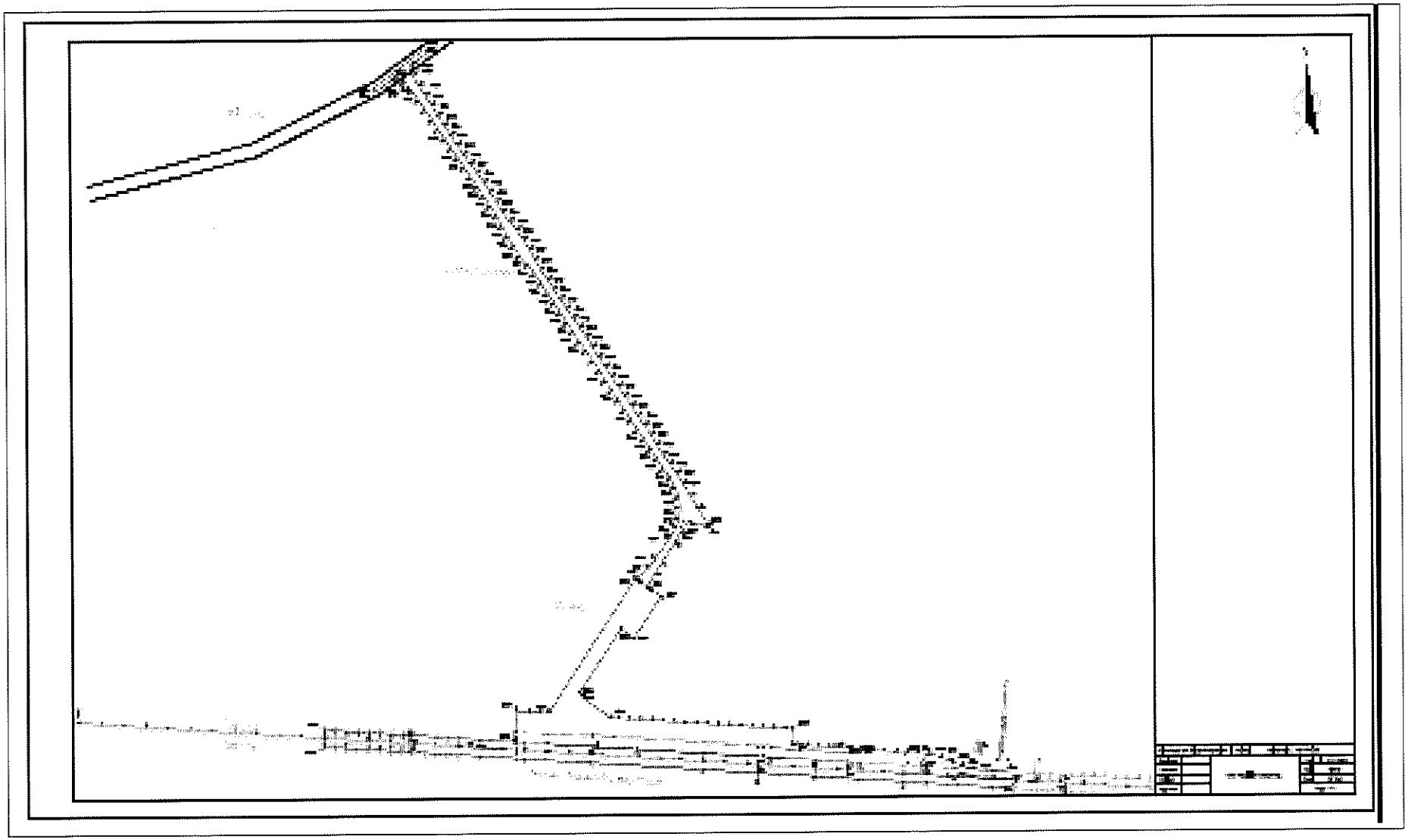

LEGEND

Annex 4: Site Design Conceptual Drawings





Description of Project Components

(Container Yard, Connecting Road and Railways Yard)

1 Overview of Naivasha ICD

1.1 Location of Naivasha ICD

This project is located in the southwest of Maai Mahiu town, south of B3 road, and is about 12km away from Maai Mahiu town. The line is located at K548 + 385, the main line of Nairobi-Naivasha Standard Gauge Railway Project. It is led to the right of the main line, and the ICD railway yard is set parallel to the main line of Nairobi-Naivasha Standard Gauge Railway Project. The ICD railway handling line is arranged parallel to the main line of Nairobi-Naivasha Standard Gauge Railway Project with a distance of about 75m. The ICD connection road starts at the gate on the north side of the ICD. The road extends northwest along the existing road and connects to B3 road. The total length of the road is 2.637km.

1.2 Significance and effect of the Project

The construction of this project can improve the efficiency of container operations and ease the pressure on ICD operations in ports and Nairobi. Containers arriving in Nairobi and beyond, especially Uganda, will not need to go through customs clearance and other procedures at the Port of Mombasa and Nairobi ICD, and can be shipped directly to this project to reduce the handling operations and storage of containers at the Port of Mombasa and Nairobi. In time, the berths and yard capacity of the ICD in Mombasa Port and Nairobi were released. The implementation of the project will effectively alleviate the traffic pressure in the central city of Nairobi and improve the transportation conditions in Nairobi and the areas along the railway. The construction of this project is an important link to improve the transportation infrastructure in Kenya, especially in the western region. It can achieve the efficient integration of various modes of transportation, meet the needs of regional transportation needs, and also promote the sustainable development of the region's society and economy.

2 General Layout of ICD and Design of Station and Yard

2.1 General Layout of ICD

The Naivasha ICD is composed of container yards arranged in a piece of L-shaped land. Container yards are divided into the main container yards on both sides of the line and auxiliary container yard on the north.

An arterial road of ICD, is used to connect the auxiliary container yard and auxiliary construction area of ICD. One access gate is located in the north part of ICD. The area on the northeast side of the gate is the parking area for tractor and trailer outside ICD.

In the auxiliary construction area, which is arranged at the east of the access gate, an integrated building is arranged near the gate. On the east side of auxiliary construction area lie the pump house, water tanks, water tower and overhaul shop respectively in the site. A police building, a sewage treatment station as well as a box-type substation

and diesel generator are arranged at the west of auxiliary construction area.

