ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT

FOR

THE PROPOSED RESIDENTIAL APARTMENTS DEVELOPMENT ON PLOT NO. NAIROBI/BLOCK 3/85 LOCATED ALONG MKOKO CLOSE IN WESTLANDS AREA OF NAIROBI CITY COUNTY

This Environmental Impact Assessment (EIA) Study Report is submitted to the National Environment Management Authority (NEMA) in conformity with the requirements of the Environmental Management and Coordination Act, Cap 387 and the Environmental (Impact Assessment and Audit) Regulations, 2003

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Project Proponent:

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Nairobi.

27th October 2023

Declaration

This Environmental Impact Assessment (EIA) Study Report for the **Proposed Residential Apartments Development** on Plot No. Nairobi/Block 3/85 located along Mkoko Close in Westlands area of Nairobi City County has been prepared by **Space Planners Limited, EIA/Audit Firm of Experts (NEMA Reg. No. 10,492),** in accordance with the Environmental Management and Coordination Act, Cap 387 and The Environmental (Impact Assessment and Audit) Regulations, 2003 for submission to the National Environment Management Authority (NEMA).

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Signed: _____ Date: _____

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Designation: ……

EIA Study Team

Name	Position	Roles
Plan. Solomon Kyeni	Team Leader/ Lead Expert, Reg. No.: 3081	▪ Stakeholder Engagement ▪ Land Use Zoning ▪ Site Baseline Survey ▪ Impact Analysis and Mitigation Plans
Aaron Mumo	Associate Expert, Reg. No.: 9047	▪ Detailed baseline survey and data collection ▪ Review of relevant environmental literature, environmental policy and legislation framework ▪ Analysis of the environmental impacts ▪ Preparation of Environmental Management Plan ▪ Analysis of the project alternatives ▪ Interpretation of Structural and Civil drawings
Maureen Dieto	Sociologist	▪ Stakeholder analysis ▪ Holding Public Consultative forums within the project area. ▪ Describing the socio-economic and cultural environment within the assignment area. ▪ Analysis of socio-economic impacts
Lilian Mbogo	Associate Expert, Reg. No.: 13273	▪ Baseline survey and data collection ▪ Fieldwork and analyses; baseline identification and analysis ▪ Undertake Consultation and Public Participation with the PAP ▪ Coordinate project meetings and compilation of minutes ▪ Report writing and compilation of EIA Study Report
Arch. Thomas Bowman	Architect	▪ Design and detail of the architectural drawings for the project.
Eng. Nathaniel Matalanga	Structural Engineer	▪ Structural design and supervision of construction.
Eng. Gicheru Kimani	Mechanical Engineer	▪ Consultant Engineer responsible for mechanical engineering services including design, supervision, contract management and cost control
Eng. Maina Muriuki	Electrical Engineer	▪ Consultant Engineer in charge of electrical engineering services including design, supervision, contract management and cost control

Executive Summary

Introduction

Article 43 of the Constitution of Kenya 2010 stipulates that every person as a right to accessible and adequate housing and to reasonable standards of sanitation. Although this is a constitutional right, the housing situation in the country is such that the demand far exceeds supply leaving many people to live in deplorable conditions. According to the Ministry of Lands, Public Works, Housing, and Urban Development, the average national annual housing demand is estimated at 250,000 units while the annual supply is approximately 50,000 housing units leading to a deficit of about 200,000 housing units per year and a cumulative backlog of 2 million housing units. The country has made remarkable strides over the years in a bid to address decent housing such as government-led initiatives, private sector innovations, and public-private partnerships. However, more is required for the majority of Kenyans to realize this constitutional right. In light of the above, the proponent ***Hale End Properties Limited*** has proposed to construct **419 residential apartments, 313 parking bays, and associated amenities** on Plot No. Nairobi/Block 3/85 located along Mkoko Close in Westlands area of Nairobi City County. At present, the site is characterized by an unoccupied maisonette structure which will be demolished to pave way for the proposed development upon acquisition of a demolition permit from NCC.

Scope

The scope of the report is to describe the nature of the project and the physical extent of the project site and its immediate environs, document all the baseline information, describe the legal and regulatory framework associated with the project, analyze the project alternatives, assess the environmental impacts, and develop feasible mitigation measures for the anticipated negative impacts including designing the Environmental Management Plan (EMP) for the project while maximizing on the anticipated positive impacts.

Project Objectives

The objective of the proposed project is to construct **three (3) blocks (2 blocks of 17 floors and a block of 19 floors) with a total of 419 residential apartments (242 one-bedroom apartments, 163 two-bedroom apartments, and 14 three-bedroom apartments), 313 parking bays, and associated amenities** in Westlands area of Nairobi City County.

EIA Objectives

The objective of the EIA is to identify, predict and evaluate the economic, environmental, and social impacts of development activities, to provide information on the environmental consequences for decision-making, and to promote environmentally sound and sustainable development through the identification of appropriate alternatives and mitigation measures.

Methodology

The methodology used for preparation of this EIA Study Report is stated below:

i. Environmental Screening of the proposed project in line with the Second Schedule of the Environmental Management and Coordination Act (EMCA), Legal Notice No. 31 of 2019. The EIA team established that the proposed development falls under **High-Risk Projects *(Urban development including establishment of new housing estate developments exceeding one hundred housing units)*** which requires submission of the EIA Study Report to NEMA under Section 58 (2) of the Act.

ii. A scoping exercise that identified the key issues to be addressed in the assessment including environmental, health and safety concerns of the neighbors and the public.

iii. Preparation of Terms of Reference (TOR) and submission to the authority for approval.

iv. Documentary review on the nature of the proposed activities, policy and legal framework, environmental setting of the area and other available relevant data/information.

v. Consultations and Public Participation (CPP) with PAP through public meetings, the administration of questionnaires, discussions and key informant interviews.

vi. Physical evaluation of the project site and the surrounding areas using a pre-prepared checklist with a specific focus on environmental and human safety issues that are likely to be affected,

vii. A site reconnaissance and visual survey to assess the baseline information of the project area using a prepared checklist.

viii. Reviewing the proposed project designs and implementation plan/schedules with a view to suggesting suitable alternatives.

ix. Develop an EMP outlining the responsibilities, schedules, monitorable indicators and time frames.

x. Preparation and submission of the EIA Study Report to NEMA.

Potential Positive Impacts

The positive impacts associated with the proposed project include the following among others:

i. Provision of 419 residential apartments in Westlands area.
ii. Enhance convenience to the residents through the provision of a convenience store and recreational facilities such as gym and swimming pool within the same development.
iii. Creation of employment opportunities throughout the project cycle i.e., property managers, construction workers, domestic workers, caretakers, security personnel, gym trainers, and cleaners among others.
iv. Revenue generation to the National Government through taxes such as VAT for goods and services, Monthly Rental Income (MRI), and enhanced ground rent among others.
v. Revenue generation to the County Government through permits such as building plans fees and enhanced rates among others.
vi. Revenue generation to the proponent through the sale and/or lease of the residential apartments.
vii. Provide a market for goods and services throughout the project cycle such as building materials (cement, sand, ballast, steel) and professional services such as architectural, engineering, and environmental consultancy services.
viii. Increase in the value of land/property in the area by putting the land into a more productive and economic use.

Potential Negative Impacts and Mitigation Measures

The anticipated negative impacts associated with the proposed project and their mitigation measures include the following:

Impact	Mitigation Measures
Soil Erosion	▪ Apply for an excavation permit from Nairobi City County before the construction begins. ▪ Use of soil erosion control structures on prone areas within the site. ▪ Levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil. ▪ Undertake landscaping exercise by planting appropriate vegetation and indigenous trees on the open spaces after completion of construction works.
Air Pollution	▪ Screening of the entire site to control and arrest construction-related dust. ▪ Sprinkling of water on the work areas twice a day to prevent fugitive dust violations especially during the dry season. ▪ Provide PPE such as masks to the workers in dusty areas within the site. ▪ Monitor the air quality levels as per the EMCA (Air Quality) regulations.

Noise and Excessive Vibrations	▪ Construction activities will be carried out between 0800hrs to 1800hrs on weekdays and 0800hrs to 1800hrs on Saturdays only. ▪ All noisy activities shall be scheduled concurrently to reduce the exposure period. ▪ Provision of appropriate PPE such as earmuffs to all workers in noisy environment within the site. ▪ Regular monitoring of noise and vibration levels at the site as per the EMCA (Noise and Excessive Vibrations) regulations.
Solid Waste	▪ The proponent shall prepare a Waste Management Plan for the entire project cycle. ▪ Provision of a central waste collection point within the site before final disposal. ▪ Provision of properly labelled and colour-coded receptacle bins for solid waste management within the site. ▪ Segregation of non-hazardous waste into organic and non-organic fractions before final disposal. ▪ Provide adequate and appropriate PPE to the refuse collection personnel such as gloves and masks. ▪ Engagement of a NEMA registered waste transporter to collect and dispose of segregated waste to designated disposal sites. ▪ Manage the waste in line with the EMCA (Waste Management) Regulations and Sustainable Waste Management Act.
Liquid Waste	▪ Extension of the connection of the proposed development to the sewer system upon acquisition of a connection permit from NCWSC. ▪ Construction of an internal reticulation system which can consistently handle the loads even during peak volumes. ▪ Apply for a site toilet from NCC before the construction begins and ensure the provision of sufficient and suitable sanitary conveniences for the workers within the site. ▪ Install hygiene awareness signs at strategic points within the site and hold regular toolbox talks on hygiene with the personnel. ▪ Proper decommissioning of the sanitary conveniences once the construction works are completed.
Water Demand	▪ Drill a borehole to supplement the existing NCWSC water supply subject to the acquisition of an authorization permit from WRA. ▪ Extend the connection of the main water supply to the proposed development upon acquisition of a connection permit from NCWSC. ▪ Rainwater harvesting within the site to supplement the existing water supply. ▪ Install water efficient fixtures/fittings within the development such as 6 litres dual flush cisterns, low flow rate taps and showerheads. ▪ Monitor the water consumption within the site every month.
Energy Demand	▪ Install a sole transformer to supply energy to the proposed development subject to the acquisition of a connection permit from KPLC. ▪ Install a 100 KWp grid tied Solar PV Plant as an alternative source of renewable energy for the proposed development. ▪ Install energy efficient fixtures and fittings within the development such as

	LED bulbs. ▪ Monitor the energy consumption within the site every month.
Traffic Congestion	▪ Construct a service lane within the property adjacent to Mkoko Close to ensure a smooth flow of traffic in and out of the site. ▪ The proponent will prepare a Traffic Management Plan (TMP) to ensure a smooth flow of traffic during the construction phase. ▪ Ferry building materials and construction waste during the off-peak hours. ▪ Engage traffic marshals to control traffic in and out of the site. ▪ Install traffic control/warning signs to inform the motorists and public of the potential hazards.
Storm Water Drainage	▪ Construct drainage channels within the site covered with gratings to avoid the occurrence of accidents and the entry of dirt. ▪ Construct gently sloping drains to convey water at non-erosive speed. ▪ Use of semi-permeable materials during the construction of pavements.
Oil Pollution	▪ All drainage facilities shall be fitted with adequate functional oil-water separators and silt traps. ▪ All oils/grease shall be stored in a designated area in the contractor's yard away from the site. ▪ Proper disposal of oily materials such as oil drums and cans at designated disposal sites by licensed waste transporters.
Health and Safety of Workers	▪ Register the site as a workplace with the DOSHS. ▪ Provide adequate and appropriate PPE to the workers within the site such as safety boots, overalls, helmets, goggles, earmuffs, masks, gloves etc. ▪ Provide first aid kit within the site fully equipped at all times and managed by qualified personnel. ▪ Install appropriate precautionary signage at strategic places within the site. ▪ Undertake a health and safety audit of the workplace annually by a registered health and safety adviser. ▪ Adapt a suitable Emergency Response Plan (ERP) to manage the occurrence of anticipated hazards during the construction phase. ▪ Comply with OSHA 2007 and all other relevant regulations governing the health and safety of the workplace.
Fire Risks	▪ Hire a competent authorized contractor to do the electrical works on site. ▪ Provide adequate firefighting equipment at strategic places within the property. ▪ Train staff on the use of the available firefighting equipment. ▪ Conduct annual fire drills within the site to sensitize the workers.
Insecurity	▪ Engage security personnel to guard the site and monitor the movement of people in and out of the property at all times. ▪ Install security lights around the property and ensure they are switched on only during the night hours. ▪ Hoard the site and construct a gatehouse to enhance security within the site.
Devegetation and Impact On Fauna	▪ Conserve all the young trees along the setbacks and within the riparian reserve. ▪ The proponent will obtain a tree-cutting permit before cutting down the trees and adhere to the conditions therein.

	▪ Undertake comprehensive landscaping exercise after the construction phase by planting indigenous trees along the riparian reserve and designated open spaces. ▪ Avoid dumping spoil and waste into the Nairobi River.
Conflict With Neighbours	▪ Establish a Grievance Redress Mechanism that is easily accessible to all the stakeholders. ▪ Continuous communication between the proponent and stakeholders on the progress of the project and its effects.

Conclusion and Recommendations

The proposed project will have numerous benefits to the housing sector as outlined above. The negative impacts identified can be mitigated to a level of no significance throughout the project cycle. The implementation of the EMP developed in this report will be instrumental in ensuring environmental protection, health, and safety of the workers and the general public. It is, therefore, our recommendation that the proponent be granted an EIA license to implement the proposed project.

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Acronyms

CBD	Central Business District
CCTV	Closed-circuit Television
CPP	Consultations and Public Participation
DOSHS	Directorate of Occupational Safety and Health Services
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management Plan
EPRA	Energy and Petroleum Regulatory Authority
ERP	Emergency Response Plan
GPS	Global Positioning System
GRS	Grievance Redress System
KEBS	Kenya Bureau of Standards
KPLC	Kenya Power and Lighting Company
LED	Light-Emitting Diode
MRI	Monthly Rental Income
NCA	National Construction Authority
NCC	Nairobi City County
NCWSC	Nairobi City Water and Sewerage Company
NEAP	National Environment Action Plan
NEMA	National Environment Management Authority
NET	National Environment Tribunal
OHS	Occupational Health and Safety
PAP	Project Affected Persons
PPE	Personal Protective Equipment
SDGs	Sustainable Development Goals
TIA	Traffic Impact Assessment
TMP	Traffic Management Plan
TOR	Terms of Reference
VAT	Value Added Tax
WRA	Water Resources Authority

CHAPTER ONE: INTRODUCTION

1.1 General Overview

The demand for housing in Kenya has been rising in the recent years as a result of high urbanization and population growth rates. According to 2022 Yearbook published by the Centre for Affordable Housing Finance in Africa (CAHF) on Housing Finance in Africa, Kenya's trend towards urbanization is projected to continue with 50% of the country's population expected to live in urban areas by 2050. The housing demand is estimated at 250,000 units annually with a supply of only 50,000 units annually resulting to 80% annual housing deficit. Therefore, there is need to construct more housing units in order to meet this demand. The Government under the *Bottom-Up Economic Transformation Agenda (BETA)* plans to increase the supply of new housing to 250,000 units per annum in order to bridge this gap. It is also providing an enabling environment for supply of housing by both the public and private sectors through the lowering cost of inputs and providing incentives to developers. In light of the above, the proponent ***Hale End Properties Limited,*** has proposed to construct **419 residential apartments, 313 parking bays and associated amenities** on Plot No. Nairobi/Block 3/85 located along Mkoko Close in Westlands area of Nairobi City County. The proposed development will contribute to bridging of the housing shortage in the area while adhering to environmental best practices, the area zoning regulations as well as other relevant laws.

The sustainability of developments must be seriously taken into consideration right from the design stage. The proponent recognizes that they have a responsibility to the environment beyond legal and regulatory requirements and are committed to minimizing environmental impacts and continually improving and monitoring the environmental performance of the proposed development and its surroundings and has therefore engaged the environmental experts to carry out the EIA in accordance with the EMCA, CAP 387. The EIA team has evaluated the possible environmental, occupational health and safety impacts of the proposed development during the project cycle and in turn, proposed suitable methods of mitigating the anticipated negative impacts. This will not only achieve a safe and clean environment but also ensure that the proposed project activities are in conformity with the existing environmental legislation.

1.2 Objectives of the EIA

The overall objective of EIA is to ensure that environmental concerns are integrated in the proposed project in order to contribute to sustainable development.

The specific objectives are:

i. To identify potential environmental impacts of proposed project and assess the significance of these impacts.
ii. To assess the relative importance of the various project alternatives.
iii. To propose mitigation measures for the significant negative impacts of the project on the environment.
iv. To seek the views and concerns of all the Project Affected Persons (PAP) in regards to the proposed project.
v. To generate baseline data for monitoring and evaluation of how well the mitigation measures are being implemented during the project cycle.
vi. To develop an Environmental Management Plan (EMP) for the project cycle with mechanisms for monitoring and evaluating the compliance and environmental performance which shall include the cost of mitigation measures and the time frame of implementing the measures.
vii. To present the results of the EIA in such a way that they can guide informed decision making.

