ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT

PROPOSED RESIDENTIAL DEVELOPMENT PROJECT

ALONG PROF. WANGARI MAATHAI ROAD, NAIROBI COUNTY
PLOT L.R. No. Nairobi/Block 38/42

PROPONENT

FUGUANGWEIFA INVESTMENT COMPANY LIMITED
P.O. Box 15221– 00100,
Nairobi, Kenya.

View Park Towers 12th Floor, Utalii Lane
P.O. Box 28803-00100,
Nairobi, Kenya.
NEMA Reg: 1689
Tel: 0720679680
Email: info@stalinenvironment.com

DOCUMENT AUTHENTICATION

This Environmental Impact Assessment Exercise has been carried out according to the Environmental Management and Coordination Act, Cap 387 and Environmental (Impact Assessment and Audit) Regulations, 2003. We the undersigned, certify that the particulars in this report are accurate to the best of our knowledge.

FIRM OF EXPERTS:
STALIN ENVIRONMENT
View Park Towers, 12th Floor, Utalii Lane
P.O. Box 28803-00100,
Nairobi, Kenya.
Tel: 0720 679680
NEMA Reg: 1689

STALIN ENVIRONMENT
P. O. Box 28803 - 00100
NAIROBI, KENYA
Tel: 0720 679 680 / 0721 484 766

Name___Eric Moses Omondi__
(Lead Expert Reg. No. 6150)

Signed__ _ **Date**_10th November 2025__

Name___Anthony Odenyo Odongo_
(Lead Expert Reg. No. 1634)

Signed__ _ **Date**_10th November 2025__

PROPONENT:
FUGUANGWEIFA INVESTMENT COMPANY LIMITED
P.O. Box 15221- 00100,
Nairobi, Kenya.

Name____Bunny Lew____

Signed____ ___ **Date**_10th November 2025__

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ACRONYMS

CCTVs	Closed Circuit Televisions
EA	Environmental Audit
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management/Monitoring Plan
EMS	Environmental Management System
GOK	Government of Kenya
ICT	Information Communication Technology
KBS	Kenya Bureau of Standards
KPLC	Kenya Power
KURA	Kenya Urban Roads Authority
NCG	Nairobi County Government
NEMA	National Environment Management Authority
NCWSC	Nairobi City Water and Sewerage Company
OSHA	Occupational Safety and Health Act
RPE	Respiratory Protective Equipment
PPE	Personal Protective Equipment
PPM	Parts Per Million
TOR	Terms of Reference
VOC	Volatile Organic Compounds
WRA	Water Resources Authority

EXECUTIVE SUMMARY

Fuguangweifa Investment Company Limited, a Kenyan registered company is proposing to construct a twenty two storey residential building development on plot LR. No Nairobi/Block 38/42 located along Prof. Wangari Maathai Road, Nairobi County. The proposed development will mainly comprise of four hundred and forty apartment units and residential amenities such parking, swimming pool, club house, fitness center and children's play areas and associated ancillary facilities within the proposed project site.

Environmental Impact Assessment is a tool for environmental planning and is identified as a key component in new project implementation. According to section 58 of the Environmental Management and Coordination Act (EMCA) Cap 387 second schedule 9 (1), and Environmental (Impact Assessment and Audit) regulation, 2003, new projects must undergo Environmental Impact Assessment. The Report of the same must be submitted to National Environment Authority (NEMA) for approval and issuance of relevant certificates.

The main objective of the assignment was to assist the proponent prepare a study report after carrying out an Environmental Impact Assessment (EIA) of the proposed development to ensure that appropriate measures to mitigate any adverse impacts to the environment are taken into consideration. The Environmental Impact Assessment carried out on the project identified existing and potential environmental impacts and possible concerns that interested and/or affected parties have with the development, as well as the associated prevention and mitigation measures for the negative impacts as stipulated in the proposed Environmental Management Plan (EMP).

The Environmental Impact Assessment (EIA) for the proposed project was conducted using a comprehensive, multi-step methodology in line with regulatory guidelines. It began with a baseline study to assess current environmental conditions. Site surveys and stakeholder consultations were then carried out to identify potential impacts and community concerns. Data from these assessments were analyzed to forecast the environmental effects of both construction and operational phases. The EIA also included a review of legal and regulatory frameworks to ensure compliance with environmental standards. Mitigation measures were proposed based on the identified impacts, and a monitoring plan was developed to track the project's environmental performance during and after construction.