After completion, the container yard can meet the requirements for such functions as functions to inland ports in operation, collection, distribution, transfer and storage of containers, domestic container agent, information management and service.

2.2 Main Functions of ICD

The Container Depot mainly handles transportation, handling, multimodal transportation and delivery service of containers, stuffing and destuffing operation, temporary repairing, overhaul and cleaning of handling machines as well as transportation machines, transfer and delivery of railway transportation information and information of containers in the site etc.

2.3 Design Specification for Railway Yard of Naivasha ICD

The Naivasha ICD connecting line, with r-400m reverse curve, was set from the newly established line station in the section. After about 500m to the west, it entered the new container yard and set up the container center station.

Two container loading and unloading lines are set up in the yard, with the effective length meeting 880m, which satisfies the conditions of the whole loading and unloading operation. One locomotive running line with an effective length of 978m and one locomotive waiting line with an effective length of 70m shall be set. The track layout of ICD storage yard is shown in figure 2.3-1.

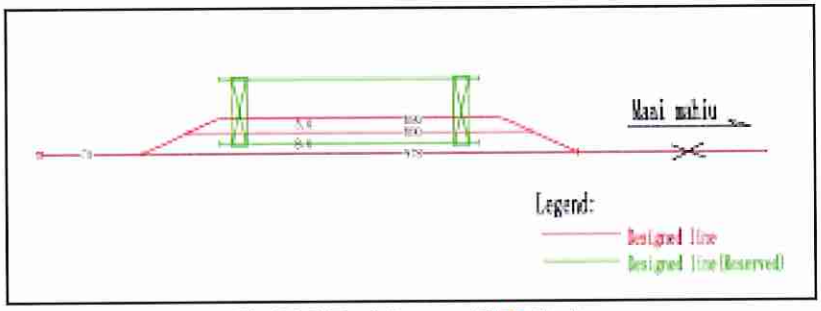


Fig.2.3-1 Track Layout of ICD Yard

2.4 Handling Process

2.4.1 Layout scale

According to Forecast of Naivasha ICD container traffic maximum volume will be 200,000 TEU which is appear in 2024.

2.4.2 Scheme description

The handling operations in the railway handling area and the ICD yard are adopted Reach stacker. Horizontal transport using container tractor and trailer.

2.4.3 Operation Procedures of Container

(1) Arrival in container yard

1) Train → Reach stacker → Main container yard;

2) Train → Reach stacker → Container tractor and trailer → Reach stacker → Auxiliary container yard.

(2) Departure in container yard

1) Container tractor and trailer → Reach stacker → Main container yard

2) Container tractor and trailer → Reach stacker → Auxiliary container yard → Reach stacker → Container tractor and trailer → Reach stacker → Train

2.4.4 Capacity of yard and number of slots on the ground

Two areas are set as per the difference in operation arrangement and function area, namely main container yard and auxiliary container yard for operation of reach stacker. For use of yard, containers with short storage period are mainly stored in main container yard and those with long storage period are mainly stored in auxiliary container yard.

Through calculation, the number of slots on the ground designed is 822 TEUs.

Considering that the storage period of containers in railway container yard is short, main container yard and auxiliary container yard are combined for use, and main container yard shall be used for containers with short storage period with priority.

Actual number of slots on the ground:

Main container yard: 778 TEUs, auxiliary container yard: 102 TEUs, 880 TEUs in total, which meet the requirements for use.

3 Road and Yard

3.1 Overview

The scope of roads and yards of the Project includes roads in the site, container yard, auxiliary construction area and parking lot etc.

3.2 Design load of road and yard

In the design scope of the Project, the main loads of mobile machinery are as follows:

Process equipment in container yard: 45t container front-handling mobile crane, 40' container tractor, 40' container semi-trailer.

3.3 Design scheme of surface structure

According to the general layout plan, use requirements of function areas and process load, the structures that can be adopted for surface structure of road yard include high-strength interlocking block structure and cement concrete surface structure etc.

Referring to the design experience of large container ports and the Nairobi ICD, the design scheme for surface structures as follows:

(1) Roads

3

It is planned to adopt concrete slab pavement structure in the design. The C40 concrete pavement structure is 300mm thick with 300mm thick cement-stabilized macadam, and 150mm thick graded gravel.

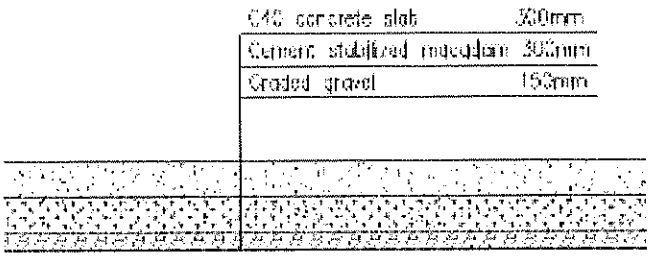


Fig. 3-3-1 Section of Main Road Structure

The road of gate area needs to be strengthened. The C40 concrete pavement structure is 350mm thick with 250mm thick cement-stabilized macadam, and 150mm thick graded gravel.

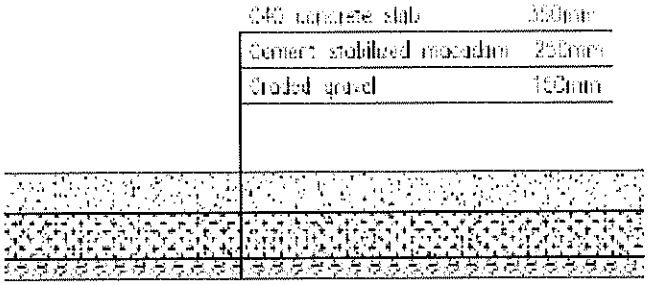


Fig. 3-3-2 Section of gate area Road Structure

(2) Container yard

It is planned to adopt concrete slab pavement structure in the design. The C40 concrete pavement structure is 450mm thick with 300mm thick cement-stabilized macadam, and 150mm thick graded gravel.