1.3 Project Objectives

The objectives of the proposed development include:

i. To construct **three (3) blocks (2 blocks of 17 floors and 1 block of 19 floors) comprising a total of 419 residential apartments (242 one-bedroom apartments, 163 two-bedroom apartments, and 14 three-bedroom apartments), 313 parking bays, and associated amenities** in Westlands area of Nairobi City County.
ii. To put the current land into more productive and economic use while ensuring minimal environmental degradation.

1.4 Methodology

The methodology used for preparation of this EIA Study report is stated in the steps below:

i. Environmental Screening of the proposed project in line with the Second Schedule of EMCA, Legal Notice No. 31 of 2019 and established that the proposed development falls under **High Risk Projects *(Urban development including establishment of new housing estate developments exceeding one hundred housing units)*** which requires submission of the study report to NEMA under Section 58(2) of the act.

ii. A scoping exercise that identified the key issues to be addressed in the assessment including environmental, health and safety concerns of the neighbors and the public.
iii. Preparation of Terms of Reference (TOR) and submission to the authority for approval in line with Regulation 11 of the Environmental (Impact Assessment and Audit) Regulations. (*Attached is the copy of TOR approval (Ref: No. NEMA/TOR/5/2/626)).*
iv. Documentary review on the nature of the proposed activities, policy and legal framework, environmental setting of the area and other available relevant data/information.
v. Consultations and Public Participation (CPP) with PAP through public meetings, the administration of questionnaires, discussions and key informant interviews.
vi. Physical evaluation of the project site and the surrounding areas using a pre-prepared checklist with specific focus on environmental and human safety issues that are likely to be affected.
vii. A site reconnaissance and visual survey to assess the baseline information of the project area using a prepared checklist.
viii. Reviewing the proposed project designs and implementation plan/schedules with a view to suggesting suitable alternatives.
ix. Develop an EMP outlining the responsibilities, schedules, monitorable indicators and time frames.
x. Preparation and submission of the EIA Study Report to NEMA.

1.5 Terms of Reference

The following are the TOR developed during the scoping exercise;

i. The proposed location of the project;
ii. A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project;
iii. The objectives of the project;
iv. The technology, procedures and processes to be used, in the implementation of the project;
v. The materials to be used in the construction and implementation of the project;
vi. The products, by-products and waste generated project;
vii. A description of the potentially affected environment;

viii. The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short term and long-term effects anticipated;

ix. Alternative technologies and processes available and reasons for preferring the chosen technology and processes;

x. Analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies;

xi. An Environmental Management Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment; including the cost, time frame and responsibility to implement the measures;

xii. Provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities or major industrial and other development projects;

xiii. The measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies;

xiv. An identification of gaps in knowledge and uncertainties which were encountered in compiling the information;

xv. An economic and social analysis of the project;

xvi. An indication of whether the environment of any other state is likely to be affected and the available alternatives and mitigating measures.

1.6 Project Justification

i. Demand for Housing

Article 43 (1) (b) of the Constitution of Kenya empowers every citizen with a right to accessible and adequate housing and to reasonable standards of sanitation. According to the National Housing Corporation, the country has a cumulative housing deficit of 2 million housing units which grows by 200,000 units annually. The deficit is bound to rise due to the rapid population growth of 2.6 per cent per annum compared to the global average of 1.2 per cent and an urbanization rate of 4.4 per cent against the global average of 2.1 percent. Nairobi is among the areas affected by the deficit with close to 60 percent of its population living in slums. This, therefore, calls for the development of housing units to meet the current demand. The proposed development will contribute to bridging the housing shortage while adhering to environmental best practices and the area zoning regulations.

ii. Socio-Economic Benefits

The proposed development will provide the following socio-economic benefits;

a) Provision of 419 residential apartments in Westlands area.
b) Enhance convenience to the residents through the provision of a convenience store and recreational facilities such as gym and swimming pool within the same development.
c) Creation of direct and indirect employment opportunities throughout the project cycle i.e. property managers, construction workers, domestic workers, caretakers, security personnel, gym trainers, and cleaners among others.
d) Revenue generation to the National Government through taxes such as VAT for goods and services, Monthly Rental Income (MRI), and enhanced ground rent among others.
e) Revenue generation to the County Government through permits such as building plans fees and enhanced rates among others.
f) Revenue generation to the proponent through the sale and/or lease of the residential apartments.
g) Provide a market for goods and services throughout the project cycle such as building materials (cement, sand, ballast, steel) and professional services such as architectural, engineering, and environmental consultancy services.
h) Increase in the value of land/property in the area by putting the land into a more productive and economic use.
i) Increased security within the area.

iii. Neighborhood Development Trend

The area has undergone development regeneration and restructuring in recent years at a high rate as a result of its strategic location and proximity to the Central Business District (CBD). The area is located approximately a kilometer west of the CBD and has seen a transformation from the *previous Single Dwelling Units to High Rise Residential Apartments.* Reference is made to similar developments at a radius of 200 meters from the site which includes *Lilac Valley Suites (10 floors), Breezes (9 floors), Rhapta Height (8 floors), Andrew Apartments (7 floors), Chelsea Park Apartments (6 floors*), *and Royal Heights Apartments (5 floors).* Therefore, the proposed development will conform to the neighborhood development trend and will ensure better utilization of the property giving it a higher-quality urban character.

Plate 1. 1: Lilac Valley Suites Apartments (L) and Chelsea Park Apartments (R)

Source: Field Work, 24/10/2023

CHAPTER TWO: PROJECT DESCRIPTION, DESIGN AND IMPLEMENTATION

2.1 Nature of the Project

The proposed project will entail the construction of **419 residential apartments, 313 parking bays, and associated amenities** in Westlands area. The project aims at providing housing infrastructure as well as maximizing the utilization of the property. At present, the site is characterized by an unoccupied residential maisonette structure which will be demolished to pave way for the proposed development upon acquisition of a demolition permit from NCC.

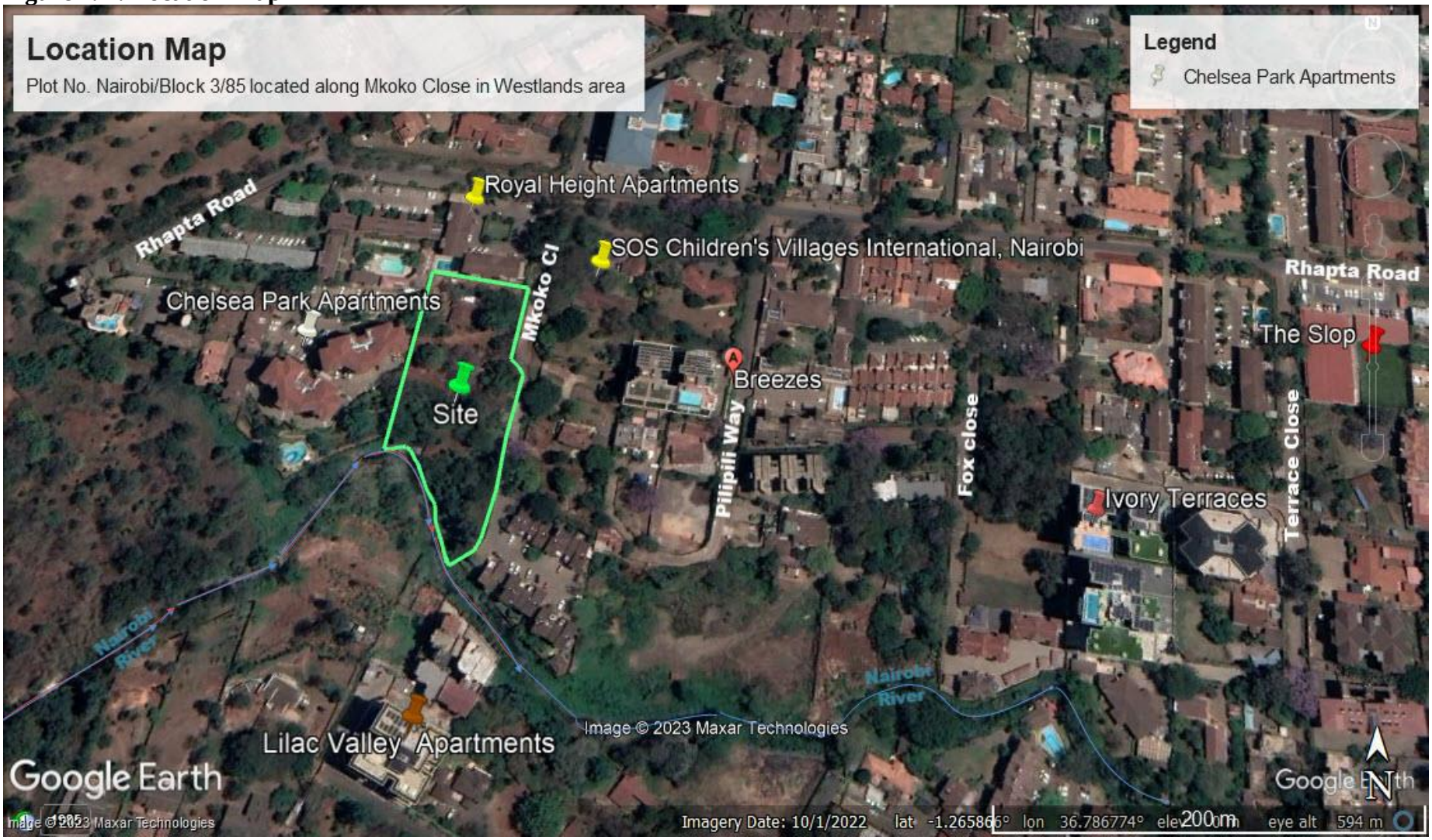
Plate 2. 1: The Site

Source: Fieldwork, 24/10/20223

2.2 Site Location

The subject plot is located along **Mkoko Close** and lies on latitude -1.2644 and longitude 36.7830 in Westlands area of Westlands Sub County, Nairobi City County. It abuts *Nairobi River* to the south; *Rhapta Apartments* to the north; *Chelsea Park Apartments* to the west and *SOS Children's Villages International, Nairobi Regional Office* to the northeastern side as shown in figure 2.1 below.

Figure 2. 1: Location Map



Source: Google Earth, 2023

2.3 Land Tenure, Size, Ownership, and Use

The property is registered as **Plot No. Nairobi/Block 3/85 (formerly L.R. No. 1870/IV/71)** under the Land Registration Act (No. 3 of 2012) on **leasehold interest** for 50 years from 1st day of May 2001. The subject plot measures approximately **0.7689 hectares** and the current registered proprietor is **Hale End Properties Limited** of P.O. Box 67961 - 00200, Nairobi. (*Attached is a copy of the ownership documents*). The proponent applied for a **Change of Use** from a **Single Dwelling Unit** to **Multiple Dwelling Units (Apartments)** and approval granted by the Nairobi City County *(Ref No. PLUPA-COU-001506-N) (Attached is a copy of the Change of Use Approval).*

2.4 Project Description

The proponent proposes to construct **three (3) blocks (2 blocks of 17 floors and 1 block of 19 floors) comprising a total of 419 residential apartments (242 one-bedroom apartments, 163 two-bedroom apartments, and 14 three-bedroom apartments), 313 parking bays, and associated amenities** with the following features:

BLOCK A comprising of 19 floors with a total of 195 residential apartments and 95 parking bays as discussed below;

i. **Ground floor** comprising 46 parking bays, a convenience store and a reception.
ii. **1st floor** comprising 49 parking bays.
iii. **Typical 2nd to 17th floor** comprising 9 units of one-bedroom apartments and 3 units of two-bedroom apartments.
iv. **18th floor** comprising a media room, games room, lounge, a swimming pool with 2 changing rooms and a relaxation area.
v. **19th floor** comprising 3 units of one-bedroom apartments.
vi. **Other salient features** include 3 lift shafts, a lift lobby, staircase, and garden court.

BLOCK B comprises 17 floors with a total of 102 residential apartments and 218 parking bays as discussed below;

i. **Typical 1st to 2nd basement** comprising 60 parking bays.
ii. **Typical 3rd to 5th basement** comprising 27 parking bays.
iii. **Ground floor** comprising a management office, lounge, reception, and 17 parking bays.

iv. **1st floor** comprising 2 units of two-bedroom apartments, a unit of three-bedroom apartment with a DSQ, a media room, and a games room.

v. **2nd floor** comprising 2 gym area, a three-bedroom apartment with a DSQ, 3 units of two-bedroom apartments, and a unit of one-bedroom apartment.

vi. **Typical 3rd to 13th floor** comprising 3 units of one-bedroom apartment, 3 units of two-bedroom apartment, and a unit of three-bedroom apartment with a DSQ.

vii. **14th floor** comprising 3 units of one-bedroom apartments, a unit of two-bedroom apartment, a unit of three-bedroom apartment with a DSQ, and a children's play area.

viii. **Typical 15th to 17th floor** comprising 3 units of one-bedroom apartment and a unit of two-bedroom apartment.

ix. **Other salient features** include 2 services room, a store, 2 lift shafts, and staircase.

BLOCK C comprises of 17 floors with a total of 122 residential apartments as discussed below;

i. **Typical 1st to 5th basement** comprising a unit of one-bedroom apartment and 3 units of two-bedroom apartments.

ii. **Ground floor** comprising a unit of one-bedroom apartment and 3 units of two-bedroom apartments.

iii. **1st floor** comprising a unit of one-bedroom apartment and 4 units of two-bedroom apartments.

iv. **Typical 2nd to 13th floor** comprising 3 units of one-bedroom apartments and 4 units of two-bedroom apartments.

v. **14th floor** comprising a media room, games room, lounge, a swimming pool with 2 changing rooms and a relaxation area.

vi. **Typical 15th to 17th floor** comprising 2 units of one-bedroom apartments and a unit of two-bedroom apartments.

vii. **Other salient features** include a reception area, 2 service rooms, 2 lift shafts and staircases.

Each residential apartment consists of a lounge, kitchen, dining, and washrooms

Other salient features include an arrival courtyard, landscaped gardens, electrical and mechanical ducts, a gatehouse, a boundary wall, ramps, a passage, and a driveway. More fine details, specifications, and features of the proposed project can be obtained from the architectural plans annexed in the report.

Table 2. 1: Total Number of Units per Block

Description	**1 Bedroom Units**	**2 Bedroom Units**	**3 Bedroom Units**	**Parking Bays**	**Total Units**
Block A	147	48	-	95	195
Block B	46	42	14	218	102
Block C	49	73	-	-	122
Sub Total	**242**	**163**	**14**	**313**	**419**
Grand Total					

2.5 Construction Inputs

The project inputs will include the following:

i. The materials that will be used will include stones, cement, sand, crushed rock (gravel/ballast), ceramic fixtures, reinforcement bars, wood/timber, glass, painting materials, plastic, electrical and mechanical fixtures. All these materials shall be sourced from licensed dealers who have complied with the environmental management guidelines and policies and approved by Kenya Bureau of Standards (KEBS).

ii. Several machines shall be used which will include earth moving equipment (excavators, loaders, wheel loading shovels and backhoes), material handling equipment (cranes and hoists), construction equipment (concrete mixers and vibrators) and engineering vehicles (trailers, tippers and dumpers).

iii. The project will require a labour force of both skilled and non-skilled workers. The skilled personnel will include the project consultants (architects, engineers, quantity surveyors and environmental experts) and the contractor with a team of foreman, masons, plasterers, carpenters, plumbers, welders, electricians, glaziers, and painters. The unskilled personnel will include the casual labourers.

iv. Other construction inputs will include water from the Nairobi City Water & Sewerage Company (NCWSC) or borehole water and electricity from the main grid or provided by a generator.

2.6 Construction Activities

2.6.1 Pre-Construction Phase

i. Appraisal of the baseline conditions to determine supply and demand for the required infrastructural services.
ii. Preparation of the preliminary architectural designs and submission to NCC for approval.
iii. Preparation of an EIA Study Report and submission to NEMA for licensing.
iv. Seeking a Project Compliance Certificate from the National Construction Authority (NCA) before the construction begins.
v. Seeking demolition, hoarding, and excavation permits from NCC before the construction begins.
vi. Site preparation through demolition of the existing structures, construction of a hoarding area, site office, material storage area, and provision of sanitary facilities within the site to be used by construction workers.