The proposed residential building is anticipated to have several significant environmental impacts. Air quality will be affected during the construction phase due to emissions from machinery, vehicles, and dust generation, which could temporarily degrade local air quality. Noise pollution from heavy equipment, excavation, and piling is expected to exceed permissible levels, especially affecting nearby residents. Water resources may be impacted by stormwater runoff and potential contamination from construction materials or chemicals, posing risks to nearby water bodies and drainage systems. Waste generated from construction activities could increase landfill pressure if not properly managed. In the long term, the project

will increase energy and water consumption, contributing to urban heat islands and higher carbon emissions if not designed for efficiency. The project could also exacerbate traffic congestion and strain local infrastructure, especially during peak construction periods and after occupancy, due to increased population density in the area.

Mitigation measures are focused on minimizing these impacts through sustainable practices. Dust suppression and control measures, noise abatement measures, and proper wastewater management systems will be implemented during construction. The building design will incorporate energy-efficient systems, renewable energy sources, and water-saving technologies to reduce operational impacts. Landscaping with native species and creating green spaces will enhance biodiversity, while traffic management plans and infrastructure upgrades where feasible will address community concerns. Continuous monitoring and compliance with environmental regulations will ensure that impacts are effectively managed throughout the project lifecycle.

The Environmental Impact Assessment Study indicates that the proposed project will have both positive and negative environmental and social impacts. By putting in place the mitigation measures outlined within the report the negative environmental, safety, health and social impacts associated with the life cycle of the proposed project can be eliminated, minimized and controlled. In this light, it is recommended that the proposed project is granted an EIA License with adequate conditions that the project proponent should adhere to as well as the standards guidelines outlined in this reports Environmental Management Plan.

1. INTRODUCTION

1.1 Background and rationale for an Environmental Impact Assessment (EIA)

The surge in the construction of residential buildings in Nairobi City and its environs can be attributed to a confluence of demographic, economic, and social factors that are reshaping the housing landscape. Urbanization is a key driver, as an increasing number of people are seeking opportunities in cities, resulting in higher demand for housing in urban areas. Apartments provide a practical solution to accommodate this trend, offering efficient use of limited urban space while providing proximity to employment centers and amenities. Developers are responding to this demand by constructing more apartment buildings that cater to diverse lifestyles and needs.

Economic considerations play a significant role in the construction boom of apartment buildings. The costs associated with single-family homes, such as land prices, construction materials, and labor, have been steadily increasing, making homeownership a less attainable goal for many. In contrast, apartments offer a more cost-effective option for both developers and residents. The economies of scale achieved through apartment construction make it possible to provide housing at relatively lower costs per unit. This affordability factor, coupled with the growing preference for rental living, has led to sustained demand for apartments, prompting developers to capitalize on this market trend by initiating more construction projects.

The proposed project comprises of the construction of a twenty two storey residential apartment development (440 apartment units) along Prof. Wangari Maathai Road, Nairobi County. According to Sections 58 and 138 of the Environmental Management and Coordination Act (EMCA) Cap 387 and Part II and III of the Environmental (Impact Assessment and Audit) Regulations 2003, construction of the proposed development requires an Environmental Impact Assessment Report prepared and submitted to the National Environment Management Authority (NEMA) for review and eventual Licensing before the development commences.

The main objective of the EIA study is to predict, assess, and analyze the possible positive and negative environmental and social impacts that are expected during the construction, operation and decommissioning phases of the project. This was done with the aim of proposing the possible mitigation measures for the highlighted negative impacts. This is in line with ensuring that the development does not impact negatively on the environment in terms of social, health, economic and physical (soil, water, plant and animals) state of the project site.

1.2 Scope of the environmental impact assessment

In order to identify the potential environmental and social impacts, and to come up with the proper mitigation measures for the proposed project the consultant undertook the following:-

- A review of preliminary designs for the proposed project to get acquainted with environmental issues in the project site vicinity.
- The planning and preparing of a time schedule for the activities to be undertaken for the EIA.
- Visiting the project site, and consulting with the local communities and relevant key stakeholders
- Carrying out a comprehensive assessment ensuring all environmental concerns and views of all parties/persons likely to be affected by the project are taken into consideration.
- Developing an environmental and social management plan with mechanisms for monitoring and evaluating the compliance and environmental performance, which

include the cost of mitigation measures and the timeframe of implementing the measures.

- Liaising with NEMA for compliance with all mandatory and regulatory requirements relating to the EIA.