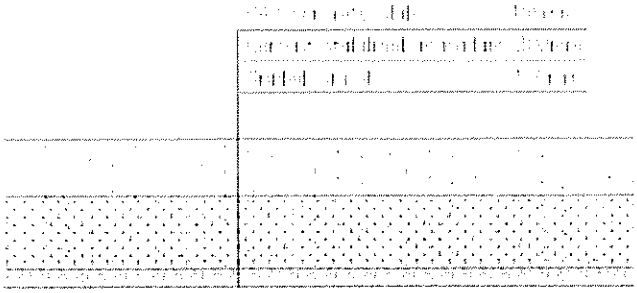


Fig. 3-3-3 Section of Structure of Container Yard

(3) Auxiliary building area and parking lots

It is planned to adopt the scheme of high-strength concrete interlocking block structure in the design. C50 high-strength concrete interlocking block is adopted for surface, with the thickness of interlocking block being 80mm, 30mm thick medium coarse sand, 300mm thick cement-stabilized crushed stone base and 150mm thick lime fly-ash gravel cushion are laid below.

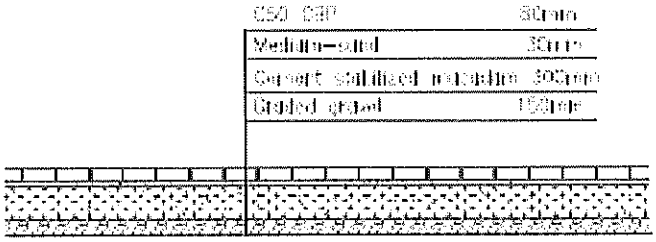


Fig. 3-3-4 Structural section of auxiliary building area and parking lots

4 Connecting Road

4.1 Overview

The proposed project creates a connecting road between the Naivasha Inland Container Depot (hereinafter referred to as ICD) to B3 national trunk road in Kenya, which starts from B3 road and ends at ICD yard entrance, with the total length of 2.637km. The construction of this project will contribute to the improvement of the traffic environment for collecting and distributing cargos in ICD yard, which serves Nairobi – Naivasha Standard Gauge Railway. The project will effectively alleviate the regional traffic congestion in correspondence to the increasing traffic demand and providing a convenient, comfortable and safe transportation environment for the rapid and coordinated development of local economy. In addition, it is the key to promote regional social economy and sustainable development.

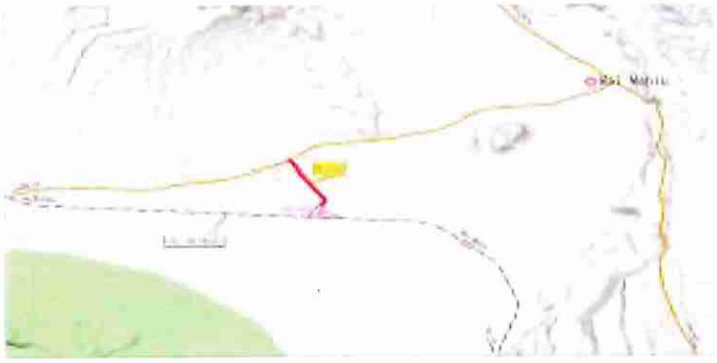


Fig. 4-1-1 Location Map of External Roads

4.2 Main Technical Standards

According to the forecasting results of traffic volume and regulations of Road Design Manual of Kenya, the standard of Class B national highway is adopted, and two-way two-lane section is adopted for the section type, with the design speed of 60km/h and subgrade width of 11m. See Fig. 4-2-1 Standard Cross Section of Subgrade for the subgrade standards and see Table 4-2-1 for the main design technical parameters.

Fig. 4-2-1 Standard Cross Section of Subgrade

Table 4-2-1 Main Technical Parameters

Parameters	Unit	Index Value
Landform		Flat
Classification		Class B national highway
Design speed	km/h	60
Design flood frequency	years/time	100/1
Width of Subgrade	m	11
Carriageway width	m	2×3.5
Design vehicle load of bridge and culvert	-	BS5400HA load, 30 HB loads
Bridge width	m	19.5

4.3 General Design Scheme

The total length of this project is 2.637km, including one bridge with total length of 47m, two culverts, and only one level-crossings.

4.3.1 Route

The project starts from B3 highway and ends at the gate of Naivasha ICD field area. The route is arranged along the existing dirt road to the southeast, with a total length of 2.637km.

4.3.2Subgrade

1 Design reference, subgrade cross section and super elevation

（1） Design reference

1）*Kenya Road Design Manual-Volume I -Highway Alignment Design* (referred to as the Alignment Manual);

2）*Kenya Road Design Manual-Volume III-New Highway Materials and Pavement Design* (referred to as the Subgrade Manual);

3）*Kenya Road and Bridge Construction Specification* (referred to as the Construction Specification).

Appropriate subgrade cross section and slope rate shall be determined according to actual conditions, such as topography, landform, geology, hydrometeorology and environmental protection requirements. At the same time, according to the local actual situation, effective drainage and protection measures should be taken to avoid damage to the subgrade.

In the whole process of subgrade design, attention should be paid to land conservation, landscape effect and safety. The slope rate of filling and excavation slope, properties of fillers and the degree of compaction shall meet the requirements of Kenya specification.

The height of subgrade in this project is affected by topography, landform, hydrology, geology and other conditions.

（2） Subgrade cross section

The cross section adopted in this project is shown in the following figure:

11.0m = 2.0m (soil shoulder) + 3.5m (carriageway) + 3.5m (carriageway) 2.0m (soil shoulder)

（3） Slop rate

Reference to the *Road Design Manual* of Kenya, the slope setting of the project is: when the filling height of the slope is less than 3m, the slope ratio is 1:4; when the filling height is greater than 3m, the slope ratio is 1:2; when the slope ratio of the excavation slope is 1:1.5, the 1.5m crushing platform is required.

（4） Cross slope and Super elevation

Referring to the *Road Design Manual* of Kenya, the pavement type, local natural conditions and setting standards of other roads in the project area, the cross slope of carriageway is 2.5%, and the cross slope of hard shoulder is 4%.

Maximum super elevation 4%.

2 Subgrade compaction standard and filler strength

（1） Subgrade filler requirements

Generally, the soil and rock excavated shall be used for filling subgrade in priority.

The following materials can be used for subgrade filling:

1) The organic content in the material is more than 5% (such as topsoil, materials from swamp, mud land, tree stump and humus soil, etc.);

2) materials with expansion rate more than 3%;

3) cohesive soil with plasticity index over 50;

4) all materials with moisture content exceeding 105% of the optimum moisture content (standard compaction)

（2） Filling and compaction requirements

Before construction, the waste soil and organic soil must be removed and backfilled to the original surface. The compaction standard is 95% (standard compaction).