2.6.2 Construction Phase

i. Excavation and Foundation Works

The site is generally characterized by a surficial layer of reddish moist sandy clay of intermediate plasticity underlain by grey medium strong horizontally fractured tuff which if further underlain by very strong horizontally fractured slightly weathered trachyte. Excavation and carting away of all soils and the weathered tuff will be undertaken to pave way for the foundation and the basement using standard equipment which includes an excavator and hydraulic hammer. Loaders and tippers shall be used to aid in the removal of the soils and rock materials. The excavated red volcanic soils and rocks will be reused within the property and the excess material reused elsewhere in other projects. The topsoil will be disposed of at designated disposal sites by licensed waste transporters. Appropriate excavation works shall be undertaken to ensure that the volumes for the excavation works are clearly defined under the supervision of the project engineers and the county engineers.

ii. Structural Steelworks

The structural elements which include the strip footings, retaining walls, shear walls, slabs, beams, columns, and column bases will be constructed using reinforced concrete. The structural steel will be used to reinforce the concrete since it is weak in tensile strength. Structural steelworks will involve steel cutting, welding and fixing on an already constructed formwork

before concreting is carried out. The steelworks shall be carried out by steel fixers under strict supervision from the project engineer.

iii. Concrete Works

The construction of the proposed development will be carried out in line with the approved architectural & structural plans and comply with the specifications issued and approved by the project team. The structural elements will be constructed using reinforced concrete. Concrete works will involve the mixture of cement, sand, and ballast in the specified ratios and poured into already constructed formwork. The poured concrete will be cured for a specified period approved by the project engineer. The concreting will be supplemented by concrete mixers and vibrators.

vii. **Masonry Works**

The interior and exterior walls shall be built using machine-cut stones sourced from licensed suppliers. The walls will be constructed using cement and sand mortar at specified ratios approved by the project engineer.

viii. **Mechanical and Electrical Works**

This phase will involve the installation of water and wastewater piping, electrical fixtures and appliances including lighting fixtures within the proposed development by licensed electricians and plumbers. This will be followed by an extension of connection of the electrical and mechanical configuration to the existing power and sewer lines upon acquisition of the relevant permits from Kenya Power and Lighting Company (KPLC) and NCWSC respectively.

ix. **Interior and Exterior Finishes**

After concrete and masonry works are completed, plastering will be carried out both internally and externally in line with the specifications of the architect. The plastering will ensure the building is structurally strong, protect it from weather effects and give it an attractive look. Painting of the building will be carried out with cement primer and eco-friendly zero Volatile Organic Compounds (VOC) paints. Thereafter, the installation of floor and wall ceramic tiles will be undertaken by a licensed tiling artisan.

x. **Final Clean Up and Landscaping**

The final cleanup will be carried out once the construction activities are completed. All the solid waste generated during the construction phase will be reused where feasible and/or disposed of at designated approved sites by licensed waste transporters.

Thereafter, the proponent will undertake a comprehensive landscaping exercise by planting indigenous trees along the riparian reserve and within the designated open spaces. The residents shall be sensitized to practice apartment gardening within their residential units during the operation phase.

2.6.3 Operational phase

The project will be used for **residential purposes** and the operational activities will involve the following:

i. **Residence:** A total of 419 families will reside within the development. Operational activities will include *cooking, laundry, cleaning, and resting activities within the residential apartments*.

ii. **Recreational Activities:** There will be several recreational and leisure activities within the development aided by the presence of the gym, games room, swimming pool, and children's play area.

iii. **Property Management:** The proponent shall engage the services of a management company to ensure the following:

- Obtain an Occupation Certificate from the Nairobi City County before operation begins.
- Collect service charges from the tenants and ensure routine maintenance of the development and handling of complaints.
- Ensure monthly monitoring of energy and water consumption within the development.
- Ensure regular cleaning of the common areas within the development such as the parking bays, management office, lounges, media rooms, game rooms, gym, swimming pools, children's play area, corridors, & staircases.
- Ensure regular inspection and maintenance of the generator, electrical and mechanical equipment.
- Enhance security within the site by engaging the services of licensed security guards to man the property at all times.

2.6.4 Decommissioning Activities

Decommissioning is an important phase in the project cycle and comes last to wind up the operational activities of a particular project. It refers to the final disposal of the project and associated materials at the expiry of the project lifespan. If such a stage is reached, the proponent needs to remove all materials resulting from the demolition/ decommissioning of the site. The following should be undertaken to restore the environment:

i. Give notices of at least three (3) months of the intention to redevelop the property and/or demolition of the development to the tenants.
ii. Prepare a decommissioning plan and submit it to NEMA for approval at least three (3) months prior to the exercise.
iii. Apply for a demolition permit from the Nairobi City County Government.
iv. Dismantle the equipment including the electrical and mechanical fixtures/fittings.
v. Demolish the existing structures and removal of the debris from the site while adhering to all the relevant environmental legislation.
vi. Backfill the surface openings with a suitable material such as pebbles and/or demolition debris.
vii. Undertake soft landscaping by planting indigenous trees, grass, and flowers. The site should be well landscaped by flattening the mounds of soil.
viii. Fence and signpost unsafe areas until natural stabilization occur.

The major emphasis here will be the restoration of the affected environment, proper disposal of dismantled materials and protection of public health and safety.

2.7 Construction Products, By Products and Wastes

i. **Products:** The final product will be **419 residential apartments.**
ii. **By-Products:** The by-products will include;
    - The excavated red volcanic soils will be reused for landscaping purposes.
    - Excavated rock debris shall be reused within the site and other construction sites.
    - Large pieces of timber/wood generated during the construction phase will be transported back to the contractor's yard for reuse in future while the small pieces of timber/wood will be disposed-off for use as fuel for cooking and heating.
    - Empty cans and drums will be used to store water whereas the damaged ones will be sold to licensed scrap metal dealers.

iii. **Wastes:** The solid waste generated during construction will include construction debris, sanitary waste, excavated soil and rocks. The other wastes that are likely to be generated during operation are solid waste such as paper, plastics, cans, glasses, metallic pieces, organic waste and e-wastes. The liquid waste generated throughout the project cycle will be disposed of into the existing trunk sewer system whereas the solid waste will be segregated, reused and/or recycled where appropriate and disposed of at designated sites by a licensed waste transporter in line with EMCA (Waste Management) Regulations of 2006.

2.8 Project Budget and Duration

The proposed project is estimated to cost **One billion three hundred million eight hundred seventy five thousand five hundred ninety and fifty five cents Kenyan shillings only (Kshs. 1,300,875,590.55)**. The project implementation works is estimated to take 2 years.

CHAPTER THREE: POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK-

3.1 INTRODUCTION

EIA is an instrument for environmental management and development control. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is a condition that all developers conduct EIAs on the development projects. EIAs are carried out in order to identify potential positive and negative impacts associated with the proposed development with a view of taking advantage of the positive impacts and developing mitigation measures for the negative ones. There are a number of policies, laws and regulations that govern the protection, conservation and exploitation of the natural resources coupled with provisions for environmental management. These national policies, laws and regulations cover infrastructure, water, agriculture, forestry and health just to mention a few. The national environment action plan documents cover policy directions regarding integration of environmental concerns including EIA into development planning process. Some of the key national laws, policies and regulations that govern the management of environmental resources in the country are discussed herein.

3.2 POLICIES

3.2.1 The National Environmental Action Plan (NEAP)

The NEAP was a deliberate policy effort to integrate environmental considerations into the country's economic and social development initiatives/plans. The integration process was to be achieved through a multi-sectorial approach to develop a comprehensive framework to ensure that environmental management and conservation of natural resources are an integral part of societal decision-making. As a result of its adoption and implementation, the establishment of appropriate policies and legal guidelines as well as harmonization of the existing ones have been accomplished and/or are in the process of development. Under the NEAP process, EIAs were introduced targeting the industrialists, business community and local authorities (now the county governments).

The proponent has commissioned the EIA experts to undertake the EIA for the proposed development in adherence with this policy.

3.2.2 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. The same policy also requires that such projects undergo Comprehensive EIAs that will provide suitable measures to be taken to ensure environmental resources and people's health in the immediate neighborhood and further downstream are not negatively impacted by the emissions.

All liquid waste generated from the proposed project will be disposed of into the existing trunk sewer system.

3.2.3 National Housing Policy for Kenya, 2016

The Sessional Paper No. 3 of 2016 on National Housing Policy is expected to ensure the progressive realization of the right to accessible and adequate housing and reasonable standards of sanitation for every person as per Article 43 of the Constitution. High urbanization and demographic dynamics in the region are driving demand for real estate and infrastructure. Rapid urbanization being experienced worldwide has brought about many challenges, the most critical being a general deterioration of the living standards of an increasing majority of urban dwellers. The problem of urban housing in the country is characterized by an acute shortage in the number of dwellings, overcrowding in the existing housing stock as well as the existence of sub-standard human settlements such as slums and squatter settlements.

The proposed project aims at the provision of residential apartments in the area.

3.2.4 Sustainable Development Goals (SDGs)

On 25th September 2015, countries adopted the United Nations Sustainable Development Goals (SDGs) aimed at contributing towards ending poverty, protecting the planet, and ensuring prosperity for all as part of a new sustainable development agenda. The SDGs have very significant implications for investment needs and the role of the public sector is fundamental and pivotal. At the same time, the contribution of the private sector is indispensable. The proponent has committed to the SDGs through the proposed development in the following ways:

Goal 3: Good Health and Well Being

The project will contribute to improved health and productivity through the provision of a safe and clean environment by ensuring all liquid waste is channeled to the existing trunk sewer system; that the solid waste is collected and transported for final disposal at a designated disposal site by a licensed waste transporter and that the proposed development will be connected to the existing NCWSC water supply and borehole drilling as an alternative source of water for the proposed development.

Goal 6: Clean Water and Sanitation

The proponent is committed to providing adequate sanitary facilities during the project cycle. All liquid waste will be channeled into the existing sewer system. This shall improve water quality and sanitation by ensuring zero proportion of untreated wastewater is not discharged into the environment.

Goal 7: Affordable and Clean Energy

The implementation of an energy management system through the installation of energy-efficient fixtures and fittings shall contribute to increased energy efficiency. The developer shall also *install a 100 KWp grid tied Solar PV Plant as a source for renewable energy for the proposed development.*

Goal 8: Decent Work and Economic Growth

The creation of employment opportunities during the project cycle shall contribute to reducing the proportion of youth not in employment. The proponent shall ensure an environment that emphasizes the protection of labor rights and promotes a safe and healthy environment for all the workers during the project cycle.

3.3 LEGAL FRAMEWORK

3.3.1 The Constitution of Kenya 2010

The Constitution of Kenya is the supreme law of the Republic of Kenya and binds all persons and all State organs at all levels of government. It provides the broad framework regulating all existence and development aspects of interest to the people of Kenya, and along which all national and sectorial legislative documents are drawn. In relation to environment, Article 42 of Chapter 4, the Bill of Rights, confers to every person 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 measures, particularly those contemplated in Article 69, and to have obligations relating to the environment fulfilled under Article 70.

Chapter 5 of the new constitution provides the main pillars on which the 77 environmental statutes are hinged and covers "Land and Environment" and includes the aforementioned articles 69 and 70. Part 1 of the Chapter dwells on land, outlining the principles informing land policy, land classification as well as land use and property. Part 2 of the Chapter directs focus on the environment and natural resources. It provides for a clear outline of the state's obligation with respect to the environment. The Chapter seeks to eliminate processes & activities likely to endanger the environment.

There are further provisions on enforcement of environmental rights as well as establishment of legislation relating to the environment in accordance to the guidelines provided in this Chapter. In conformity with the Constitution of Kenya 2010, every activity or project undertaken within the Republic of Kenya must be in tandem with the state's vision for the national environment as well as adherence to the right of every individual to a clean and healthy environment. The proposed development project is a development activity that will utilize sensitive components of the physical and natural resources hence need for a clearly spelt out environmental management plan to curb probable adverse effects to the environment.

The proponent will therefore adhere to the provisions of the EMP provided in this report to ensure the residents and general public right to a clean and safe environment is not infringed.

3.3.2 Environment Management and Coordination Act, Cap 387.

Section 3 states that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment and that the entitlement to a clean and healthy environment under subsection (1) includes the access by any person in Kenya to the various public elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes. Section 58 (2) of the Act states the proponent of any project specified in the Second Schedule shall undertake a full environmental impact assessment study and submit an EIA Study Report to the Authority prior to being issued with the EIA license. Section 58 (5) states that EIA studies and reports required under the Act shall be conducted or prepared respectively by individual experts or a firm of experts authorized in that behalf by the Authority. Section 58 (7) further states that EIA shall be conducted in accordance with the EIA regulations, guidelines and procedures issued under this Act.

The proponent has engaged the services of the environmental experts to conduct the EIA Study Report in line with the provisions of this Act. The environmental experts conducted the EIA in line with the regulations, guidelines and procedures issued under the Act.

3.3.3 The Environmental (Impact Assessment and Audit) Regulations, 2003

These regulations stipulate how an EIA Study Report should be prepared and specifies all the requirements that must be complied with. It highlights the stages to be followed, information to be made available, role of every stakeholder and rules to be observed during the EIA Study Report making process. Regulation 4 (1) states that no proponent shall implement a project likely to have a negative environmental impact or for which an EIA is required under the Act or these Regulations unless an EIA has been concluded and approved in accordance with these Regulations. Regulation 11 (1) states that an EIA study shall be conducted in accordance with terms of reference developed during the scoping exercise by the proponent and approved by the Authority. Regulation 17 (l) stipulates that during the process of conducting an EIA study under these regulations, the proponent shall in consultation with the Authority, seek the views of persons who may be affected by the project.

The environmental experts have undertaken this EIA Study report in line with the provisions set out in these regulations. A public meeting, administration of questionnaires and interviews were conducted to seek views of persons who may be affected by the project in line with these regulations.

3.3.4 Environmental Management and Co-ordination (Water Quality) Regulations, 2006

The Regulations apply to drinking water, water used for industrial purposes, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife, and water used for any other purposes. Regulation 4 (1) states that every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act. Regulation 4 (2) further states that no person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit. Regulation 24 states that no person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive wastes, or other pollutants or permit any person to dump any such matter into water meant for fisheries, wildlife, recreational purposes or any other uses. According to these regulations, every person shall refrain from any action which directly or indirectly causes, or

may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act.

All waste water shall be channeled into the existing trunk sewer system so as not to pollute the ground and surface water and if a pollution incidence occurs the contractor/proponent shall notify the authority immediately.

3.3.5 Environmental Management and Co-ordination (Waste Management) Regulations, 2006

Regulation 4 states that no person shall dispose any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle and that any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed of such waste in the manner provided for under these regulations. Regulation 6 (1) stipulates that any person who owns or controls a facility or premises which generates waste shall minimize the waste generated by adopting the following cleaner production principles: improvement of production process through conserving raw materials and energy, eliminating the use of toxic raw materials within such time as may be prescribed by the Authority and reducing toxic emissions and wastes; monitoring the product cycle from beginning to end by identifying and eliminating potential negative impacts of the product, enabling the recovery and re-use of the product where possible and reclamation and recycling and Incorporating environmental concerns in the design, process and disposal of a product. Regulation 9 further states that any person licensed to transport waste shall collect waste from the designated area of operations or storage areas and shall deliver such waste to the designated storage site, disposal site or plant.

The proponent shall engage the services of a licensed waste transporter to collect, transport and dispose of wastes to the designated disposal sites.

3.3.6 The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

Regulation 3 of the 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 except as otherwise provided in the Regulations. These regulations also relate noise to its vibration effects and seek to ensure no harmful vibrations are caused by controlling the level of noise. Regulation further 4 states that

except as otherwise provided in these regulations, no person shall make or cause to be made excessive vibrations annoys, disturbs, injures or endangers the comfort, response, health or safety of others and the environment; or cause to be made excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 meters from any moving source. Regulation 14 relates to noise, excessive vibrations from construction, demolition, mining or quarrying site, and state that where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority may impose 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. *The proponent has conducted a baseline survey for environmental noise within the site to determine whether the levels are within the recommended limits. The contractor shall ensure that all construction activities are carried out between 0800hrs and 1800hrs on weekdays to ensure that the neighbors are not disturbed. The contractor shall also ensure the construction machinery is in good working condition to reduce frictional noise.*

3.3.7 The Environmental Management and Co-Ordination (Air Quality) Regulations, 2014

The objective of these regulations is to provide for the prevention, control and abatement of air pollution to ensure clean and healthy ambient air. Regulation 5 states that no person shall act in a way that directly or indirectly causes, or is likely to cause immediate or subsequent air pollution; or emit any liquid, solid or gaseous substance or deposit any such substance in levels exceeding those set out in the first Schedule. Further, regulation 6 stipulates that no person shall cause or allow emission of the priority air pollutants prescribed in the second schedule to cause the ambient air quality limits prescribed in the first schedule to be exceeded. Regulation 25 (1) states that no person shall cause or allow the emission of visible air pollutants from a stationary or mobile vehicle in excess of the limits set out under the prescribed Standard. Clause 33 states that no person operating construction equipment or handling construction material shall allow emission of particulate matter so as to adversely affect the limits set out in the First schedule. Regulation 35 states that no person shall cause or allow stockpiling or other storage of material in a manner likely to cause ambient air quality levels set out under the First Schedule to be exceeded. Regulation 38 stipulates that no person shall cause or allow emissions of priority air pollutants set out under the Second Schedule from disposal of medical waste, domestic waste, plastics, tyres, industrial waste or other waste by open burning.

The proponent has conducted a baseline survey for environmental air within the site to determine whether the levels are within the recommended limits. The proponent shall comply with these regulations and implement all mitigation measures provided in the EMP to prevent air pollution during the project cycle.