1.3 Methodology of the environmental impact assessment

1.3.1 Screening and scoping

The Second schedule of the Environmental Management and Coordination Act (EMCA) outlines the type of projects that need to undergo the assessment. Projects are categorized based on their scale, location, and potential environmental impact. In this case, the proposed project falls under high risk projects i.e. Urban development including establishment of a new housing estate development exceeding one hundred housing units.

The scoping process identifies the critical environmental issues that need to be addressed during the EIA study. The contents of the EIA study report is based on the Environmental (Impact Assessment and Audit) Regulations Part IV. According to the Regulations the Study Report should where possible, contain description of the following:-

- ✓ a description of the nature of the proposed project;
- ✓ the proposed location of the project;
- ✓ a concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project;
- ✓ the objectives of the project;
- ✓ the technology, procedures and processes to be used, in the implementation of the project;
- ✓ the materials to be used in the construction and implementation of the project;
- ✓ the products, by products and waste generated by the project;
- ✓ a description of the potentially affected environment;
- ✓ 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;
- ✓ alternative technologies and processes available and reasons for preferring the chosen technology and processes;
- ✓ analysis of alternatives including project site, design and technologies and reasons for preferring the proposed site, design and technologies.
- ✓ 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;
- ✓ provision of an action plan for the prevention and management of foreseeable accidents and hazardous activities in the cause of carrying out activities of the development project;
- ✓ the measures to prevent health hazards and to ensure security in the working environment for the employees and for the management of emergencies;
- ✓ an identification of gaps in knowledge and uncertainties which were encountered in compiling the information;
- ✓ an economic and social analysis of the project;
- ✓ an indication of whether the environment of the surrounding areas is likely to be affected; and the available alternatives and mitigating measures; and
- ✓ any other matters as the NEMA may require.

1.3.2 Baseline data collection

Baseline data collection is essential for understanding the current environmental conditions before the project begins. This involves gathering information on:

- ✓ Physical environment: climate, geology, topography, hydrology, and air quality.

- ✓ Biological environment: flora, fauna, ecosystems, and biodiversity.
- ✓ Socio-economic environment: population, land use, cultural heritage, infrastructure, and public health. This data provides a reference point for future impact assessments and monitoring.

Data collection was carried out through administration of questionnaires, public meetings, use of checklists, observations and photography, site visits and desktop environmental studies, where necessary and in the manner specified the Environmental (Impact Assessment and Audit) Regulations, 2003. Field visits were carried out specifically for physical inspection of the proposed Project site characteristics and the environmental status of the surrounding areas to determine the anticipated impacts.

1.3.3 EIA public consultation

Public consultation is a crucial element of the EIA process. It ensures that the concerns and inputs of affected communities, and other stakeholders are incorporated into the assessment. Stakeholder engagement takes place through:

- ✓ Public hearings or meetings.
- ✓ Surveys and interviews.
- ✓ Written submissions and feedback mechanisms.

All the above named stakeholder engagements were undertaken for the proposed project. Public meetings were conducted at the proposed project site and in accordance with Section 17 of the Environmental (Impact Assessment and Audit) Regulations, 2003 with the information gathered incorporated into the report. The appendices contain copies of the completed questionnaires administered to the public, written submissions, public meetings register and public meeting minutes.

1.3.4 Impact identification, mitigation and monitoring

Once baseline conditions are established and stakeholder engagement carried out, potential impacts of the project are identified and predicted. After identifying the potential impacts, the next step is to evaluate their significance and propose mitigation measures. Mitigation measures are then proposed to avoid, minimize, or compensate for the potential negative impacts. Finally, an Environmental Management Plan is then developed and outlines how the mitigation measures will be implemented and monitored during the construction, operation, and decommissioning phases of the project.

1.3.5 Reporting and documentation

A comprehensive EIA Study report containing the findings is then compiled by the Consultant in accordance with NEMA guidelines and submitted to NEMA by the Lead Expert on behalf of the proponent for consideration and approval/rejection.

1.3.6 Review and Decision-Making

Once the EIA report is submitted to the relevant authority - NEMA, it undergoes a review process. This review includes a public review, technical evaluations, and input from regulatory bodies. Based on this review, the project may receive an approval with conditions whereby the project can proceed if certain conditions are met or a rejection whereby the project is deemed too harmful to the environment.