When filling soft materials, layered filling is adopted in which the layer thickness shall not exceed 150 mm (after compaction). When filling hard materials, the maximum particle size shall not exceed 250mm, and the layer paving thickness shall not exceed 400mm (loose Square).

Generally, the dry density of each layer of filling material shall be compacted to at least 95% MDD (standard compaction), and the dry density of the top 300 mm layer of subgrade shall be compacted to at least 100% MDD (standard compaction). Embankments shall be constructed as soon as possible to ensure sufficient time to prevent cracks in the pavement. The moisture content at the same time of compaction shall not exceed 105% of the optimum moisture content (standard compaction).

The soft filler material shall have a CBR of more than 3% and an expansion rate of not more than 1% after 4 days of immersion.

CBR soaked for 4 days shall not be less than 15% for 300 mm layer under pavement structure, expansion rate shall not exceed 1%, compaction degree shall be 100% (AASHTO T99), and particle size shall not exceed 25 mm.

4.3.3. Subgrade protection

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In order to ensure the stability of subgrade slope, prevent soil erosion, and ensure the appearance of the road, the embankment and cutting slope need to be protected. The whole line is protected by grass planting, and the grass suitable for local growth is used.

4.3.4 Subgrade drainage

The drainage design shall be based on the highway level of the project as well as the terrain, geology, hydrology, meteorology, the setting of bridges and culverts and other conditions along the line. The subgrade drainage system consists of drainage ditch and side ditch. Drainage ditch is generally used for filling embankment section and side ditch is generally used for excavation section. Pay attention to the connection between various drainage facilities and drainage structures, so as to form a complete drainage system for the whole line. Coordinate with the local irrigation and drainage system to prevent the destruction of farmland and other water conservancy facilities, pay attention to environmental protection, and prevent soil erosion and water resource pollution.

4.3.5 Pavement

1 Design principles

According to the utilization requirements of the project, climate, hydrology, soil and other natural conditions, and in close combination with local practical experience, the pavement design shall be carried out comprehensively. On the premise of meeting the traffic volume and use requirements, pavement design shall follow the principles of adjusting measures to local conditions, reasonable material selection, convenient construction, conducive to maintenance and investment saving. The pavement structure scheme that is advanced in technology, reasonable in economy, safe and reliable, and conducive to mechanized and factory construction is selected.

2 Pavement structure

The cement concrete pavement is adopted in the project, and the elastic foundation plate theory is adopted in the pavement structure analysis. The design standard is that the surface plate does not produce fatigue fracture under the combined action of driving load and temperature gradient in the design reference period.

The pavement structure is composed of:

26cm C40 cement concrete
under-sealed layer
30cm Cement stabilized macadam
30cm Cement stabilized macadam
15cm Unscreened crushed macadam
Total thickness 81cm.

4.3.6 Line crossing

1 Route crossing

There are only one grade crossings in this tender.

（1） Graphic design of intersection

The level crossing is the intersection with B3 highway, which is 11m wide and adopts the form of T-shaped intersection.

（2） Vertical design of intersection

The longitudinal slope of the road within the design scope of the intersection is controlled below 2.5%, and the design elevation of the intersection is determined by comprehensively considering factors such as driving comfort, smooth drainage and coordination with the elevation of surrounding buildings. Detailed design refers to drawings of chapter VI route crossing.

5 Track

5.1 Standard for Station Track

Table 5-1-1 Height and Standard of Station Track

S/N	Item				Unit	Connecting Track	Loading and unloading and receiving-departure Track	Other Station Track
1	Rails	Type			kg/m	60	60	50
		Track length of each section			m	25	25	25
2	Sleeper	Reinforced concrete sleeper			Pc/km	New type II	New type III	New type II
						1680	1520	1440
3	Ballast bed	Material				Crushed stone	Crushed stone	Crushed stone
		Top width			m	2.9	2.9	2.9
		Slope			m	1:1.5	1:1.5	1:1.5
		Thickness	Double-deck	Surface layer	m	0.20	~	~
				Bottom layer		0.20		
			Single-deck		m	~	0.25	0.25
4	Track height	Soil subgrade (concrete sleeper)			m	0.776	0.655	0.655
		Sand-stone subgrade (concrete sleeper)			m	0.776	0.655	0.655

Note:

① Other station line refers to locomotive waiting line and safety line.

② The height of loading and unloading and receiving-departure lines shall refer to the height from the rail top of track center to the surface of subgrade when the transverse gradient of single bevel subgrade is 2%.

③ The safety line, the crossing line between 5# ~ 7# and 2#~4# turnouts can be used for 50 kg/m rail.

5.2 Rail and Accessories

5.2.1 Rail

There are jointed tracks in all ICD stations are laid with 60kg/m ordinary rail of 25m standard length.

5.2.2 Accessories

High strength joint bolts of grade 8.8 and above shall be adopted for the rail joint bolts of the station track., and high strength nuts of grade 10 and single-layer spring washers shall also be adopted.

5.3 Sleeper and Fastenings

5.3.1 Sleeper

New type II concrete sleepers shall be laid for the connecting line with 1680 pcs for each kilometer.

New type II concrete sleepers shall be laid for the loading and unloading and receiving-departure lines with 1520 pcs for each kilometer.

New type III concrete sleepers shall be laid for other station lines with 1440 pcs for each kilometer.

5.3.2 Fastenings

Type II elastic rod fastenings shall be adopted for concrete sleepers of station track.

5.4 Ballast Bed

See table 6-1-1 for the structure of the ballast bed, which shall be filled with fine ballast between 2 and 3 lines.

5.5 Turnout

5.5.1 Figure Number for Turnout

Figure number for No. 9 lateral turnout of 50kg/m shall be CZ2209A; turnout sleeper figure No.: CZ2209A.

Figure number for No. 12 lateral turnout of 60kg/m shall be Special line 4249~4252; turnout sleeper figure No.: Special line 3399.

5.5.2 Regulation for the Length of Rail Inserted between Adjacent Turnouts

Rail length inserted between adjacent lateral turnouts shall meet the regulation of Table 5-5-1 and Table 5-5-2.