3.3.8 The Water Act, 2016

This Act of Parliament provides for the regulation, management and development of water resources, water and sewerage services. Section 9 of this Act states that every person has a right to access water resources, whose administration is the function of the national government. Section 11 states the establishment of the WRA whose functions are stipulated in section 12 and include but not limited to receiving water permits applications for water abstraction, collection of water permit fees and water use charges. Section 63 of the act states that every person in Kenya has the right to clean and safe water in adequate quantities and to reasonable standards of sanitation as stipulated in Article 43 of the Constitution. Section 143 states that a person shall not, without authority conferred under this Act willfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.

The proponent shall ensure that the provisions stated in the act are observed and that the water permits shall be obtained before connecting to the NCWSC water supply to the proposed development and drilling of the borehole

3.3.9 The Water Resources Regulations, 2021

Rule 105 states that the reserve in all instances shall comprise of one element related to the quantity of the resource and the respective probability associated with that quantity and a second element related to the quality of the resource. Public Consultation. Composition of the Reserve. 106. (1) In all instances where water resource records are Reserve Quantity. available, the Authority shall establish the Reserve. (2) The Reserve Quantity for— (a) streams and rivers, shall not be less than the flow value that is exceeded ninety-five per cent of the time as measured by a naturalized flow duration curve at any point along the water course; The Authority shall, in conjunction with relevant institutions and stakeholders, establish management regulations or

plans that shall apply to each protected area or groundwater conservation area. The management regulations or plans shall contain the items listed in the Seventh Schedule. The activities proscribed on riparian land are: Tillage or cultivation; Clearing of indigenous trees or vegetation; Building of permanent structures; Disposal of any form of waste within the riparian land; Excavation of soil or development of quarries; Planting of exotic species that may have an adverse effect to the water resource and/or any other activity that in the opinion of the Authority and other relevant stakeholders may degrade the water resource.

*The proponent shall observe and conserve the **riparian reserve of 10 meters** that was determined and pegged by WRA officers on 24th October 2023 in line with the provided guidelines and shall ensure no activities proscribed under Water Act 2016 and the physical &land use planning regulation within the stated riparian reserve.*

3.3.10 Occupational Health and Safety Act, 2007

This is an act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. The key areas addressed by the Act include: General duties including duties of occupiers, self-employed persons and employees. Enforcement of the act including powers of an occupational safety and health officer; Health General Provisions including cleanliness, ventilation, lighting and sanitary conveniences; Machinery safety including safe handling of transmission machinery, hand held and portable power tools, self-acting machines, hoists and lifts, chains, ropes & lifting tackle, cranes and other lifting machines, steam boilers, air receivers, refrigeration plants and compressed air receiver; Safety General Provisions including safe storage of dangerous liquids, fire safety, evacuation procedures, precautions with respect to explosives or inflammable dust or gas; Chemical safety including the use of material safety data sheets, control of air pollution, noise and vibration, the handling, transportation and disposal of chemicals and other hazardous substances materials; Welfare general provisions including supply of drinking water, washing facilities, and first aid.

The proponent shall ensure that safety measures are implemented in the use of tools and machinery within site and that protection of the workers and general public with any form of interaction with the construction site is given first priority.

3.3.11 The Physical and Land Use Planning Act No. 13 of 2019

The objectives of development control are to ensure orderly physical and land use development; to ensure optimal land use; to protect and conserve the environment; to promote public safety and health among others. Section 57 (1) states that a person shall not carry out development within a county without development permission granted by the respective county executive committee member. Section 58 (1) and (2) further states that a person shall obtain development permission from the respective county executive committee member by applying for development permission from that County Executive Committee Member in the prescribed form and after paying the prescribed fees and 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. Section 58 (3) stipulates that an applicant for development permission shall indicate the proposed uses to which the land shall be put, the population density to which the 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.

The Change of Use and Architectural plans for the proposed project have approved by NCC.

3.3.12 Public Health Act Cap 242

Section 115 of the Act states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health. Section 116 requires that the local authorities (county governments) take all lawful, necessary and reasonably practicable measures for maintaining its district (counties) at all times in clean and sanitary condition, and for preventing the occurrence therein of, or for remedying or causing to be remedied, any nuisance or condition liable to be injurious or dangerous to health, and to take proceedings at law against any person causing or responsible for the continuance of any such nuisance or condition. Section 136 states that all collections of water, sewage, rubbish, refuse and fluids which permits or facilitate the breeding or multiplication of pests shall be termed nuisances and are liable to be dealt with in the manner provided by this Act. Section 138 states that no person shall within a township permit any premises or lands owned or occupied by him or over which he has control to become overgrown with bush or long grass of such a nature as, in the opinion of the medical officer of health, to be likely to harbour mosquitoes.

The proponent will contract a licensed waste transporter to collect and dispose of the solid waste at designated disposal sites and that all liquid waste from the proposed development will be channeled into the existing sewer system.

3.3.13 County Government Act, 2012

The main purpose of the enactment of this Act was to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Functions which were carried out by local governments were effectively transferred to the county governments. The Act gives county the responsibility of planning and co-coordinating all developments within their areas of jurisdiction. Part XI (sections 102-115) of the Act provides for planning principles and responsibilities of the county governments. The land use and building plans provided for in the Act are binding on all public entities and private citizens operating within the particular county. The proposed project is within the Nairobi City Government and thus there will be need of working in liaison with the County Government. The plans for the proposed project must be approved by the County Government and the County government may also issue directives and authorizations on various aspects e.g. waste management and fire emergency preparedness among others.

The Change of Use and Architectural plans for the proposed project have approved by NCC.

3.3.14 Energy Act, 2019

The act establishes an Energy and Petroleum Regulatory Authority (EPRA) mandated to perform all function that pertains to energy production, transmission, setting and enforcing of energy policies, public education and enforcing energy conservation strategies, prescribing the energy licensing process and issuing of licenses that pertain to energy sector in Kenya. Sections 117-126 of the Act provides the factors that shall be taken into consideration prior to issuance of license. It states the need and expression of an entity to conserve and protect the environment and natural resources in accordance to the EMCA Cap 387. Moreover, the Act gives provisions for the need to protect health and safety of users of energy by providing an enabling environment of operation that protects the health and safety of users of the service for which the license or permit is required and other members of the public affected by the undertaking.

The proponent will extend the connection of power supply from the main grid to the proposed development upon acquisition of a connection permit from KPLC. The proponent will also install a solar 100 KWp grid tied Solar PV Plant upon acquisition of a permit from the authority.

3.3.15 National Construction Authority Act, 2011

The act is set to streamline, overhaul and regulate the construction industry in Kenya for sustainable development. The NCA establishes the authority and confers on its power to register contactors within the construction industry. The act requires all the contractors, both foreign and local contractors to be registered with the authority. The act also regulates the practices of foreign contractor by limiting their work to only tender work. The foreign contractors are licensed for only a specific period and once they certify they are in Kenya for that specific time. The foreign contractors must also produce a certificate of compliance. Furthermore, they must lodge an affidavit with the NCA that once the project they have been licensed is over, they shall wind up their business. This prevents them from engaging in any other construction in the country.

The proponent shall engage the services of a contractor registered by the authority and ensure that the construction workers are registered with the authority.

3.3.16 Climate Change Act, 2016

This Act of Parliament was formulated to provide for a regulatory framework for enhanced response to climate change and provide mechanisms and measures to achieve low carbon climate development. It has provided for incentives that are geared towards encouraging innovations that are centered on climate change mitigation and enhancing climate change resilience and low carbon development for the sustainable development of Kenya. Climate change is an international agenda and every stakeholder must take an active role in the mitigation of the effects of climate change. Section (2) of this act states that this Act shall be applied in all sectors of the economy by the national and county governments to mainstream climate change responses into development planning, decision making, and implementation; build resilience and enhance adaptive capacity to the impacts of climate change.

The proponent has incorporated aspects of climate change adaptation and mitigation such as: the protection of the riparian land; planting of trees along the plot boundary and the riparian reserve; installation of solar panels as a source of renewable energy for the development; rainwater harvesting as alternative source of water for the development; and waste management through the engagement of a licensed waste transporter to collect and dispose of the solid waste regularly; and installation of water and energy efficient fixtures/fittings.

3.3.17 Land Registration Act, 2012

Section 26 (1) of the act states that the certificate of title issued by the registrar upon registration, or to a purchaser of land upon a transfer or transmission by the proprietor shall be taken by all courts as prima facie evidence that the person named as proprietor of the land is the absolute and indefeasible owner, subject to the encumbrances, easements, restrictions and conditions contained or endorsed in the certificate, and the title of that proprietor shall not be subject to challenge, except on the ground of fraud or misrepresentation to which the person is proved to be a party; or where the certificate of title has been acquired illegally, unprocedurally or through a corrupt scheme. A certified copy of any registered instrument, signed by the Registrar and sealed with the seal of the registrar, shall be received in evidence in the same manner as the original.

The subject plot is a private property owned by the proponent and does not constitute part of any disputed public utility.

3.3.18 The National Land Commission Act, 2012 (No. 5 of 2012)

Section 5 of the act outlines the functions of the Commission, pursuant to Article 67(2) of the Constitution as follows: to manage public land on behalf of the national and county governments; to recommend a national land policy to the national government; to advise the national government on a comprehensive programme for the registration of title in the land throughout Kenya; to conduct research related to land and the use of natural resources and make recommendations to appropriate authorities; to initiate investigations, on its own initiative or a complaint, into present or historical land injustices, and recommend appropriate redress; to encourage the application of traditional dispute resolution mechanisms in land conflicts; to assess tax on land and premiums on immovable property in any area designated by law, and to monitor and have oversight responsibilities over land use planning throughout the country.

The subject plot is a private property owned by the proponent and does not constitute part of any disputed public utility moreover the proposed project site is registered & has a title deed.

3.3.19 The Sustainable Waste Management Act, 2022

This is an act of Parliament that establishes the legal and institutional framework for the sustainable management of waste and ensure the realization of the constitutional provision on the right to a clean and healthy environment. Section 12 of the act states that all public and private sector entities shall segregate non-hazardous waste into organic and nonorganic fractions; that the segregated waste shall be placed in properly labeled and color-coded receptacles, bins,

containers and bags and that all waste service providers shall collect, handle and transport segregated waste.

The proponent shall prepare a Waste Management Plan for the entire project cycle; provide properly labelled and color-coded receptacle bins for segregation of waste at source of non-hazardous waste into organic and non-organic fractions; employ the waste hierarchy order for efficient use of resources and minimization of pollution; and engage the services of NEMA-registered waste service providers to collect, handle and transport the segregated waste.

3.4 INSTITUTIONAL FRAMEWORK

3.4.1 National Environment Management Authority (NEMA)

The objective and purpose for which NEMA is established is to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. A Director General appointed by the president heads NEMA. The Authority is mandated to co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plan, programmes and projects with a view to ensuring the proper management and rational utilization of the environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya and identify projects and programmes or types of projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under EMCA.

The EIA Study Report is submitted to the authority for review and licensing. The proponent shall work in liaison with the authority in complying with the provisions of EMCA and any other subsidiary legislation under the Act.

3.4.2 National Environment Tribunal (NET)

The tribunal is established under section 125 of EMCA and shall upon an appeal made to it in writing by any party or a referral made to it by the Authority on any matter relating to EMCA, inquire into the matter and make an award, give directions, make orders or make decisions thereon, and every award, direction, order or decision made shall be notified by the Tribunal to the parties concerned, the Authority or any relevant committee thereof, as the case may be.

Any disputes related to the proposed project shall be presented to the tribunal for hearing and determination in accordance with EMCA and related laws.

3.4.3 Water Resources Authority (WRA)

The WRA will provide necessary water abstraction permits for the drilling of borehole within the site and ensuring the surface water sources (rivers) riparian reserve is observed during the implementation of the project. The authority will also monitor the water usage in the region and provide guidance on water use.

*The proponent shall observe and conserve the **riparian reserve of 10 meters** that was determined and pegged by WRA officers on 24th October 2023 in line with the provided guidelines and shall also ensure that no activities proscribed under Water Act 2016 and the physical &land use planning regulation within the stated riparian reserve.*

3.4.4 Directorate of Occupational Safety and Health Services (DOSHS)

The directorate will be responsible for the provision of Occupational Health and Safety (OHS) permits for workplaces and conducting inspections to ensure conformance to Occupational Health and Safety Act.

The proponent will register the site as a workplace with DOSHS and obtain requisite permit before the construction begins.

3.4.5 National Environment Complaints Committee (Public Complaints Committee)

The National Environmental Complaints Committee (NECC) is the body charged with the task of investigating complaints or allegations regarding the condition of the environment in Kenya and suspected cases of environmental degradation. The NECC also undertakes public interest litigation on behalf of the citizens in environmental matters.

In case of any disputes will arise in regards to this project, the NECC will also play an important role in the facilitation of alternative dispute resolution mechanisms relating to environmental matters

CHAPTER FOUR: BASELINE INFORMATION

4.1 PHYSICAL ENVIRONMENT

4.1.1 Climate

According to the Nairobi County Integrated Development Plan (CIDP) of 2023-2027, Nairobi area has a fairly cool climate resulting from its high altitude the county lies at an altitude 1,795 metres above sea level. The sunniest and warmest part of the year is from December to March. Temperatures ranges from a low of 10°C to a high of 29°C. It has a bi-modal rainfall pattern. The long rains season falls between March and May with a mean rainfall of 899 millimetres (mm) while the short rains season falls between October and December with a mean rainfall of 638 mm. The mean annual rainfall is 786.5 mm.

4.1.2 Topography and Drainage

The subject plot slopes southwards towards the Nairobi River with the highest point at 1733 meters near Mkoko Close and the lowest point at 1705 meters near the river. Storm water from the site infiltrates naturally and excess flows towards the river. The proponent shall design and construct internal drains for storm water management. To prevent storm water pollution into Nairobi River, the proponent shall install sediment barriers; plant trees along the riparian reserve; install permeable surfaces; and harvest rainwater to reduce the amount of runoff within the site.

4.1.3 Geology and soils

The soils in the area are shallow red in colour characteristic of volcanic soils. They owe their origin to weathering and erosion of underlying volcanic rocks and may include clays, laterite and alluvial deposits. The volcanic rocks are represented by the Nairobi Trachytes, Nairobi Phonolites, and the Athi series. The thickness of these volcanic varies and below them are the basement system rocks consisting mainly of gneiss and schist. Excavation and cart away of all soils and the weathered tuff will be undertaken to pave the way for the foundation and the basement using standard equipment such as an excavator and hydraulic hammer.

4.1.4 Hydrology

The property abuts **the Nairobi River** on its southern side as shown on plate 4.1 below. A site visit by WRA officers was conducted on 24th October 2023 where they marked a **10 meters wide riparian reserve** from the highest water mark *(Attached is the WRA Pegging Report).* The proponent shall ensure that none of the proscribed activities are carried out within the marked riparian reserve.

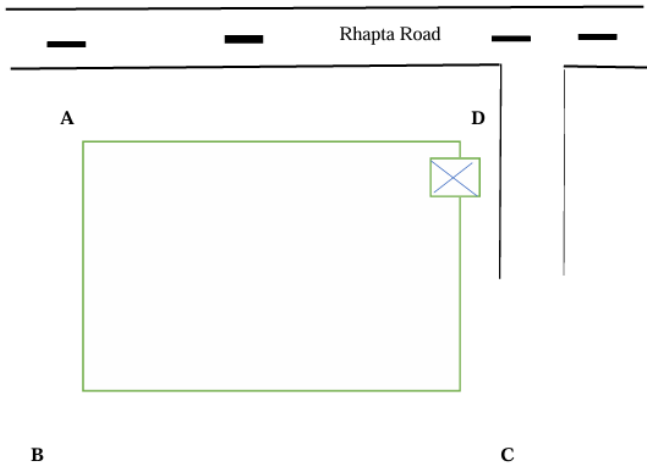
Plate 4. 1: Nairobi River

Source: Fieldwork, 24/10/2023

4.1.5 Ambient Air Quality

The site was evaluated for potential sources of air emissions including fugitive dust and exhaust emissions from vehicles and machinery. Baseline air quality measurements were carried out across the four (4) points on 30th September 2023 during the day time at about 11:00 am.

Figure 4. 1: Sampling Positions within the Plot



Air samples were analyzed for Particulate Matter (PM10 and PM2.5). The equipment in use was the Casella CEL-712 Microdust Pro calibrated using ISO 12103-1 Fine Dust Test. The Casella CEL-712 Microdust Pro is equipped to measure various airborne containments or air pollutant. Applications include; Particulate matter sampling (dust monitoring) and gas sampling-CO2. The measurement of PM10 and PM2 were taken alongside noise level readings under similar weather condition and time. ***The results and observations made on site during the sampling exercise shows that the concentrations of PM10 and PM2.5 were within the recommended TLV with no effect/harm to the environment as shown in table 4.1 below***. The low readings were attributed to the mild precipitation at the time of the assessment that held dust to the ground.