2. PROJECT DESCRIPTION

2.1 Introduction

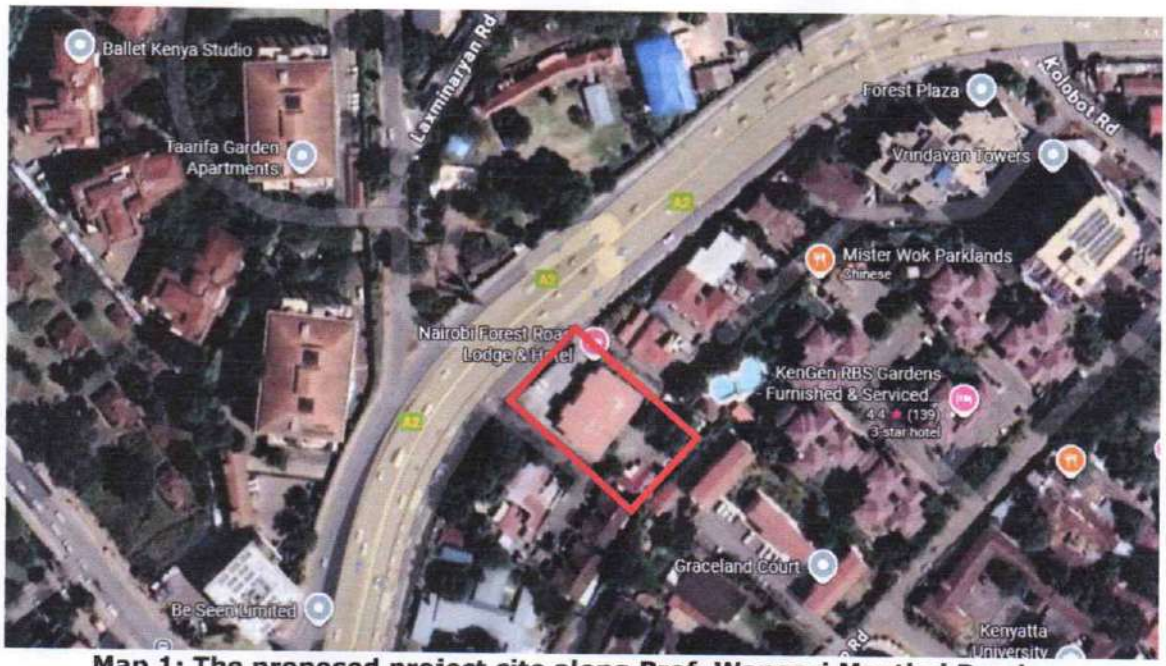
This chapter provides a detailed description of the project development assessed within this EIA. The overall objective of this Project is to develop and avail modern residential apartments with associated amenities within the proposed project site in Nairobi County. The proposed project will lead to conversion of the current single dwelling residential buildings into a multistorey development project. The actual design components of the project include: -

- ✓ Construction of a twenty two storey building block with 3 lower ground levels comprising of 176 No. two bedroom units; 264 No. one bedroom units and other facilities including a swimming pool, club house, fitness center and children's play areas
- ✓ Construction of a driveways, sidewalks, utility rooms and 183 parking bays
- ✓ Installation of development utilities (water, drainage, electricity, health and safety systems, IT systems and security)
- ✓ Site landscaping/beautification

The project will contribute towards increased availability of housing facilities within the area in general. The project will create several employment and business opportunities in addition to the several positive impacts discussed in this report. The proposed project site falls within an area with several upcoming residential and commercial developments including a good road network, piped water supply, electricity supply and sewer line.

2.2 Location and size of the project site

The proposed project site is located on Land Parcels identified as L. R. No. Nairobi/Block 38/42 which measures a total area of Nought Decimal Two Five Two Two (0.2522) Hectares. The proposed project site is located along Prof. Wangari Maathai Road - GPS coordinates 1°16'14.0"S 36°48'55.5"E - Museum Hill, Ngara West, Nairobi County. Notable neighbours near the proposed project site include Forest Road Plaza, Taarifa Suites, The Aga Khan Academy Nursery School, Vrindavan Towers amongst others..