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Table 5-5-2 Minimum Length of Two Pairs of Rail Inserted between Lateral Turnouts

(Unit m)

Layout of Turnout	Type of Track	There are standard trains passing through the two side track simultaneously	There is no standard train passing through the two side track simultaneously
		The two groups of turnouts consist of concrete turnout sleeper.	The two groups of turnouts consist of concrete turnout sleeper.
	Main track	12.5	6.25
	Receiving-departure Track	6.25	0
	Other station track and auxiliary station track	—	0

Table 5-5-3 Minimum Length of Two Rails inserted between Consequent and Lateral Turnouts (Unit m)

Layout of Turnout	Type of Track	The two groups of turnout consist of concrete turnout sleeper.
	Main track	12.5
	Receiving-departure Track	8.0
	Other station track and auxiliary station track	8.0

Note:

① when there are standard trains passing through the tracks on both sides of the main line, the length of rail inserted between No. 18 lateral turnouts shall not be less than 25m.

② when there are passenger trains passing through the tracks on both sides of receiving-departure track, the length of rail inserted between turnouts shall not be less than 12.5m. If the rail models of the adjacent turnouts are different, 12.5 profiled rail shall be adopted as the inserted rail.

6 Subgrade

6.1 Width from Central Line of Station Track to Subgrade Edge

The width of the connecting line track shall not be less than 3.5m; The width of the most distant track shall not be less than 3.0m; the width of the most distant ladder and

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the plane shunting neck at the side with getting-on and off of shunting personnel shall not be less than 3.5m

6.2 Subgrade of Station Track

6.2.1 Transverse Gradient of Subgrade Surface

Transverse gradient tending to drainage system shall be set for the subgrade surface of railway station. The subgrade can be designed as a single-side slope, double-side slope and zigzag slope based on the subgrade surface width, discharge requirements and filling and excavating condition of subgrade of the station. The transverse gradient of subgrade surface shall not tend to the main track. The subgrade transverse slope of top surface of formation surface layer and top surface and bottom layer of formation of receiving-departure track and other station tracks shall be 2%.

6.2.2 Subgrade Filling Material and Compacting Criteria

Subgrade filling material and compacting criteria shall be designed based on the subgrade standard of I -class railway. Formation consists of surface layer and bottom layer. The thickness of surface layer of the station track formation shall be 0.3m, the thickness of bottom layer is 0.9m, and the total thickness of formation is 1.2m.

The surface layer of formation shall adopt soil A and B, soil improvement and reinforcement measures shall be taken for the nonconforming filling materials and the particle diameter of filling material shall not be more than 150mm.

Filling material of groups A, B and C can be adopted for the bottom layer of formation. When filling material of group C is adopted for the formation in the area with annual precipitation more than 500mm, the plasticity index shall not be higher than 12, liquid limit shall not be high than 32%, or soil improvement and reinforcement measures shall be taken for the filling material with the maximum particle size not more than 100mm and the paving thickness of 2/3.

Filling material of groups A, B and C shall be adopted for the part below the embankment formation.

Compacting criteria shall meet the requirements of Code for Design on Subgrade of Railway (TB10001-2005).

6.2.3 Subgrade Slope

6.2.3.1 Embankment slope

Slope gradient: The slope gradient shall be 1:1.5 when the height of slope is 0~0.8m, and 1:1.75 when the height of slope is higher than 8m. 2.0m wide slope platforms shall be set at the location of 8m when the height of slope is higher than 15.0m.

7 Bridges and Culverts

There are 1 bridge and 3 culverts work in ICD station and yard. Bridge is set on external road connecting with ICD. Culverts are set on ICD station and yard and railway siding.

7.1 Distribution of Bridges and Culverts along the Line

Along the connecting road between Naivasha ICD to B3, there is one 47m long and 19.5m wide bridge. It is two-way four –lane, which two –lane is reserved. In railway

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siding, there are one 21.18m long slab culvert and one 8.06m long frame culvert. In ICD station and yard, there is one 138.99m long frame culvert.

7.1.1 Bridge

It is planned to set 1 bridge for drainage. Spans as 2×20m, which all are made of post-tension prestressed box girder of shall be adopted according to existing road width and natural width of the trench. The precast box girder is of simple structure, which can be constructed quickly and conveniently.

Double cylindrical pier of diameter 1.1m which has mature technique, clear force and is convenient for construction shall be adopted for substructure pier, while the bored pile foundation of diameter 1.2m shall be adopted for pier foundation. Abutment is pile column foundation of diameter 1.2m, with length of Flank is 3.5 m, Length of transition slab is 6 m. See Table 7-1-1 for bridge setting in detail.

Table 7-1-1 Schedule of Bridge set on connecting road between Naivasha ICD to B3

S/N	Bridge Description	Central Chainage	Grade of Existing Crossed Road/Number of Carriageway Planned	Cross Angle (°)	Spans	Total Length of Bridge (m)	Width of Bridge Deck (m)	Structure
1	Drainage	K0+930.0	--/two-way two -lane	90	2×20 m	47	19.5	Precast box girder of prestressed concrete

7.1.2 Culvert

Reinforced concrete slab culvert and frame culvert shall be selected for the culvert according to using function, flood discharge capacity, subgrade filling height, geological conditions and the local construction feature that local materials be used. The culvert inlet and outlet shall be wing type. Slab culvert shall be used for filling height than 5m.

Consisting of 1 reinforced concrete slab culvert and 2 reinforced concrete frame culverts. See Table 7-1-2 for detailed culvert arrangement.

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Table 7-1-2 Schedule of Culvert Arrangement

S/N	Center Chainage	Structure	Culvert Description	Portal Quantity– Span (m)	Intersection Angle (°)	Culvert Length (m)	Portal Type	Location
1	DK0+174.6	Reinforced concrete slab culvert	Drainage	1-3	95	21.18	Wing wall	Railway siding
2	DK0+686.7	Reinforced concrete frame culvert	Drainage	1-3	90	8.06	Wing wall	Railway siding
3	DK1+783.5	Reinforced concrete frame culvert	Drainage	1-3	113	138.99	Wing wall	ICD station and yard

7.2 Design Flood Frequency, Design Live Load

7.2.1 Design Flood Frequency

Bridge and culvert: 1/100.

7.2.2 Design Live Load

Highway bridge: Class A Highway.

Culvert: "ZKH" Live Load of China Railway Standard

7.3 Design of Highway Bridge

7.3.1 Span Layout

Spans as 2×20m, which are precast box girders.