4.1.6 Ambient Noise Levels

A precision sound level meter type SL821, Serial Number P20009485 was used to collect noise measurement levels in dB (A) while standing one (1) meter from the boundary wall. The noise levels were carried out across the four (4) points on 30th September 2023 as shown in figure 4.1 above. The noise levels obtained were compared with the guidelines provided by the First Schedule of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009, that is, residential outdoor during the day. The noise level assessment undertaken at the site showed the following;

i. The noise levels for Point A near Chelsea Park Apartments are within the recommended threshold limit levels as per EMCA (Noise and Excessive Vibration Pollution) (Control) Regulations.
ii. The noise levels for Points B, C, and D were 58.5dBA, 54.8dBA, and 53.4dBA respectively. The levels were above the threshold limit recommended by EMCA (Noise and Excessive Vibration Pollution) (Control) Regulations.
iii. The main sources of noise is majorly from vehicular traffic along Rhapta Road and therefore the noise levels at the mentioned points would vary depending on the traffic along Rhapta Road, weather, and time of the day.

4.2 BIOLOGICAL ENVIRONMENT

4.2.1 Flora

The site is characterized by 76 trees (13 mature trees and 63 young trees), shrubs, flowers, and grass as shown in plate 4.2 below. The tree species observed includes; *Guava Trees, Avacado Trees (Persea Americana), Mango Trees, Lukuat Trees, Monstera Deliciosa, Cupania Venalis Cambess, Terminalia Paniculata, Gravillea Trees,Dracaena Arborea and Croton Megalocarpus*. The tree species observed are not rare or endangered and no sensitive habitats are within the vicinity of the site. All the young trees located along the riparian reserve and setbacks will be conserved while the 13 mature trees will be cut down to pave way for the proposed development upon acquisition of a tree-cutting permit from the Nairobi County Director of Forestry. Measures will be taken to plant more trees along the riparian reserve and designated open spaces while observing the necessary relevant policies.

Plate 4. 2: Trees within the Site

Source: Fieldwork, 24/10/2023

Plate 4. 3: Trees within the Site

Source: Fieldwork, 24/10/2023

4.2.2 Fauna

The area is characterized by a few bird species and domestic animals such as cats and dogs. No endangered or endemic faunal species were found in the vicinity of the project site. *To prevent the risk of bird collisions, the proponent shall install non-reflective window panes.*

4.3 SOCIO-ECONOMIC ENVIRONMENT

4.3.1 Land Use

The property is located in **Zone 4** according to the Nairobi City Development Ordinances and Zones which allows for **Residential (Apartments allowed on sewer only) at a minimum area of 0.05 hectares.** According to Sessional Paper No. 1 of 2023 on Nairobi City County Development Control Policy, the property is in **Zone 4 Sub Zone 4B** which allows for **Mixed Development: Residential, Commercial Offices, and Professional Offices at a minimum area of 0.05hectares; Plot ratio of 1200; and Ground Coverage of 75.** The area is undergoing urban transformation from *Single Dwelling Units to High Rise Residential Apartments*.

Notable Residential Apartments in the area include *Chelsea Park Apartments (6 floors*), *Breezes (9 floors),* and *Lilac Valley Suites (10 floors).* The predominant land use in the area is *Residential Apartments* whereas the other supportive land uses at a radius of 500 meters from the project site include *Health Facilities, Commercial, Educational, Religious Institutions and Administrative* as shown in figure 4.2. The existing social amenities can support the incoming population access the essential goods and services. This will guarantee sustainable community and support economic growth, social equity, and environmental protection by balancing the needs of various stakeholders. Therefore, the proposed project conforms to the general character of the area and will ensure optimum utilization of the land resource and thus urban neighbourhood sustainability.

Figure 4. 2: Land Use Analysis Map

Source: Google Earth 2023

4.3.2 Project Area Administration

Nairobi County is divided into seventeen (17) sub-counties/constituencies, namely Starehe, Kamukunji, Kasarani, Roysambu, Ruaraka, Makadara, Embakasi South, Embakasi North, Embakasi Central, Embakasi East, Embakasi West, Dagoretti North, Dagoretti South, Langata, Westlands, Kibra and Mathare. The sub counties are further subdivided into eighty-five (85) electoral wards. The project is located in Muthangari Sub Location, Kileleshwa Location, Westlands Area of Westlands County.

4.3.3 Demographic Patterns

According to the Kenya Population and Housing Census 2019, Kenya had a population of 47,564,296 distributed between 1,506,888 households. Nairobi County's population in 2019 was 4,397,073 distributed within the seventeen sub counties whereas Westlands Sub County had a population of 308,854. The Sub County's population is projected to rise to 354,695 by 2027 and therefore growing at the rate of over 4.1 % per annum which is above the national average of approximately 2.3 % per annum. The population in the area has been tremendously increasing on yearly basis causing increased pressure on the limited available housing units. This, therefore calls for the development of infrastructure and social amenities to support the population.

4.3.4 Socio-Economic Activities

The key economic activities undertaken within the county include manufacturing, financial activities, wholesale and retail trade, construction activities, transport and real estate sector. Other economic activities practiced and are not fully utilized with potential for further growth include urban agriculture and ICT. These activities have contributed to the country's Gross Domestic Product (GDP). The social-economic activities in the area at a radius of one (1) kilometer from the site include *ABC Place Shopping Mall* which houses retail shops, supermarket, cafe & restaurant, groceries, stores salon and spa, and financial institutions such as *Java House, Chandarana Food Plus Supermarket, NIC Bank and Tarikus Hair & Beauty*. Other commercial activities include *The Rhapta Square and The Slop*. These activities will support the incoming population in their day to day demand for goods and services.

4.3.5 Educational Institutions

Westlands area has seen an increasing number of educational institutions due to the increasing population. The different education facilities found in the area at a radius of a kilometre from the project site include; Kindergarten such as *St Austin Nursery, Nairobi International School*

Kindergarten and First Steps Day Care and Kindergarten; Primary Schools such as *Loreto Convent Msongari Primary School, Strathmore School Primary School and Nairobi International School*; High Schools such as *Strathmore School, St Mary's School Nairobi & Agakhan High School Nairobi* and College such as *International University Pathways College*. These institutions will serve the residents of the proposed development.

4.3.6 Religious Institutions

The religious institutions found in the neighbourhood at a radius of a kilometre from the project site include churches and mosques such as *St Austin Parish Church Msongari, St Jude Church Rhapta Road, Living Faith International, ACK Christ Church Westlands, Nairobi Chapel Waiyaki Way, Westlands Mosque and Al Rabeta Al Eslameya,*. These institutions will provide places of worship for the incoming population.

4.3.7 Health Institutions

The major health institutions serving the residents in the area are found approximately a kilometer from the project site include *AIC Kijabe Hospital* and *My Health Arica.* Access to health facilities will enhance the provision of medical care to the incoming population and is part of the Government Agenda on Universal Health Care.

4.4 INFRASTRUCTURE AND SERVICES

4.4.1 Roads and Accessibility

The property is accessed via **Mkoko Close off Rhapta Road** in Westlands area of Nairobi City County. Mkoko Close is in murram state, in need of rehabilitation and lacks Non-Motorized Transport facilities such as the walkways and street lights whereas Rhapta Road is tarmacked, in good condition, with streetlights and walkways. The proponent has designated a portion of the property adjacent to the access road to construct a service lane to ensure minimal traffic interruptions of vehicles entering and exiting the proposed development. The developer shall only rehabilitate Mkoko Close to cabro state. The roads connect to *Waiyaki Way, Mahiga Mairu Avenue and Nairobi Expressway* linking the area to various centers such as ABC Place and CBD for socio-economic activities. The accessibility of the site will be instrumental during the project cycle.

4.4.2 Water Supply

The general area as well as the site is served with water by the NCWSC. The proponent will extend the connection of the main water supply to the proposed development upon acquisition of a connection permit from NCWSC. The developer will drill a borehole within the site and install rainwater harvesting facilities. The proponent will also provide adequate tanks with a capacity of *600,000 liters for storage purposes able to serve the residents for at least five (5) days.*

Plate 4. 4: Mkoko Close (L) and Rhapta Road (R)

Source: Field Work, 24/10/2023

4.4.3 Liquid Waste Management

The general area as well as the site is served by NCWSC conventional trunk sewer system as shown on plate 4.5 below. The sewer line comprises of 225mm diameter that feeds to a 600mm diameter line constructed along the riparian section of the river. The proponent shall extend the connection of the proposed development to the existing sewer system upon acquisition of a connection permit from NCWSC. All sanitary works will be done to the satisfaction of the County Government Health Department.

Plate 4. 5: Sewer Manhole within the Site

Source: Field Work, 24/10/2023

4.4.4 Solid Waste Management

The solid waste within the area is managed by private waste transporters. The waste generated from the development will be segregated, reused where feasible, and transported for final disposal by a licensed waste transporter. The proponent will prepare a *Waste Management Plan,* designate a central waste collection point within the property and ensure compliance with the provisions of the Sustainable Waste Management Act.

4.4.5 Energy

The general area as well as the site is served by electricity from the national grid. The proponent will apply for a *sole transformer* to energy supply within the development subject to the acquisition of a connection permit from KPLC. The developer will also install a *100 KWp grid tied Solar PV Plant* as a source of renewable energy for the development and energy efficient technologies.

Plate 4. 6: Electricity Lines along the Access Road

Source: Field Work, 24/10/2023

4.4.6 Security

Muthangari Police Station is the administrative facility in the area which is located approximately 500 meters north west of the project site. The police station is responsible for maintaining public order and safety, enforcing the law, and preventing, detecting, and investigating criminal activities. During occupation, the proponent shall beef up security by installing streetlights along the plot boundary, employing security guards and installing CCTV cameras at strategic points within the premises to enhance the overall safety of the proposed development. The security will also be part of the activities undertaken by the management company.

4.4.7 Telecommunication

The tech ecosystem in Kenya is rapidly growing with telecommunication services being the core infrastructures. The area is well covered by mobile telecommunication such as *Safaricom, Telkom, and Airtel networks.* Other telecommunication services in the area include fiber optics provided by *Safaricom Home Fiber, Liquid Telecom, and Zuku Fiber*. All these will facilitate communication during the project cycle.

CHAPTER FIVE: IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 ANTICIPATED IMPACTS

The proposed project will affect the environment both positively and negatively during the construction and operation phases. This chapter will assess the impacts that are likely to occur and how the project will interact with the environment. Adequate, cost effective and feasible measures have been recommended to avoid, minimize, mitigate, or compensate any potential negative impacts. The anticipated impacts of the proposed project on the environmental elements are categorized into five (5) major parameters: the **type of impact** is described as either direct or indirect; the **nature of the impact** as positive or negative; the **duration** may be short-term, medium term or long term; the **extent** is evaluated in terms of being local, regional or national and the **magnitude** as being low, medium or high. The following criteria was used to evaluate the significance of impact of the proposed project on the physical environment, community and the biological environment:

Table 5. 1: Assessment criteria for significant impacts

S/N	Impact	Classification
1.	Impact Type	**Direct:** The impacts will be generated directly from project activities. **Indirect:** The impacts are generated from secondary sources.
2.	Impact Nature	**Positive:** The impacts will affect the environment positively. **Negative:** The impacts will affect the environment negatively.
3.	Impact Duration	**Short Term:** The potential impacts only last for a short time during the construction period or less. **Medium Term:** The potential impacts last for approximately 10 years or half the lifetime of the project. **Long Term:** Impact will remain after operational life of project but appropriate mitigation measures have been used to reduce the impacts.
4.	Impact Extent	**Local:** Impacts extend beyond the project site. **Regional:** Impacts extend beyond the administrative area. **National:** Impacts are considered nationally.
5.	Impact Magnitude	**Low:** The magnitude of the impacts has minimal effect on the environment. **Medium:** The magnitude of impacts is significant and can be reversed with mitigation measures. **High:** The magnitude of impacts is significant and mitigation measures can only reverse a very small portion.

On the basis of information gathered during both the desktop and field study, the potential environmental impacts for the proposed project are as tabulated below:

Table 5. 2: Anticipated Impacts during the Project Cycle

S/N	Impact	Type	Duration	Extent	Magnitude
1.	Soil Erosion	Direct	Short term	Local	High
2.	Air Pollution	Direct	Short term	Local	Medium
3.	Noise pollution	Direct	Short term	Local	Medium
4.	Traffic Density	Direct	Long term	Regional	Medium
5.	Solid waste	Direct	Long term	Local	Medium
6.	Liquid waste	Direct	Long term	Regional	Medium
7.	Storm water drainage	Direct	Long term	Regional	Medium
8.	Water demand	Direct	Long term	Regional	Medium
9.	Energy demand	Direct	Long term	Regional	Medium
10.	Health and Safety Risks	Direct	Short term	Local	Medium
11.	Fire Risks	Direct	Short term	Local	Medium
12.	Security Risks	Indirect	Long term	Local	Medium
13.	Oil Pollution	Direct	Short term	Local	Medium
14.	Devegetation	Direct	Long term	Local	Medium

5.2 POSITIVE IMPACTS

Positive impacts that shall be associated with the implementation of the proposed project include and are not limited to the following:

i. Provision of housing units

The proposed project will provide **419 residential apartments** to the residents living in Westlands area. This will contribute towards meeting the demand for housing in the area.

ii. Provision of employment opportunities

The proposed project will create employment opportunities for both skilled and semi-skilled workers. During the construction phase, the project will employ a workforce of foremen, masons, plumbers, electricians, and casual laborers among others. For the operation phase, the project will employ property manager, shop attendant, caretaker, domestic workers, gym trainers, security guards, and cleaners among others.

iii. Provision of market for goods and services

During the construction phase, the project will require building materials sourced both locally and in other parts of the region. This will have a positive impact towards the economic status of the suppliers and also to the national economy through the payment of taxes for goods and services. The local economy in the area will also receive a boost through the purchase of food items, drinks, and other commodities required by the workers and incoming population.

iv. Provision of Revenue to the Government

There will be an increase in revenue to the National Government through the payment of taxes on goods and services such as VAT, MRI & ground rent.

v. Provision of Revenue to the County Government

There will be an increase in revenue to the County Government through payment of rates and permits such as building plans and occupation permit fees.

vi. Provision of Revenue to the Proponent

There will be an increase in revenue to the proponent through the renting and/or sale of the residential apartments.

vii. Improved security

Security will be ensured around the proposed development through the installation of security lights and the engagement of security guards to man the property at all times. CCTV cameras will also be installed at strategic points including near the access road. This will lead to improvement in the general security within the surrounding area.

viii. Land use optimization

The proposed development will result to a more economical use of the land without significant environmental degradation. The area has been zoned for residential apartments and therefore the proposed development is in conformity with the zoning regulations.

5.3 NEGATIVE IMPACTS

5.3.1 Soil Erosion

The proposed project will have a negative impact on the geology of the site. This will be as a result of the clearing of the existing vegetation and excavation of the soils to pave way for the construction of the substructure. The presence of underground rocks will lead to the complex excavation of rocks to pave way for the foundation of the proposed development. The design is to excavate and cart away the excavated soils and rocks to pave way for the proposed

development upon acquisition of an excavation permit from NCC. The process will involve using standard excavation and normal hydraulic hammers to level the site hence no blasting will be undertaken. The soils will be exposed to weather elements including wind and surface run off causing soil erosion. The traversing of heavy machinery during the construction will lead to compaction, soil erosion and may lead to contamination of the soil by oil & fuel leaks and hydraulic fluids. Uncontrolled soil erosion can have adverse effects on the local water bodies and lead to air pollution (dust).

Mitigation Measures

i. Use of soil erosion control structures on prone areas within the site.
ii. Levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil.
iii. Control excavation works especially during rainy/wet conditions.
iv. Building of physical barriers to prevent mass movement where necessary.
v. Avoid unnecessary excavations and other soil disturbances that can predispose the soil to the agents of erosion.
vi. Avoid unnecessary movement of soil materials from the site.
vii. The stockpiling of excavated soils within the site before final disposal shall be properly controlled and well managed.
viii. Undertake landscaping exercise by planting appropriate vegetation and indigenous trees on the open spaces after completion of construction works.

5.3.2 Air Pollution

The proposed project is located in a residential zone. Air pollutants in the area are from fugitive dust and fumes/exhaust emissions from vehicular traffic along the access road. During the construction phase, air quality may decline as a result of an increase in levels of fugitive dust from the excavation works, construction activities, the stockpiled earth materials, and concrete mixing. Tiny particulates are a public health hazard and may otherwise create considerable nuisances to the immediate neighbors and the public. There may be air pollution due to the combustion of fossil fuels expected from construction machinery and vehicles. This is expected to be a short-term, reversible impact lasting only for the duration of the construction activity. The potential receptors of the air pollution will include the immediate neighbours (*Chelsea Park Apartments and Royal Height Apartments)* and the workers within the site.

Mitigation Measures

i. Conduct baseline air survey to determine the air quality within the site.
ii. Screening of the entire site to control and arrest construction-related dust.
iii. Sprinkling of water on the work areas twice a day to prevent fugitive dust violations especially during the dry season.
iv. Provide PPE such as masks to the workers in dusty areas within the site.
v. Ensure no open burning of waste within the site.
vi. Switch off the machinery and vehicles when not in use to reduce the generation of emissions.
vii. Regular maintenance of the machinery to minimize the generation of hazardous gases.
viii. Restrict heights from which materials are to be dropped, as far as practicable to minimize the fugitive dust arising from unloading/loading.
ix. Cover the stockpiles within the site and install windbreaks, water and/or soil stabilizers to reduce wind-blown dust emissions.
x. Ensure training of all personnel working on the project on air quality management.
xi. Monitor the air quality levels as per the EMCA (Air Quality) regulations.