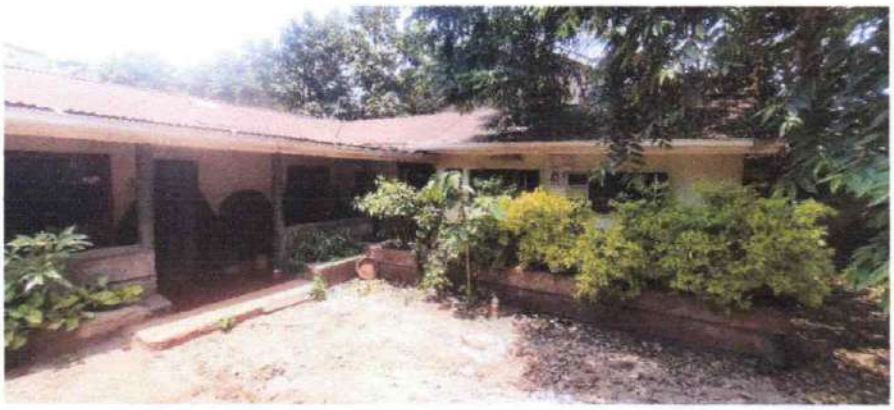


Map 1: The proposed project site along Prof. Wangari Maathai Road

2.3 Existing structures on site and surrounding environment

The proposed project site is occupied by a single storey building as well as other single storey structures. The project plot is surrounded by masonry stone boundary wall and natural hedge borders. There are several mature trees within the proposed plot with other vegetation including various flowers and grass lawns. The area is served by NCWSC piped water and sewer line connection as well as KPLC electricity power. Prof. Wangari Maathai Road and the general surrounding area consists of blend of residential and commercial buildings.

Photo 1: Views of the proposed project site



2.4 Design particulars, licenses and permits

The project developer has sought and obtained several key construction-related permits and approvals, with some already granted and others currently in various stages of review and processing. Documents obtained include Approved Change of User, Notification of Approval and Approved architectural and structural drawings. Permits under review include WRA Water Abstraction Permit and proposed Borehole EIA License Application. Other studies conducted and complete include Traffic Impact Assessment Report and Geotechnical Survey Report. These authorizations have been sought to ensure full compliance with all necessary regulatory requirements.

The proposed buildings design proposes the construction of a twenty two storey building block with three lower basement levels. Table 1 below describes the facilities on each of the proposed buildings floors. Specific details of the proposed development are outlined in the proposed projects approved architectural drawings containing the site plan, layouts, sections, elevation and other plans that illustrate the development in more detail attached within the appendices.

Table 1: Apartment units and facilities per floor

Floor	Facilities
Basement 1, 2, 3	183 Vehicle parking Utility Rooms – generator/ transformer/ electricity switchboard Underground water tanks/ stores
Ground Floor	Gatehouse, Main Entry/Exit Lobby/Health Centre, Swimming Pool, Playground
Typical Floor 1st-22nd	176 No. two bedroom units 264 No. one bedroom units
TOTAL	**440 apartment Units**

Parking area and driveway - Three basement floors of the building will be designated mainly as a vehicle car parks with 183 parking slots. The driveways will measure 5 meters while the main entry/exit gate will measure 5.2 meters and will be spacious enough such as to allow easy turning and passage of vehicles. A gate house will also be provided at the building entry/exit for sentries to control and monitor the in and outflow of vehicles and human traffic.

Electrical system - The development will be connected to the electricity main line of the Kenya Power which already exists within the project area and thus will be used in all phases of the project. Backup generators shall also be installed to be used during the operational phase of the project. The necessary guidelines and precautionary measures relating to the use of electricity shall be adhered to.

Water reticulation system - Water from the Nairobi City Water and Sewerage Company and a proposed borehole to be drilled onsite will be used during the operational phase of the project. Underground water reservoir tanks shall be built on site to increase water storage capacity within the project. Necessary pumps shall be installed to facilitate water pumping into overhead tanks.

Storm water run-off - All storm water drainage will be channeled into storm water drains which will be constructed within the project compound. The drains will then be channeled to the nearby existing peripheral storm water drainage systems. All inspection chambers in the driveway and parking will have heavy duty covers.

Wastewater/Sewerage - Foul water drainage from the buildings will be connected to the Nairobi City Water and Sewerage Company sewer mains. All sanitary works will be up to M.O.H standards.

Security - Security within and around the project during construction will be enhanced by security guards posted at the site and installation of security lighting around the project site. During operation, 24 hours security will be incorporated by having security guards on site, CCTV and security lighting around and within the premises.

Safety systems - Safety and emergency preparedness components will be incorporated into the project design so as to boost the emergency response and preparedness index of the building. Emergency staircases shall be incorporated from the topmost floor to the ground floor in each building. Once complete clearly marked and unobstructed emergency exits, fire-rated stairwells, and exit signs on each floor shall be maintained. The building shall be equipped with fire detection and suppression systems, such as smoke detectors, fire alarms, sprinkler systems, and fire extinguishers placed at accessible locations. Emergency lighting and backup power supplies will be available to support critical systems during power outages. Designated assembly points and posted evacuation plans shall also be provided.