7.3.2 Type of Bridge Structure

The structure size and internal force of bent cap must meet the requirements of superstructure and substructure. Main beam side block shall be set at the bent cap of simply-supported beam of the bridge. Bearing top elevation and bearing block size, as well as bearing installation method shall be indicated in the bent cap structural diagram. At least 0.1m space shall be reserved between bent cap top and main beam bottom for setting jack when replacing bearing. When the buried abutment is adopted and with good ground conditions, pile column abutment may be adopted in case that the depth of fill is less than 5m, while ribbed slab abutment should be adopted if the depth of fill is or more than 5m.

The foundation type shall be determined reasonably according to such conditions as geological, hydrologic and hydraulic conditions and type of construction.

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Pile-column form shall be adopted in preference for pile of diameter of 1.2m selected for pile foundation, and bores for pile foundation shall be formed by drill.

7.3.3 Bearing

Plate type elastomeric pad bearing shall be used for bridges, the performance of which shall conform to the provisions of the industrial standard issued by Ministry of Transport - Plate Type Elastomeric Pad Bearings for Highway Bridges (JT/T 4-2004).

7.3.4 Bridge Deck Pavement

15cm thick cast-in-situ layer of C40 waterproof concrete bridge decks. The waterproof concrete shall be set with diameter10 cold-rolled ribbed reinforcement mesh, and the space between grids shall be 10cm × 10cm; the reinforcement mesh shall conform to the requirements of Welded Steel Fabric for Reinforced Concrete (GB/33365-2016), the clear distance between mesh and the top of concrete pavement is 2.5cm, and meshes shall be constructed in strict accordance with Technical Specification for Concrete Structures Reinforced with Welded Steel Fabric (JGJ114-2014).

7.3.5 Crash Barrier

Bilateral crash barrier shall be set on the whole bridge. C30 concrete bilateral crash barrier with anti-collision level SS shall be set for each bridge to ensure the safety of traffic after its open. The crash barrier 1.15m high.

7.3.6 Bridge Deck Drainage

For each square meter of bridge deck, the discharge area of drain pipe is (2~3) ×10—4m2, and the drain pipe spacing is not more than 5m; steel or cast-iron pipe shall be adopted as drain pipe; cast-iron processed approved products shall be used for grating; the drain pipe shall be set up in horizontal, while it shall be set in vertical if it is available in processing structure, off course the gutter inlet must be done well.

7.3.7 Transition Slab behind Abutment

The transition slab behind abutment is 6m long and 30cm thick. It shall be the same as that of carriageway, and along the route longitudinal slope. The transition slab shall be placed on the bracket of abutment back wall along the direction of bridge to the end near the abutment, and the top of which shall be consistent with the level of pavement base, and the transverse direction of bridge shall be consistent with the pavement cross slope. Four-layer linoleum in non-bonded bolted type shall be put between transition slab and abutment bracket to ensure the free rotation of transition slab.

7.3.8 Ground Treatment behind Abutment

The subgrade fill of bridgehead shall be grooved again for abutment construction after the completion of preloading settlement. Sandy soil or sand gravel which has the best water content and good water permeability shall be chosen for filling behind abutment by compacting in layers of which thickness cannot be more than 20cm and density is or more than 95% (heavy compaction standard).

7.3.9 Grounding for Lightning

Lightning protection and grounding devices shall be set on the bridge pier and abutment.

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Technical Standard for Design

1. Railway

1.1 Station and Yard

1.Code for Design of Railway Station and Terminal (TB10099-2017)

2.Code for Design of Railway Line (TB10098-2017)

3.Code for Design of Railway Earth Structure (TB10001-2016)

4.Code for Design of Railway Track (TB10082-2017)

1.2 Culvert

1.Basic Code for the Designs of the Railway Bridges and Culverts (TB10002-2017)

2.Code for Design of Concrete Structures of Railway Bridge and Culvert (TB10092-2017)

3.Code for Design on Subsoil and Foundation of Railway Bridge and Culvert (TB10093-2017)

4.Code for Seismic Design of Railway Engineering (GB50111-2006) (Version 2009)

5.Code for Durability Design of Railway Concrete Structures (TB10005-2010)

6.Code for environmental protection design of railway engineering (TB10501-2016)

7.Code for Design on Hydrology Investigation of Railway Engineering (TB 10017-99)

1.3 Building

1.Code for design of civil buildings (GB50352-2005)

2.Coed for fire protection design of buildings (GB50016-2014 (2018))

3.Code for Design of Fire Prevention for Railway Engineering (TB10063-2016)

4.Standard for Design of Railway Buildings (Q\CR9146-2017)

5.Code for fire prevention in design of interior decoration of buildings (GB50222-2017)

6.Coder for design of sound insulation of civil buildings (GB50118-2010)

7.Unified technical specification for application of wall materials (GB50574-2010)

8.Code for design of building floor (GB50037-2013)

9.Technical code for roof engineering (GB50345-2012)

10.Code for acceptance of construction quality of roof (GB50207-2012)

11.Technical specification for small concrete hollow block buildings (JGJ/T14-2011)

12.Technical specification for application of architectural glass (JGJ113-2015)

13.Technical specification for external thermal insulation on walls (JGJ144-2008)

14.Technical specification for waterproofing of exterior wall of buildings (JGJ/T235-2011)

1.4 Water Supply and Drainage

1. Reinforced concrete reservoir 05S804

2. Reinforced concrete water meter chamber 05S502

3. Reinforced concrete water supply valve well 05S502

4. Reinforced concrete mud valve shaft 05S502

5. Reinforced concrete drainage inspection chamber r02S515

6. Reinforced concrete septic tank 03S702

7. Reinforced concrete oil separation tank 04S519

8. Sewage pumping well 08S305

1.5 Structure

1. Standard for Classification of Seismic Protection of Building Constructions (GB50223-2008)

2. Load Code for The Design of Building Structures (GB50009-2012)

3. Code for Design of Concrete Structures (GB50010-2010 Ver.2015)

4. Code for Seismic Design of Buildings (GB50011-2010 Ver.2016)

5. Code for Design of Building Foundation (GB50007-2011)

6. Code for Design of Masonry Structures (GB50003-2011)

7.Code for Anticorrosion Design of Industrial Constructions (GB/T50476-2008)