5.3.3 Noise and Excessive Vibrations

The sources of noise pollution and excessive vibrations will include the construction activities such as site preparation through the cutting of trees and excavation works; operation of earthmoving and excavation equipment; transportation of materials and machinery to the site and operation of the generator and other machinery within the site. Albeit annoying, this negative impact will be short-term limited to the construction phase. During operation phase, noise will be as a result of activities of the outdoor activities in the lounge, the gym and from the generator room. The potential receptors of the noise impact will include the immediate neighbours (*Chelsea Park Apartments and Royal Height Apartments)* and the workers within the site.

Mitigation Measures

i. Conduct baseline noise level survey to determine the noise levels within the site.
ii. Construction activities will be carried out between 0800hrs to 1800hrs on weekday and 0800hrs to 1800hrs on Saturday only.
iii. Provision of appropriate PPE such as earmuffs to all workers in noisy environment within the site.

iv. All noisy activities shall be scheduled concurrently to reduce the exposure period.
v. The contractor shall endeavour to use equipment installed with noise abatement devices as much as practicable.
vi. Use of noise shields or noise suppressors around the noisy equipment within the site.
vii. Switch off the construction machinery and vehicles when not in use.
viii. Regular maintenance of the construction machinery and vehicles to reduce frictional noise.
ix. Drivers delivering materials shall be advised to avoid unnecessary hooting of the trucks/vehicles.
x. Provision of a billboard at the construction site/gate notifying of the construction activity and timings.
xi. Install sound-absorbing materials such as acoustic foam within the generator room to reduce noise pollution.
xii. Safe excavation shall be done using technologies that cause minimal vibrations so as to minimize the effect of excessive vibrations to the immediate buildings.
xiii. Regular monitoring of noise and vibration levels at the site as per the EMCA (Noise and Excessive Vibrations) regulations.

5.3.4 Traffic Density

The project site is located in an area that is largely occupied by residential developments. The majority of vehicles using the access road are light vehicles from the different residences; school vans picking and dropping children in the area and few heavy commercial vehicles such as trucks that deliver goods to different commercial premises in the area. The road tends to get congested during the peak hours (early morning and late in the evening) when the residents leave and come back from work respectively. The proposed development will increase the traffic volume that may lead to congestion along the access road. This may cause increased potential for accidents since the construction vehicles will be making right turns to leave and enter the project site. During the operation phase, the traffic volume will increase as a result of an increase in the number of cars accessing the site.

Mitigation Measures

i. Construct a service lane within the property adjacent to Mkoko Close to ensure a smooth flow of traffic in and out of the site.

ii. The proponent will prepare a Traffic Management Plan (TMP) to ensure smooth flow of traffic along the access roads.
iii. Ferry building materials and construction waste during the off-peak hours.
iv. Engage traffic marshals to control traffic in and out of the site.
v. Install traffic control/warning signs to inform the motorists and public of the potential hazards.
vi. Provide a billboard at the site entrance to notify the motorists and the public about the project.
vii. Enforce speed limit within the site during the construction period.
viii. Ensure the construction vehicles comply with axle load limits.
ix. Employ well-trained and experienced drivers to operate the construction vehicles.

5.3.5 Solid Waste

The potential sources of solid waste during the construction phase will include general construction waste such as debris, metal cuttings, cement bags, tree cuttings among others; food waste and rejected materials. During the operation phase, the potential sources will include food waste, paper, e-waste, plastic, glass and organic waste. Such wastes can be injurious to the environment through blockage of drainage systems, choking of water bodies and negative impacts on human health. Some of these waste materials especially the plastic/polythene are not biodegradable thus may cause long term injurious effects to the environment. The biodegradable waste such as organic wastes may be injurious to the environment because as they decompose, they produce methane gas, a greenhouse gas known to contribute to global warming. During the operation, waste that will emanate from the proposed development include paper, cardboard, plastic, and organic waste. The waste if not well managed may impact on the site soil, fauna, air quality, and the workers' health & safety.

Mitigation Measures

i. The proponent shall prepare a Waste Management Plan for the entire project cycle.
ii. Provision of a central waste collection point within the site before final disposal.
iii. Provision of properly labelled and colour-coded receptacle bins for solid waste management within the site.
iv. Segregation of non-hazardous waste into organic and non-organic fractions before final disposal.

v. Provide adequate and appropriate PPE to the refuse collection personnel such as gloves and masks.
vi. Engagement of a NEMA registered waste transporter to collect and disposal of segregated waste to designated disposal sites.
vii. Ensure the covering of loaded vehicles with clean impervious sheeting to ensure that the materials/waste does not leak from the vehicles during transportation.
viii. Efficient use of building materials to reduce waste and recycling where possible.
ix. Use of an integrated solid waste management system through a waste hierarchy of options: avoidance, source reduction, reuse, repair, refurbishment, recycling, recovery and finally treatment for safe disposal during the project cycle.
x. Sensitize the workers during the toolbox meetings on the reuse of materials where feasible.
xi. Manage the waste in line with the EMCA (Waste Management) Regulations and Sustainable Waste Management Act.

5.3.6 Liquid Waste

Liquid waste is anticipated to increase as a result of an increase in population during the construction and operation phase. Lack of or inadequate provision of sanitary facilities within the site for use by the workers can lead to ad hoc defecation in secluded areas thus creating unsanitary conditions and sources of fly infestation. This can threaten the health of workers and compromise the air quality in the area. The anticipated daily wastewater volumes from the proposed development will be approximately *139,275 litres.* The liquid waste if not well managed may impact on the surface water (Nairobi River), underground water, air quality and the health & safety of the workers.

Mitigation Measures

i. Extension of the connection of the proposed development to the sewer system upon acquisition of a connection permit from NCWSC.
ii. Construction of an internal reticulation system which can consistently handle the loads even during peak volumes.
iii. All manholes on driveways and parking areas shall have heavy-duty covers set and double-sealed airtight as approved by specialists.
iv. Apply for a site toilet from NCC before its construction.

v. Provision of sufficient and suitable sanitary conveniences for the workers within the site.
vi. Ensure the sanitary conveniences are maintained and kept clean at all times.
vii. Install hygiene awareness signs at strategic points within the site and hold regular toolbox talks on hygiene with the personnel.
viii. Proper decommissioning of the sanitary conveniences once the construction works are completed.

5.3.7 Storm Water Drainage

The clearance of vegetation and excavation works will lead to increased soil erosion at the project site and release of sediments into the drainage systems. The construction of the building and pavements will lead to minimal infiltration and increased volume and velocity of the surface run-off. This can lead to increased amounts of storm water entering the drainage systems, resulting in overflow and damage to such systems. The proponent shall ensure that the internal drainage system within the premises is constructed to ensure the management of the storm water

Mitigation Measures

i. Construct drainage channels within the site covered with gratings to avoid the occurrence of accidents and the entry of dirt.
ii. Construct gently sloping drains to convey water at non-erosive speed.
iii. Use of semi-permeable materials during the construction of pavements.
iv. Install rainwater-harvesting facilities within the site structures to reduce the amount of storm reaching the surface.
v. Undertake comprehensive landscaping through the use of local plants and indigenous trees within the open areas.

5.3.8 Water demand

A considerable quantity of water will be required during the construction and operation phase of the proposed development. During the construction period, water will be required for the construction activities such as cement mixing, curing of concrete, drinking water for workers, and other construction-related activities. On occupation, water will be required for general use and domestic purposes such as drinking, cleaning, and car washing. The estimated amount of water required during the operation phase will be *111,420 litres/day*. This will place some amount of strain on the existing water supply in the area and therefore, a steady supply of the commodity is required.

Mitigation Measures

i. Drill a borehole to supplement the existing NCWSC water supply subject to the acquisition of an authorization permit from WRA.
ii. Extend the connection of the main water supply to the proposed development upon acquisition of a connection permit from NCWSC.
iii. Rainwater harvesting within the site to supplement the existing water supply.
iv. Construct a centralized underground tank with a capacity of 600,000 litres able to serve the residents for at least 5 days.
v. Install water efficient fixtures/fittings that turn-off automatically. Six (6) litres dual flush cisterns have been specified for the development together with low flow rate taps and showerheads.
vi. Provide water conservation notices and information signs at strategic points within the site and hold regular toolbox talks on water reuse with the personnel.
vii. Monitor the water consumption within the site every month.

5.3.9 Energy Demand

A significant amount of energy will be required during the project cycle. Energy will be required for the running of construction machinery and other equipment during the construction phase. During operation phase, electricity will be required for internal & external lighting, cooking, water heating, space cooling and running of appliances such as fridge, television, computers among others. The estimated energy demand required during the operation phase will be *736.70 KVA.* This will place some amount of strain on the existing energy supply in the area.

Mitigation Measures

i. Install a sole transformer to supply energy to the proposed development subject to the acquisition of a connection permit from KPLC.
ii. Install a 100 KWp grid tied Solar PV Plant as an alternative source of renewable energy for the proposed development subject to the acquisition of a connection permit from EPRA.
iii. Install a generator as a back-up source of energy for the development.
iv. Install energy efficient fixtures and fittings within the development such as energy saving LED fittings with an efficacy of above 90lm/w that comply with EDGE standards (EEM22) and motion sensors & timer switches that comply with EDGE standards

(EEM24) will be used to control internal common areas lighting such as corridors and staircase hence saving energy.

v. Perimeter wall lighting to be designed using IP65 rated wall mounted fittings facing the development and as a result there is will be no interference with the neighbors.

vi. Engage the services of registered personnel to install and maintain the electrical components within the site.

vii. Turn off machinery and equipment when not in use.

viii. Monitor the energy consumption within the site every month.

5.3.10 Occupational Health and Safety Risks

The sources of occupational risks within the project site will include the handling of heavy machinery, construction noise, and electromechanical works among others. Fugitive dust from construction activities may affect the respiratory system of the workers and the immediate neighbors. The generation of the waste may pose a health and safety risks to the workers. Food for the construction workforce is usually provided by mobile individuals most of which operates without licenses. This can compromise health of the workers especially if such foodstuffs are prepared in unhygienic conditions. The receptors of occupational safety and health impacts will be the workers and the immediate neighbors *(Chelsea Park Apartments, Royal Height Apartments, Mkoko Close Apartments)*

Mitigation Measures

i. Register the site as a workplace with the DOSHS.

ii. Provide adequate and appropriate PPE to the workers within the site such as safety boots, overalls, helmets, goggles, earmuffs, masks, gloves etc.

iii. Provide first aid kit within the site fully equipped at all times and managed by a qualified personnel.

iv. Install appropriate precautionary signage at strategic places within the site.

v. Undertake a health and safety audit of the workplace annually by a registered health and safety adviser.

vi. Adapt a suitable Emergency Response Plan (ERP) to manage occurrence of anticipated hazards during the construction phase.

vii. Engage a qualified full-time health and safety advisor during the construction phase.

viii. Establish a Health and Safety committee during the construction phase.

ix. Induct and train all construction workers on OSH procedures.
x. Hold daily (or as appropriate) toolbox meetings for all workers.
xi. Provide a workmen's compensation cover that complies with Work Injury and Benefits Act (WIBA) as well as other ordinances, regulations and union agreements.
xii. Local individuals preparing food for the workers at the site shall be monitored and evaluated to ensure that food is hygienically prepared.
xiii. Provision of clean and potable drinking water for the workers within the site.
xiv. Monitoring and evaluation of the safety of the workplace every week.
xv. Sensitize the workers on social issues such as drug and substance abuse, COVID-19, HIV/AIDS etc.
xvi. Keep a record of the public emergency service telephone numbers including Police, Fire brigade, and Ambulance at strategic points within the site.
xvii. Comply with OSHA 2007 and all other relevant regulations governing the health and safety of the workplace.

5.3.11 Fire Risks

Fire risks and electrocution may occur within the site from poor handling of electrical systems, faulty electrical equipment, and carelessness among others. Electronic equipment may also contain hazardous material harmful to human health. The level of exposure to fire risks will vary from one task to another. The receptors of the fire risks include the workers and immediate neighbors *(Chelsea Park Apartments and Royal Height Apartments).*

Mitigation Measures

i. Hire a competent authorized contractor to do the electrical works on site.
ii. Provide adequate firefighting equipment at strategic places within the property.
iii. Organize for inspection and maintenance of firefighting equipment bi-annually.
iv. Train staff on the use of the available firefighting equipment.
v. Conduct annual fire drills within the site to sensitize the workers.
vi. Clearly mark the fire exit routes and the fire assembly point.
vii. Develop and post at the site fire emergency and evacuation procedures at strategic points within the site.
viii. Post 'No smoking signs' where flammable materials are stored.

ix. Install a fire suppression system involving a combination of a sprinkler system, a hydrant, and a fire hose reel system within the development.

x. Install lightning protection using active lightning arresters to reduce the risk of property damage by lightning strikes.

5.3.12 Insecurity

The site under consideration is fenced with iron sheets of approximately 2 meters in height and a shared masonry wall to the western side. Insecurity may arise during the construction phase since intruders may try to steal the building materials and/or machinery within the site. During operation phase, insecurity may arise especially within the development as a result of threats of theft, property damage, vandalism, robbery, and other crime.

Mitigation Measures

i. Engage security personnel to guard the site and monitor the movement of people in and out of the property at all times.

ii. Install security lights around the property and ensure they are switched on only during the night hours.

iii. Routine inspection and maintenance of the security lights within the site.

iv. Hoard the site and construct a gatehouse

v. Install CCTV at strategic points within the site to monitor and enhance the security of the property.

vi. Provision of access control measures within the development to keep out unauthorized people such as swipe cards, biometric scans, security tokens, or presenting identification documents.

5.3.13 Oil Pollution

The sources of oil pollution within the project site may include leaks and spills of oil, lubricants or fuel from the use of heavy equipment and vehicles; unused and used oil recovered from machinery and oil waste in form of oily containers or oil rugs. This pollution may occur during the project cycle. Oil leaks may also occur from the vehicles at the parking bays during the operation period. Oil pollution if not well managed may impact on the surface water (Nairobi River), site soil, air quality and the health & safety of the workers.

Mitigation Measures

i. All drainage facilities shall be fitted with adequate functional oil-water separators and silt traps.
ii. All oils/grease shall be stored in a designated area in the contractor's yard away from the site.
iii. Routine inspection and maintenance of the machinery away from the site in a well-designed and protected area to avoid oil spillage within the site.
iv. Proper disposal of oily materials such as oil drums and cans at designated disposal site by licensed waste transporters.
v. The proponent will prepare an ERP for preventing and dealing with emergencies like oil and fuel spills.

5.3.14 Devegetation

The site is characterized by 76 trees (13 mature trees number, 63 young trees), shrubs, flowers, and grass. The tree species observed include *Guava Trees, Avacado Trees (Persea Americana), Mango Trees, Lukuat Trees, Monstera Deliciosa, Cupania Venalis Cambess, Terminalia Paniculata, Gravillea Trees, Dracaena Arborea and Croton Megalocarpus*. The tree species observed are not rare or endangered and no sensitive habitats are within the vicinity of the site. All the mature trees will be cut down to pave way for the proposed development.

Mitigation Measures

i. Apply for a tree-cutting permit from the Nairobi County Director of Forestry before cutting down the trees and adhere to the conditions.
ii. Conserve all the trees within the riparian reserve and along the plot boundary.
iii. Undertake a comprehensive landscaping exercise after the construction phase by planting indigenous trees within the riparian reserve and designated open spaces.

CHAPTER SIX: OCCUPATIONAL HEALTH AND SAFETY

6.1 Introduction

Worldwide, construction workers are three times more likely to be killed and twice as likely to be injured as workers in other occupations. In Kenya, though undocumented, it is reported on our dailies that workers are injured or die on construction sites. It is therefore essential that the proponent and contractor ensure the safety and well-being of the workers, the passersby and any other person who may be directly or indirectly associated with the project.

The main hazards and risks of accidents in the construction site can be categorized and described in the following way:

i. Risks of slips, trips and falls
ii. Risks related to instability
iii. Risks related to traffic
iv. Risks related to construction machinery
v. Risks related to electricity
vi. Risks related to gas
vii. Fire and explosion risks

After identification of these major risks and the stages when they are likely to occur, efforts should then be focused on how to alleviate these dangers before they happen.

6.2 Principles of Occupational Health and Safety

The principles of environmental health and safety involve three main actions:

i. **Risk Identification and Assessment**: This shall involve identifying the various hazards and risk at the site that have the potential to occur, all the people who may be at risk such as employees, cleaners, visitors, contractors, the public, etc. as well as determine whether a control program is required for a particular hazard.
ii. **Risk Communication**: Risk communication refers to the exchange of real-time information, advice and opinions between workers and people facing threats to their health, economic or social well-being. The ultimate purpose of risk communication is to enable people at risk to take informed decisions to protect themselves and their loved ones. Risk communication uses many communications techniques ranging from media and social media communications, mass communications and community engagement. It

requires a sound understanding of people's perceptions, concerns and beliefs as well as their knowledge and practices.

iii. **Risk Management**: This involves actions undertaken for the implementation of risk evaluation decisions, monitoring, re-evaluation and prioritizing, and compliance with legal requirements that safeguard health and safety at construction sites The OHS personnel shall be required to determine if existing control measures are adequate or if more should be done.

6.3 Construction Safety, Emergency Procedures and Action Plan

The site will involve construction activities that are dynamic to the workers engaged in the activities resulting in their exposure to a variety of safety hazards such as falling objects, working from rooftops or scaffolding, exposure to heavy construction machinery, and electrocution while operating electrical equipment in moist areas. It is, therefore, a necessity to develop an Environmental Health and Safety Management Plan to regulate environmentally instigated diseases and occupational safety measures during the construction and operation phases of the proposed project. It is the obligation of the proponent and the contractor to ensure a safe and healthy environment at the workplace and within the neighborhood to prevent occupational diseases, avoid injuries, property damage, control damage to equipment, and enhance environmental sustainability through the developed sound conservation measures.

The following recommendations to ensure the health and safety of the workers and general public shall be taken into consideration:

i. Develop and Adapt an Emergency Response Plan (ERP) for the proposed project.
ii. Create a culture of safety within construction by planning, creating and supporting ongoing OHS awareness campaigns that promote the importance of workplace occupational health and safety with industry stakeholders as well as consumers.
iii. Increase safety knowledge in the construction site by promoting awareness of the top construction sector hazards (trips and falls from heights, motor vehicle incidents, struck by objects, machinery) and how to control these hazards through new and improved information channels
iv. Support the role of the supervisor in creating and maintaining a culture that fosters worker participation in identifying and mitigating workplace hazards.

v. Create a strategy for continuous health and safety learning for the construction workers e.g. conducting regular training sessions and drills on how to handle emergencies and accidents at site.
vi. Identify, review and enhance health and safety content of apprenticeship training standards to keep abreast with any new methods that are effective in promoting site safety.
vii. Provide suitable and well-maintained PPE to all the workers and visitors and ensure they are utilized at all times and in the right manner. These include safety boots, helmets, gas masks, gloves and goggles.
viii. Place visible and readable signs to control the movement of vehicles and notify motorists and pedestrians around the, and workers in the site.
ix. Do not walk, stand, or work under suspended loads. If you raise a load, be sure to crib, block, or otherwise secure the load as soon as possible
x. Enclose or isolate hazardous parts of machines or sites within the construction site to minimize exposure.
xi. Be prepared for unexpected hazards. BE ALERT ALWAYS.
xii. Prepare and maintain emergency response equipment such as fire extinguishers and first aid kits in readiness for use when need be.
xiii. Avoid placing unusual strain on equipment or materials Encourage reporting of safety incidents as soon as they occur at the site, so as to enable a quick action to alleviate the extent of the damage.
xiv. The contractor and his agents shall use barriers and guards as necessary to protect employees from physical hazards.
xv. A well-stocked First Aid kit shall be provided to take care of accidents that may arise during job executions. This shall be placed under the charge of a responsible person who shall readily be available during working hours.
xvi. Employees will be expected to take personal responsibility for their safety, the safety of their colleagues, and the general public plan.
xvii. Comply with the provision of the Occupational Safety and Health Act, 2007.

CHAPTER SEVEN: CONSULTATION AND PUBLIC PARTICIPATION

7.1 Introduction

This chapter describes the process of the public consultation conducted to identify the key issues and impacts of the proposed project. The CPP process is a policy requirement by the Government of Kenya and a mandatory procedure as stipulated by Section 58 of EMCA 1999 on EIA for the purpose of achieving the fundamental principles of sustainable development. Regulation 17 of the Environmental (Impact Assessment and Audit) Regulations 2003 states that during the process of conducting an Environmental Impact Assessment Study, the proponent shall in consultation with the Authority *seek the views of persons who may be affected by the project.* Views from the local residents, stakeholders, surrounding institutions and development partners who in one way or another would be affected or rather interested in the proposed project were sought through administering of questionnaires, interviews and public meeting as stipulated in the act.

7.2 Objectives of the Consultation and Public Participation

The objective of the consultation and public participation was to:

i. Disseminate and inform the stakeholders about the project with special reference to its key components and location.
ii. Gather comments, suggestions and concerns of the interested and affected parties.
iii. Generate a good understanding of the project.
iv. Developing effective mitigation measures and management plans.
v. Incorporate the information collected in the EIA study.

7.3 Stakeholders Identification

The process involves the identification of the stakeholders who are directly or indirectly affected by the project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. The different stakeholder groups identified include but are not limited to the following:

i. The local community who includes the immediate neighbours at a radius of 250 meters from the site such as *Royal Height Apartments, Chelsea Park Apartments, Mkoko Apartments, Kenindia Gardens, Jambo holding Apartments, River View Villas, Breezes, and Prime Serviced Apartments*.

ii. Residents Associations who include the *Rhapta Road Association and Westlands Association.*
iii. Institutions within the local area at a radius of 250 meters from the site such as *SOS Children International Nairobi Regional Office and St. Mary's School.*
iv. Government agencies who include the *National Government Administration Officers (NGAO).*
v. Development agencies who will include NCWSC and KPLC.
vi. Project personnel.

7.4 Consultation Methods and Techniques

In line with Regulation 17 of the EIA regulations on Public Participation, the following methods and techniques were employed in order to gather information, comments and concerns from the identified PAP;

i. Public meetings
ii. Administration of questionnaires to the PAP
iii. One-on-one interviews with the PAP
iv. Field surveys and observations.

7.5 Public Meeting

Prior to the public meeting, appropriate notices were sent out at least one week prior to the public meeting indicating the venue and times of the meeting. Invitation letters were circulated to the stakeholders and an onsite notice erected on the site on 23rd October 2023. *(Attached is the invitation letter and onsite notice).*The public meeting was held on *Tuesday 31st October 2023* at the project site where the local community, resident associations, and relevant stakeholders including the government and private sector representatives participated. The meeting agenda, minutes, and list of participants are annexed in this report. The issues raised and the foreseen concerns have been adequately addressed in the report and in the detailed EMP.

Plate 7. 1: Public Meeting

Source; Public Meeting, 31/10/2023

7.6 Grievance Redress System

The proponent will develop a Grievance Redress System (GRS) and make it accessible to all stakeholders internally and externally. The GRS will always seek to address grievances through legally acceptable methods and as fast as possible whilst not preventing any complainants from seeking other legally acceptable methods to justice. Such a GRS should be made available to staff on recruitment and to members of the public either through government agencies/offices through grievance application forms, and internally by establishing procedures for investigation and quick redress that will be recorded and tracked. The GRS shall be monitored through indicators of its efficiency and effectiveness of solving the grievance and producing lessons learnt through which corrective actions can be undertaken to improve the project's health and safety strategies. Additionally, as part of monitoring and review all grievances should be reported to the relevant authorities and the corrective actions taken, to ensure the system is credible and transparent. The process should also be culturally appropriate, transparent and non-coercive.

The developer will set up a team that will oversee implementation of the continuous stakeholder engagement. This will comprise of the Sociologist (Grievance Officer), EHS officer, Site supervisor and a representative from the Residents Association. All information relating to the project will be posted on the information board at the site office as well as posters erected at the gate to inform the neighbors. Any issues arising from the stakeholders in the area will be received by the grievance officer, recorded and addressed accordingly in the shortest possible time. All relevant stakeholders will be informed in advance of the planned project activities. The development of the project will be based on the EIA procedures and EMP provided in this EIA Study Report.

CHAPTER EIGHT: ANALYSIS OF PROJECT ALTERNATIVES

8.1 Introduction

In order to enable the proposed project to seek different ways of minimizing its impacts on the environment and at the same time achieve its objectives several alternatives were assessed through its architectural and engineering designs and environmental planning through this ESIA to come up with the most suitable options in implementing this project

8.2 No Project Alternative

This alternative implies that the status quo is maintained with no development of the proposed development. This alternative will ensure there is no interference with the existing conditions and would prevent the realization of any negative impacts resulting to the construction of the residential apartments. However, it means the benefits associated with the proposed development will be foregone and the demand for housing units will not be achieved resulting to increased pressure on the existing units. The neighborhood character and trends show that the area continues to grow with the predominant land uses now being high-rise residential developments as well as other land uses to support these developments such as schools, hospitals and religious institutions. In addition, the site is situated in an area that is not environmentally sensitive hence implementing the project would not pose adverse impacts on the environment. The 'No Option alternative' is therefore the least preferred and is deemed inappropriate based on economic and environmental considerations.

8.3 Proposed Project Option

The proponent has applied for a **Change of Use** from *a Single Dwelling Unit to Multi-Dwelling Units (Apartments)* and approval granted by Nairobi City County *(Ref No. PLUPA-COU-001506-N).* The proponent is proposing to construct **419 residential apartments** to cater for the rising demand of housing units in the area. The project will have numerous benefits such as provision of housing units, revenue generation to the government, provision of employment opportunities, and the market for goods and services. The EIA has proposed mitigation measures for the anticipated negative impacts and developed an EMP to ensure that the impacts are mitigated to a level of no significance. The proponent will comply with the environmental management practices throughout the project cycle in order to maintain harmonious co-existence

with the neighboring developments. Therefore, this is the best option and should be supported by the authority through the issuance of the EIA License.

8.4 Alternative Site

An alternative site could be considered for the proposed development if the project presents serious environmental challenges that cannot be managed effectively. However, the proposed mitigation measures considered are adequate to minimize the anticipated negative impacts to levels that do not warrant significant environmental damage. The proposed project complies with the area's development policy *(zoning of the area)* and is compatible with the existing land uses. Additionally, the search for an alternative site would imply increase in expenditure, time, and additional costs to the proponent. Hence, this alternative is not considered viable.

8.5 Alternative Construction Materials and Technologies

The proposed project will be constructed using reinforced concrete, natural stones for the walling, cement for mortar and plaster works, structural steel, metal scaffolds and formwork. The concrete structure will be built using locally sourced materials that meet the KEBS requirements. The metal scaffolds will be advantageous than timber because it will reduce the wasting of trees, has a longer lifetime, provides a steady and firm standing, easily assembled and dismantled and it increases the work efficiency. The technologies available include timber construction, prefabricated concrete panels, concrete frame construction, conventional brick and mortar style, steel and an aluminum frame, and Expanded Polystyrene Technology. The proponent has preferred the use of reinforced concrete construction as the technology is durable, offers outstanding resistance to the explosion and/or impact, and performs well during both natural and manmade disasters. Reinforced concrete can also endure very high temperatures from fire for a long time without loss of structural integrity and the materials are locally available.

8.6 Alternative Sources of Water and Energy

The estimated demand for water and energy is *111,420 litres/day daily and 736.70 KVA* respectively. This will place some amount of strain on the existing infrastructure in the area. The proponent has proposed to drill a borehole as one of the sources of water for the proposed development. The developer will also apply for a sole transformer from KPLC for energy supply within the development; install *a 100 KWp grid tied Solar PV Plant* as a source of renewable energy for the proposed development.

CHAPTER NINE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Environmental monitoring involves measurement of relevant parameters, at a level of details accurate enough, to distinguish the anticipated changes. Monitoring aims at determining the effectiveness of actions to improve environmental quality. The EMP outlined in the table addresses the identified issues of concern (potential negative impacts) and mitigation measures as well as roles, costs and monitorable indicators that can help to determine the effectiveness of actions to upgrade the quality of environment; as regards the proposed project. The EMP have considered for all phases; construction, operational and decommissioning phases.

9.1 EMP FOR THE CONSTRUCTION PHASE

Table 9. 1: EMP during Construction Phase

Impact	Mitigation Measures	Responsibility for mitigation	Monitoring frequency	Estimated Cost (KShs)
Soil Erosion	▪ Use of soil erosion control structures on prone areas within the site. ▪ Levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil. ▪ Control excavation works especially during rainy/wet conditions. ▪ Building of physical barriers to prevent mass movement where necessary. ▪ Avoid unnecessary excavations and other soil disturbances that can predispose the soil to the agents of erosion. ▪ Avoid unnecessary movement of soil materials from the site. ▪ The stockpiling of excavated soils within the site before final disposal shall be properly controlled and well managed. ▪ Undertake landscaping exercise by planting appropriate vegetation and indigenous trees on the open spaces after completion of construction works.	-Proponent -Contractor -NCC	Routine inspection	200,000
Air Pollution	▪ Conduct an environmental baseline air survey to determine the air quality within the site. ▪ Screening of the entire site to control and arrest construction-related dust. ▪ Sprinkling of water on the work areas twice a day to prevent fugitive dust violations especially during the dry season. ▪ Provide PPE such as masks to the workers in dusty areas within the site. ▪ Ensure no open burning of waste within the site.	-Proponent -Contractor -Workers and Drivers	Daily inspection Routine maintenance	300,000

	▪ Switch off the machinery and vehicles when not in use to reduce the generation of emissions. ▪ Regular maintenance of the machinery to minimize the generation of hazardous gases. ▪ Restrict heights from which materials are to be dropped, as far as practicable to minimize the fugitive dust arising from unloading/loading. ▪ Cover the stockpiles within the site and install windbreaks, water and/or soil stabilizers to reduce wind-blown dust emissions. ▪ Ensure training of all personnel working on the project on air quality management. ▪ Monitor the air quality levels as per the EMCA (Air Quality) regulations.			
Noise and Excessive Vibrations	▪ Conduct an environmental baseline noise level survey to determine the noise levels within the site. ▪ Construction activities will be carried out between 0800hrs to 1800hrs on weekday and 0800hrs to 1800hrs on Saturday only. ▪ All noisy activities shall be scheduled concurrently to reduce the exposure period. ▪ Provision of appropriate PPE such as earmuffs to all workers in noisy environment within the site. ▪ The contractor shall endeavour to use equipment installed with noise abatement devices as much as practicable. ▪ Use of noise shields or noise suppressors around the noisy equipment within the site. ▪ Switch off the construction machinery and vehicles when not in use. ▪ Regular maintenance of the construction machinery and vehicles to reduce frictional noise. ▪ Drivers delivering materials shall be advised to avoid unnecessary hooting of the trucks/vehicles. ▪ Provision of a billboard at the construction site/gate notifying of the construction activity and timings. ▪ Install sound-absorbing materials such as acoustic foam within the generator room to reduce noise pollution. ▪ Safe excavation shall be done using technologies that cause minimal vibrations so as to minimize the effect of excessive vibrations to the immediate buildings. ▪ Regular monitoring of noise and vibration levels at the site as per the	-Proponent -Contractor -Workers -Drivers	Random inspection Routine maintenance	250,000

	EMCA (Noise and Excessive Vibrations) regulations.			
Solid Waste	▪ The proponent shall prepare a Waste Management Plan for the entire project cycle. ▪ Provision of a central waste collection point within the site before final disposal. ▪ Provision of properly labelled and colour-coded receptacle bins for solid waste management within the site. ▪ Segregation of non-hazardous waste into organic and non-organic fractions before final disposal. ▪ Provide adequate and appropriate PPE to the refuse collection personnel such as gloves and masks. ▪ Engagement of a NEMA registered waste transporter to collect and disposal of segregated waste to designated disposal sites. ▪ Ensure the covering of loaded vehicles with clean impervious sheeting to ensure that the materials/waste does not leak from the vehicles during transportation. ▪ Efficient use of building materials to reduce waste and recycling where possible. ▪ Use of an integrated solid waste management system through a waste hierarchy of options: avoidance, source reduction, reuse, repair, refurbishment, recycling, recovery and finally treatment for safe disposal during the project cycle. ▪ Sensitize the workers during the toolbox meetings on the reuse of materials where feasible. ▪ Manage the waste in line with the EMCA (Waste Management) Regulations and Sustainable Waste Management Act.	-Proponent -Contractor -Workers	Weekly inspection	500,000
Liquid Waste	▪ Extension of the connection of the proposed development to the sewer system upon acquisition of a connection permit from NCWSC. ▪ Construction of an internal reticulation system which can consistently handle the loads even during peak volumes. ▪ All manholes on driveways and parking areas shall have heavy-duty covers set and double-sealed airtight as approved by specialists. ▪ Apply for a site toilet from NCC before its construction. ▪ Provision of sufficient and suitable sanitary conveniences for the workers within the site. ▪ Ensure the sanitary conveniences are maintained and kept clean at all times.	-Proponent -Contractor -Workers	Weekly inspection	500,000