8. Technical Code for Ground Treatment of Buildings (JGJ79-2012)

1.6 Indoor Lighting

1. Code for Design of Electric Power Supply Systems (GB50052-2009)

2. Code for Design of Low Voltage Electrical Installations (GB50054-2011)

3. Standard for Lighting Design of Buildings (GB50034-2013)

4. Code for Design Protection of Structures Against Lightning (GN50057-2010)

5. Code for Design of Railway Electric Power (TB10008-2015)

1.7 Indoor Water Supply, Drainage and HVAC

1. Code for design building water supply and drainage (GB50015-2003,2009)

2. Code for fire protection design of buildings (GB50016-2014,2018)

3. Code for design of extinguisher distribution in buildings (GBJ50140-2005)

4. Design code for heating ventilation and air conditioning of civil buildings (GB50736-2012)

5. Code of acceptance for construction quality of water supply drainage and heating works (GB50242-2002)

6. Code of acceptance for construction quality of ventilation and air conditioning works (GB50243-2016)

1.8 Connecting Road

1. Road Design Manual of Republic of Kenya.

2. Standards and Technical Codes for Construction of Road and Bridges issued by Ministry of Transport and Communications, Republic of Kenya.

3. Code of Practice for the Design & Construction of Buildings & other Structures in relation to Earthquakes.

4. British Standard BS 8110: Structural Use of Concrete.

5. British Standard BS 5400: Steel, Concrete and Composite Bridges (Part one – Part ten), current version;

6. British Standard BS 8004: British stand code of Practice for Foundations.

7. British Standard: Overseas Road Design Manual.

8. AASHTO Standard Specifications for Highway Bridge.

9. Technical Standard of Highway Engineering (JTG B01-2014)

10. General Code for Design of Highway Bridges and Culverts (JTG D60-2015)

11. Code for Design of Highway Reinforced Concrete and Prestressed Concrete Bridge and Culvert (JTG D62-2018)

12. Code for Design of Highway Masonry Bridges and Culverts (JTG D61-2005)

13. Code for Design of Ground Base and Foundation of Highway Bridges and Culverts (JTG D63-2007)

14. Guidelines for Seismic Design of Highway Bridges (JTG/T B02-01-2008)

15. Specification of Earthquake Resistance Design for Highway Engineering (JTG/T B02-01-2008)

16. Technical Specification for Construction of Highway Bridge and Culverts

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(JTG/T F50-2011)

17. Specification for Deterioration Prevention of Highway Concrete Structures (JTG/TB07-1-2006)

1.9 Communication

1. Code for design of railway communication (TB10006-2016)

2. Code for design of railway digital mobile communication system (TB10088-2015)

1.10 Signal and Control

1. Code for Railway Technical Management Rules (For normal speed railways) (TG/01 - 2014)

2. Code for Railway Signal Design Specification (TB 10007-2017)

3. Code for Preparation Principle of Railway Signal Interlocking Drawing (TB/T 1123-93)

4. Computer Interlocking Technical Conditions for Railway Stations (TB / T 3027-2015)

5. Railway Station Coding Technical Conditions (TB / T 2465-2010)

6. General Technical Conditions of Track Circuit (TB/T 2852-1997)

7. Technical Conditions of 25Hz Track-detecting Track Circuit (TB/T 2853-1997)

8. Technical Conditions for Railway Automatic Inter-Station Blocking (TB / T 2668-2004)

9. Definition and Distribution of Cab Signal Information (TB / T 3060-2016)

10. Temporary Design Specification on Railway Dispatching Command and CTC System (TJS (2007) No. 205)

11. Network Scheme and Hardware Configuration Standard for Train Dispatching Command System (TDCS), Centralized Traffic Control System (CTC) (YJXH (2009) No. 676)

12. Technical Conditions on Decentralized Autonomous Centralized Traffic Control System (CTC)" (provisional) (KJYH [2004] No. 15)

13. Technical Conditions for Railway Centralized Signal Monitoring System (YJXH (2010) No. 709)

14. Technical Conditions for Railway Signal Intelligent Power Supply Panel (provisional) (YJXH [2005] No. 458)

15. Railway Signal Power Supply Panel (KJY [2008] No. 36)

16. Implementation Guidance for Lightning Protection and EMC Comprehensive Protection of Railway Signaling Equipment (TY (2006), No. 26)

17. Technical Specification of Railway Lightning Protection and Earthing Engineering (TB 10180-2016)

18. Clock Synchronization Scheme on Wayside Signal Equipment (YDXHH [2012] NO. 109)

19. Code for Design on Fire Prevention of Railway Engineering (TB 10063-2016)

20. Standard for Design of Railway Buildings (QCR 9146-2017)

1.11 Information

1. Code for design of railway line (GB50090-2006)

2. Code for design on subgrade of railway (TB10001-2005)

3. Code for design on special subgrade of railway (TB10035-2006)

4. Code for design of railway track (TB10082-2005)

5. Code for design of railway station and terminal (GB50091-2006)

6. Code for design on tunnel of railway (TB10003-2005)

7. Technical code for service gallery of railway tunnel (TB10109-95)

8. Fundamental code for design on railway bridge and culvert (TB10002.1-2005)

9. Code for design on reinforced and prestressed concrete structure of railway bridge and culvert (TB10002.3-2005)

10. Code for design on concrete and block masonry structure of railway bridge and culvert (TB10002.4-2005)

11. Code for design on subsoil and foundation of railway bridge and culvert (TB10002.5-2005)

12. Code for design of railway locomotive facilities (TB10004-2008)

13. Code for design of railway communication (TB10006-2016)

14. Code for design of railway signaling (TB10007-2017)

15. Code for design of railway electric power (TB10008- 2015)

16. Code design of water supply and sewerage of railway (TB10010-2016)

17. Standard for design of railway buildings (TB10011-2012)

18. Code for design of railway passenger car rolling stock facilities (TB10029-2009)

19. Code for design of railway freight car rolling stock facilities (TB10031-2009)

20. Code for seismic design of railway engineering (GB50111-2006)

21. Code for durability design on concrete structure of railway (TB10005-2010)

22. Code for design on fire prevention of railway engineering (TB 10063—2016)

1.12 Electricity

1.Code for Design of Railway Electric Power (TB 10008-2015)

2.Code for Design of Railway Lighting (TB 10089-2015)