	▪ Install hygiene awareness signs at strategic points within the site and hold regular toolbox talks on hygiene with the personnel. ▪ Proper decommissioning of the sanitary conveniences once the construction works are completed.			
Water demand	▪ Drill a borehole to supplement the existing NCWSC water supply subject to the acquisition of an authorization permit from WRA. ▪ Extend the connection of the main water supply to the proposed development upon acquisition of a connection permit from NCWSC. ▪ Rainwater harvesting within the site to supplement the existing water supply. ▪ Construct a centralized underground tank with a capacity of 600,000 litres able to serve the residents for at least 5 days. ▪ Install water efficient fixtures/fittings that turn-off automatically. Six (6) litres dual flush cisterns have been specified for the development together with low flow rate taps and showerheads. ▪ Provide water conservation notices and information signs at strategic points within the site and hold regular toolbox talks on water reuse with the personnel. ▪ Monitor the water consumption within the site every month.	-Contractor -Workers -NCWSC	Daily inspection	350,000
Energy demand	▪ Install a sole transformer to supply energy to the proposed development subject to the acquisition of a connection permit from KPLC. ▪ Install a 100 KWp grid tied Solar PV Plant as an alternative source of renewable energy for the proposed development subject to the acquisition of a connection permit from EPRA. ▪ Install a generator as a back-up source of energy for the development. ▪ Install energy efficient fixtures and fittings within the development such as LED bulbs. ▪ Engage the services of registered personnel to install and maintain the electrical components within the site. ▪ Turn off machinery and equipment when not in use. ▪ Monitor the energy consumption within the site every month.	-Contractor -Workers -KPLC	Daily inspection	350,000
Traffic congestion	▪ Construct a service lane within the property adjacent to Mkoko Close to ensure a smooth flow of traffic in and out of the site. ▪ The proponent will prepare a Traffic Management Plan (TMP) to ensure smooth flow of traffic along the access roads. ▪ Ferry building materials and construction waste during the off-peak hours.	-Proponent -Contractor -Drivers -KURA	Daily inspection	200,000

	▪ Engage traffic marshals to control traffic in and out of the site. ▪ Install traffic control/warning signs to inform the motorists and public of the potential hazards. ▪ Provide a billboard at the site entrance to notify the motorists and the public about the project. ▪ Enforce speed limit within the site during the construction period. ▪ Ensure the construction vehicles comply with axle load limits. ▪ Employ well-trained and experienced drivers to operate the construction vehicles.			
Storm Water Drainage	▪ Construct drainage channels within the site covered with gratings to avoid the occurrence of accidents and the entry of dirt. ▪ Construct gently sloping drains to convey water at non-erosive speed. ▪ Use of semi-permeable materials during the construction of pavements. ▪ Install rainwater harvesting facilities within the site structures to reduce the amount of storm reaching the surface. ▪ Undertake comprehensive landscaping through the use of local plants and indigenous trees within the open areas.	-Proponent -Contractor	Routine inspection and maintenance	700,000
Oil pollution	▪ All drainage facilities shall be fitted with adequate functional oil-water separators and silt traps. ▪ All oils/grease shall be stored in a designated area in the contractor's yard away from the site. ▪ Routine inspection and maintenance of the machinery away from the site in a well-designed and protected area to avoid oil spillage within the site. ▪ Proper disposal of oily materials such as oil drums and cans at designated disposal site by licensed waste transporters.	-Proponent -Contractor	Routine inspection maintenance	100,000
Health and safety of workers	▪ Register the site as a workplace with the DOSHS. ▪ Provide adequate and appropriate PPE to the workers within the site such as safety boots, overalls, helmets, goggles, earmuffs, masks, gloves etc. ▪ Provide first aid kit within the site fully equipped at all times and managed by a qualified personnel. ▪ Install appropriate precautionary signage at strategic places within the site. ▪ Undertake a health and safety audit of the workplace annually by a registered health and safety adviser. ▪ Adapt a suitable Emergency Response Plan (ERP) to manage occurrence of anticipated hazards during the construction phase. ▪ Engage a qualified full-time health and safety advisor during the	-Proponent -Contractor -Workers -DOSHS	Weekly inspection	200,000

	construction phase. ▪ Establish a Health and Safety committee during the construction phase. ▪ Induct and train all construction workers on OSH procedures. ▪ Hold daily (or as appropriate) toolbox meetings for all workers. ▪ Provide a workmen's compensation cover that complies with Work Injury and Benefits Act (WIBA) as well as other ordinances, regulations and union agreements. ▪ Local individuals preparing food for the workers at the site shall be monitored and evaluated to ensure that food is hygienically prepared. ▪ Provision of clean and potable drinking water for the workers within the site. ▪ Monitoring and evaluation of the safety of the workplace every week. ▪ Sensitize the workers on social issues such as drug and substance abuse, COVID-19, HIV/AIDS etc. ▪ Keep a record of the public emergency service telephone numbers including Police, Fire brigade, and Ambulance at strategic points within the site. ▪ Comply with OSHA 2007 and all other relevant regulations governing the health and safety of the workplace.			
Fire Risks	▪ Hire a competent authorized contractor to do the electrical works on site. ▪ Provide adequate firefighting equipment at strategic places within the property. ▪ Organize for inspection and maintenance of firefighting equipment bi-annually. ▪ Train staff on the use of the available firefighting equipment. ▪ Conduct annual fire drills within the site to sensitize the workers. ▪ Clearly mark the fire exit routes and the fire assembly point. ▪ Develop and post at the site fire emergency and evacuation procedures at strategic points within the site. ▪ Post 'No smoking signs' where flammable materials are stored. ▪ Install a fire suppression system involving a combination of a sprinkler system, a hydrant, and a fire hose reel system within the development. ▪ Install lightning protection using active lightning arresters to reduce the risk of property damage by lightning strikes.	-Contractor -Proponent -Workers	Routine inspection and maintenance	100,000
Insecurity	▪ Engage security personnel to guard the site and monitor the movement of people in and out of the property at all times. ▪ Install security lights around the property to enhance site security.	-Contractor -Proponent	Daily inspection	200,000

	▪ Hoard the site and construct a gatehouse to enhance the site security. ▪ Install CCTV at strategic points within the site to monitor and enhance the security of the property. ▪ Provision of access control measures within the development to keep out unauthorized people such as swipe cards, biometric scans, security tokens, or presenting identification documents. ▪ Routine inspection and maintenance of the security lights within the site.			
Devegetation and Impact on fauna	▪ Conserve all the young trees within the riparian reserve and along the plot boundary. ▪ Apply for a tree-cutting permit before cutting down the trees and adhere to the conditions therein. ▪ Undertake a comprehensive landscaping exercise after the construction phase by planting indigenous trees within the riparian reserve and designated open spaces. ▪ Avoid dumping spoil and waste into the Nairobi River. ▪ Ensure that potentially contaminated runoff from the parking areas are drained through oil-water separators and silt traps.	-Contractor -Proponent -Director of Forestry	Routine inspection and maintenance	100,000
Conflict with neighbours	▪ Establish a Grievance Redress Mechanism that is easily accessible by all stakeholders. ▪ The proponent will ensure continuous communication between the stakeholders on the progress of the project and its effects.	-Proponent	Throughout	100,000

9.2 EMP FOR THE OPERATION PHASE

Table 9. 2: EMP during Operation Phase

Impact	Proposed Mitigation Measures	Responsibility for mitigation	Monitoring frequency	Estimated Cost (Kshs)
Liquid waste	▪ Ensure regular maintenance of foul water drainage works at the premises to prevent clogging and forestall breakdowns and ensure damages are fixed expeditiously. ▪ Regular cleaning of the sanitary facilities within the development. ▪ Regular monitoring and maintenance of the plumbing fixtures within the apartments by licensed personnel.	- Proponent - Occupants	Periodic inspection Routine Maintenance	250,000
Solid waste	▪ The proponent shall prepare a Waste Management Plan for the entire project cycle. ▪ Provision of a central waste collection point within the development for collection and segregation before final disposal. ▪ Provision of properly labelled and colour-coded receptacle bins for solid waste management within the site. ▪ Segregation of non-hazardous waste into organic and non-organic fractions before final disposal. ▪ Engagement of a NEMA registered waste transporter to collect and disposal of segregated waste to designated disposal sites. ▪ Use of an integrated solid waste management system through a waste hierarchy of options: avoidance, source reduction, reuse, repair, refurbishment, recycling, recovery and finally treatment for safe disposal during the project cycle. ▪ Manage the waste in line with the EMCA (Waste Management) Regulations and Sustainable Waste Management Act.	- Proponent - Occupants	Periodic inspection	350,000
Increased Water Demand	▪ Apply for permits annually from WRA before use of the borehole water. ▪ Regular maintenance of all water components including the borehole. ▪ Provide water conservation notices and information signs at strategic points within the development. ▪ Monitor the water consumption within the site every month.	- Proponent - Occupants	Routine inspection and maintenance	250,000
Increased Energy	▪ Regular maintenance of the generator and grid tied Solar PV Plant. ▪ Put off all lights immediately when not in use or are not needed.	- Proponent - Occupants	Routine maintenance	250,000

Demand	▪ Switch off equipment and machinery when not in use. ▪ Regular monitoring and maintenance of the electrical components by licensed personnel. ▪ Undertake annual energy audits to improve and implement targeted measures to enhance energy efficiency within the development. ▪ Monitor the energy consumption within the site every month.			
Air pollution	▪ Routine cleaning of the waste collection points to avoid foul smell. ▪ Regular collection and disposal of the solid waste to avoid exhaust/foul air. ▪ Regular cleaning of dust prone areas such as driveways and corridors. ▪ Regular maintenance of the machinery such as generator to minimize the generation of hazardous gases. ▪ Comply with EMCA (Air Quality regulations) 2014.	- Proponent - Occupants	Routine maintenance	150,000
Noise Pollution	▪ Undertake annual noise measurements and adhere to the recommendations therein. ▪ Sensitize the residents on minimal permissible noise levels within the development. ▪ Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	- Proponent - Occupants	Periodic inspection	200,000
Health and Safety Risks	▪ Provide adequate and appropriate PPE to the workers within the development such as safety boots and overalls. ▪ Install appropriate precautionary signage at strategic places within the development. ▪ Undertake a health and safety audit of the workplace annually by a registered health and safety adviser. ▪ Routine maintenance of the lift shafts and electrical equipment by accredited personnel. ▪ Monitor any accidents/incidents within the development and keep the records. ▪ Formulate an Internal Environmental Policy to guide on the best environmental practices within the development. ▪ Adapt a suitable Emergency Response Plan (ERP) to manage occurrence of anticipated hazards. ▪ Keep a record of the public emergency service telephone numbers including Police, Fire brigade, and Ambulance at strategic points within the site.	- Management Company - Occupants	Monthly inspection	150,000
Fire Risks	▪ Adapt an effective emergency response plan.	- Proponent	Routine	100,000

	▪ Provide adequate firefighting equipment at strategic places within the development. ▪ Organize for inspection and maintenance of firefighting equipment bi-annually by licensed personnel. ▪ Conduct annual fire drills within the development to sensitize the residents. ▪ Clearly mark the fire exit routes and the fire assembly point. ▪ Develop and post at the site fire emergency and evacuation procedures at strategic points within the development.	- Occupants	inspection	
Security Risks	▪ Engage services of registered security personnel to guard the premises at all times. ▪ Regular maintenance of the CCTV cameras and related infrastructure by licensed personnel. ▪ Post hotline numbers at strategic points within the development. ▪ Sensitize the residents on security precautions. ▪ Encourage community policing and formation of Nyumba Kumi.	- Proponent - Occupants	Periodic inspection Routine maintenance	150,000
Storm water drainage	▪ Proper maintenance of the drainage structures within the site. ▪ Inspection and maintenance of rainwater harvesting facilities. ▪ Regular maintenance of the landscaped areas and the riparian reserve.	- Proponent - Occupants	Routine inspection and maintenance	150,000
Traffic Density	▪ Regular inspection and maintenance of the traffic signs within the development. ▪ Regular inspection and maintenance of the parking bays and related infrastructure.	- Proponent - Occupants	Routine maintenance	100,000

9.3 EMP FOR THE DECOMMISSIONING PHASE

Note: A due diligence environmental audit will be undertaken and submitted to NEMA at least three months prior to decommissioning and in line with the Environmental Management and Coordination Act No. 8 of 1999.

Table 9. 3: EMP during Decommissioning Phase

Environmental / Social Impact	Proposed Mitigation Measures	Responsibility for mitigation	Monitoring Frequency	Estimated Cost (KShs)
Demolition of existing structures	▪ Apply for a demolition permit from NCC before commencing the demolition exercise. ▪ Engage an NCA registered contractor to carry out the demolition exercise. ▪ Provide adequate and appropriate PPE to the workers within the site such as safety boots, overalls, helmets, goggles, earmuffs, masks, gloves etc. ▪ Ensure that demolition exercise is carried out during the daytime only.	-Proponent -Contractor	Daily Inspection	500,000
Air pollution	▪ Screening of the entire site to control and arrest demolition-related dust. ▪ Sprinkling of water on the site twice a day to prevent fugitive dust violations especially during the dry season. ▪ Provide PPE such as masks to the demolition workers in dusty areas within the site. ▪ Switch off the machinery when not in use to reduce the generation of emissions. ▪ Regular maintenance of the machinery to minimize the generation of hazardous gases.	-Proponent -Contractor	Daily Inspection Periodic Maintenance	150,000
Noise pollution	▪ Demolition exercise will be carried out between 0800hrs to 1800hrs on weekday and 0800hrs to 1800hrs on Saturday only. ▪ Noisy activities shall be scheduled concurrently to reduce the exposure period. ▪ Provision of appropriate PPE such as earmuffs to all workers in noisy environment within the site. ▪ The contractor shall endeavour to use equipment installed with noise abatement devices as much as practicable. ▪ Switch off the demolition machinery when not in use. ▪ Regular maintenance of the machinery to reduce frictional noise. ▪ Comply with EMCA (Noise and Excessive Vibration Pollution Control) Regulations.	-Proponent -Contractor -Workers	Periodic Inspection	150,000
Health and	▪ Provision of PPE to the workers and ensure they wear them at all times.	-Contractor	Daily	200,000

safety of workers	▪ Provide first aid kit within the site fully equipped at all times and managed by a qualified personnel. ▪ Install appropriate precautionary signage at strategic places within the site. ▪ Adapt a suitable Emergency Response Plan (ERP) to manage occurrence of anticipated hazards during the construction phase. ▪ Adherence to safety procedures shall be enforced. ▪ All workers shall be adequately insured against accidents.	-Workers -Proponent	Inspection	
Solid and liquid waste	▪ Engagement of a NEMA registered waste transporter to collect and disposal of segregated waste to designated disposal sites. ▪ Ensure the covering of loaded vehicles with clean impervious sheeting to ensure that the demolition waste does not leak from the vehicles during transportation. ▪ Reuse of construction debris where feasible. ▪ Provide adequate and appropriate PPE to the refuse collection personnel such as gloves and masks. ▪ Proper decommissioning of all the sanitary conveniences.	-Contractor -Proponent	Daily Inspection	250,000
Re-vegetation and comprehensive landscaping	▪ Implement an appropriate re-vegetation program to restore the site to its original status ▪ Ensure appropriate stormwater runoff controls are implemented to prevent surface erosion ▪ Monitoring and inspection of the area for indications of erosion shall be conducted and appropriate measures are taken to correct any occurrences ▪ Fencing and signs restricting access shall be posted to minimize disturbance to newly-vegetated areas	-Contractor -Proponent	Periodic Inspection	100,000

CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

10.1 Conclusion

The proposed development will provide numerous benefits to the housing sector and the country at large. Some of the benefits include the provision of residential apartments, creation of employment opportunities, revenue generation to the National Government through taxes revenue generation to the County Government through permits, market for goods and services, and revenue generation to the proponent through the sale and/or lease of the residential apartments. However, the proposed project will also have negative impacts which include increased traffic along the access road, air and noise pollution, increased waste generation, increased energy and water demand, oil pollution, and increased health and safety hazards during the project cycle among others can be sufficiently mitigated.

The proponent has committed to putting in place various mitigation measures to mitigate the negative environmental, safety, health, and social impacts associated with the proposed project. It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the EMP as well as adhering to all relevant environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects. It is also recommended that the positive impacts that emanate from such activities shall be maximized as much as possible. It is expected that these measures will go a long way in ensuring the best possible environmental compliance and performance standards.

10.2 Recommendations

The proposed development is hereby recommended for licensing by NEMA subject to the following conditions:

i. That the construction activities will be carried out between 0800hrs to 1800hrs on weekdays and 0800hrs to 1800hrs on Saturdays only.
ii. That the proponent shall obtain all the requisite permits and licenses before the construction begins and adhere to the conditions therein.
iii. That the proponent shall ensure strict implementation of the EMP developed in this report.

iv. That the proponent shall adhere to all relevant environmental, health, and safety standards, policies, and regulations that govern the establishment of the proposed project.

v. That the proponent shall carry out annual environmental audit in the first year of operation to confirm the efficacy and adequacy of the EMP developed to improve the environmental performance of the development.

vi. That the proponent shall adhere to all other conditions that the Authority may find necessary.

REFERENCES

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APPENDICES

1. Copy of ownership documents and sale agreement
2. Copy of Proponent KRA PIN Certificate
3. Copy of architectural plans
4. Copy of the Change of Use approval
5. Copy of TOR Approval letter
6. Copy of the WRA Pegging Report
7. Copy of Baseline Noise and Air Measurements Report
8. Copy of the onsite notice for the public meeting
9. Copy of the invitation letter for the public meeting
10. Copy of minutes of the public meeting
11. Copy of Memorandum of Objection from the Rhapta Residents Association
12. Copy of the Bill of Quantities
13. Copy of the NEMA Invoice
14. Copy of NEMA Payment Receipt
15. Copy of expert practicing licenses