3.Code for Design of 20kV & under Electric Substation (GB 50053-2013)

4.Design Code for Protection of Structures Against Lightning (GB 50057-2010)

5.Code for Design of 66kV or Under Overhead Electrical Power Transmission Line (GB 50061-2010)

6.Cable Design Standard for Power Engineering (GB 50217-2018)

7.Code for Design of Low Voltage Electrical Installations (GB 50054-2011)

8.Code for Design Electric Power Supply Systems (GB 50052-2009)

9.Standard for Lighting Design of Outdoor Work Places (GB 50582-2010)

2. ICD

2.1 General Layout

1. The Stipulation for the Preparation of Detail Design Documents of Port and Waterway Engineering (JTS110-7-2013)

2. Design Code of General Layout for Sea Ports (JTS-165-2013)

3. Design Code of Environment Protection for Port Engineering (JTS 149-1-2007)

4. Code of Energy-Saving Design for Port and Waterway Engineering (JTS 150-2007)

5. General Principles for the Requirements of Safety and Health in Production Process (GB/T 12801-2008)

6. Other related design standards and codes

2.2 Handling Technology

1. Design Code of General Layout for Sea Ports (JTS-165-2013)

2. Code for Design of Railway Logistics Center (Q/CR 9133-2016)

2.3 Road and Yard

1. Technical Specification for Construction of Highway Cement Concrete Pavements (JTG f30-2015);

2. Design Code of Road and Storage yard for Port Area (JTS 168-2017)

3. Technical Guidelines for Construction of Highway Roadbeds (JTGT F20-2015).

2.4 Water Supply and Drainage

1. Code for Design of Outdoor Wastewater Engineering (GB 50014-2006)

2.Code for Design of Building Water Supply and Drainage

(GB 50015-2003, and 2009)

2.5 Power Supply and Lighting

1. Code for Design of Cables of Electric Engineering (GB500217-2018)

2. Code for Design of Low Voltage Electrical Installations (GB50054-2011)

3. Code for Design Electric Power Supply Systems (GB50052-2009)

4. Standard for Lighting Design of Outdoor Work Places (GB50582-2010)

5. Design Code of General Layout for Sea Ports (JTS 165-2013)

6. Other related design documents as provided.

2.6 Communication

1. Design Code for Communication Conduit and Passage Engineering (GB 50373-2006)

2. Code for Engineering Technology of Digital Trunking Communication (GB/T 50760-2012)

3. Code for Design of Electronic Information System Room (GB 50115-2017)

4. Code of Design for Video Monitoring System (GB 50395-2006)

5. Technical Specification of Video Monitoring Secure System (GA/T 367-2001)

6. Code for Technical Video Display System Engineering (GB 50464-2008)

7. Construction design for other disciplines

2.7 Control and IT Management

1. Design Code for Computer Management and Control System of Container Terminal (JTJ/T 282-2006)

2. Code for Design of Data Centers (GB 50174-2017)

3. Code for Engineering Design of Generic Cabling System for Building and Campus (GB 50311-2007)

4. Technical Code for Protection of Building Electronic Information System against Lightning (GB 50343-2012)

5. Design and construction of intelligent building weak electrical engineering (09X700)

2.8 Heating Ventilation and Air Conditioning (HVAC)

1. Design Code for Heating Ventilation and Air Conditioning of Industrial Buildings (GB50019-2015)

2. Design Standard for Energy Efficiency of Public Buildings (GB50189-2015)

2.9 Architecture

1. Uniform Standard for Design of Civil Building (GB50352-2019)

2. Code for Fire Protection Design of Buildings (GB50016-2014（2018）)

3. Code for Fire Prevention in Design of Interior Decoration of Buildings (GB50222-2017)

4. Technical Code for Roof Engineering (GB50345-2012)

5. Code for Design of Building Floor（GB50037-2013）

6. Code for Design of Sound Insulation of Civil Buildings (GB50118-2010)

7. Code for Seismic Design of Buildings （GB50011-2010)

8. Technical Specification for Small Concrete Hollow Block Building JGJ/T14-2011)

9. Technical Specification for Application of Architectural Glass (JGJ113-2015)

10. Technical Specification for Waterproofing of Exterior Wall of Buildings (JGJ/T235-2011)

2.10 Structure

1. Standard for Classification of Seismic Protection of Building Constructions (GB50223-2008)

2. Load Code for the Design of Building Structures (GB50009-2012)

3. Code for Design of Concrete Structures (GB50010-2010 Ver.2015)

4. Code for Seismic Design of Buildings (GB50011-2010 Ver.2016)

5. Code for Design of Building Foundation (GB50007-2011)

6. Code for Design of Masonry Structures (GB50003-2011)

7. Code for Anticorrosion Design of Industrial Constructions (GB/T50476-2008)

8. Technical Code for Ground Treatment of Buildings (JGJ79-2012)

2.11 Slope support

1.Technical code for building slope engineering (GB 50330-2013)

Annex 5: Consultants Registration and Practicing Licence

FORM 5

(r. 14(4))

Application Reference No. 1282
Registration: 1899
FOR OFFICIAL USE

THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT
CERTIFICATE OF REGISTRATION AS AN ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT EXPERT

This is to certify M/s ..... AQUACLEAN SERVICES .....

of ..... P.O. BOX 1902 – 00100 NAIROBI ..... (Address)

has been registered as an Environmental Impact Assessment Expert in accordance with the provisions of the Environmental Management and Coordination Act and is authorised to practice in the capacity of a Lead Expert/Associate Expert/Firm of Experts (Type) ..... FIRM OF EXPERTS .....

Dated this 22ND Day APRIL of 20 09

Signature .....

(Seal)

Director General
The National Environment Management Authority

FORM 7 (r 15(2))

nema

NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY(NEMA)

THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT

ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING LICENSE

License No : NEMA/EIA/ERPL/11769

Application Reference No: NEMA/EIA/EL/15854

M/S **Aquaclean Services Limitd**
(individual or firm) of address

P.O. Box 1902-00100, Nairobi

is licensed to practice in the

capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Firm of Experts**
registration number **1899**

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

Issued Date: **2/17/2020** Expiry Date: **12/31/2020**

Signature.....

(Seal)
Director General
The National Environment Management Authority

P.T.O.

ISO 9001: 2008 Certified