2.5 Description of the project's construction activities

2.5.1 Pre-construction investigations

The implementation of the proposed Project's design and construction phase will start with investigation and studies of the site's biological, physical and socio-economic factors in order to minimize any unforeseen adverse impacts during the project cycle. Infrastructure assessment studies shall also be conducted so as to harmonize the proposed project with existing infrastructure and amenities.

2.5.2 Site set up and management

This involves activities such as screening, fencing the project site, setting up temporary stores, demarcation of temporary roads, car parks, storage areas etc.

2.5.3 Demolition works and site clearance

Site clearance process entails any obstruction on the way of the intended construction activity. This entails demolition of any existing structures on site and clearing of obstructions that may lie within the proposed project path. In this case site clearance will result in substantial generation of solid waste since there is a partially demolished permanent structure onsite and several trees to be cleared from the site. Any site clearance waste generated should be disposed by using appropriate methods to be identified within this report.

2.5.4 Ground works

Ground works such as excavation and deep trenching, pile driving, filling, and the construction of earth structures e.g. embankments, bunds and cuttings; will be carried out to prepare the site for construction of foundations and drainage systems. This will involve the use of machinery such as excavators, pile drivers, bulldozers, backhoes and also manual labour.

2.5.5 Construction of foundations and structural works;

The construction of the buildings foundations, walls, floors, pavements, drainage systems and parking area among other components of the proposed project will involve a lot of concreting work, masonry work and related activities. General concreting work and masonry related activities will include concrete mixing, feeding, compacting, plastering, slab construction, construction of foundations, construction of the envelope of the building, the external facings, cladding, erection of building walls and curing of fresh concrete surfaces. These activities are known to be labour intensive and will be supplement by machinery such as concrete mixers, tower hoists, pavers, concrete compactors, vibrators amongst others.

2.5.6 Structural steel works

The building will be reinforced with structural steel for stability. Structural steel provides the essential framework that ensures strength, stability, and resistance to both vertical and lateral loads, such as wind and seismic forces. Structural steel works entail entail the fabrication, erection, and installation of steel components like beams, columns, and braces to form the building's load-bearing framework.

2.5.7 Mechanical and electrical installations and associated trades

Electrical work during construction of the buildings will include installation of electrical gadgets and appliances including transformers, meters, electrical cables, lighting apparatus, sockets etc. In addition, there will be other construction activities involving the use of electricity such as welding, metal cutting, running electrical gadgets etc. Plumbing will entail the installation of pipework for water supply and distribution will be carried out within the building and associated facilities. Pipework will be done to connect the building into the existing sewer system and for drainage of storm water from the rooftops and driveways into the peripheral storm water drainage system. Other associated trades include as joinery, painting, window placement and plastering. These activities will include metal, wood, glass, plastic and ceramic tiles cutting, the use of adhesives, metal grinding and wall drilling among other activities.

2.5.8 Removal temporary structures

This includes removal of temporary structures such as tower cranes, scaffolds, formwork, shoring, hoardings, access platforms, machinery and equipment that were used to support construction activities and ensuring the site is cleared, secure, and ready for occupancy or inspection.

2.5.9 Landscaping

Landscaping shall involve the planning and implementation of outdoor spaces around a building, including planting trees, shrubs, and grass, installing walkways, lighting, drainage systems, and decorative elements to enhance aesthetics, functionality, and environmental sustainability.

2.6 Construction Inputs and outputs

Construction Inputs for the proposed development shall include:

- ✓ Materials - Concrete, steel, glass, bricks, insulation, and finishing materials like flooring, tiles, and paints.
- ✓ Labor - Skilled and unskilled workers including engineers, architects, electricians, plumbers, and construction workers.
- ✓ Equipment - Cranes, scaffolding, excavators, mixers, and specialized tools.
- ✓ Utilities - Water, electricity, and temporary utilities for construction purposes.
- ✓ Permits and approvals.

Construction outputs for the proposed development shall include:

- ✓ Finished structure - Complete multi-story buildings with residential units, common areas, and amenities.
- ✓ Infrastructure - Installed utilities like water, electricity, safety systems, and elevators.
- ✓ Landscaping and exteriors- Finished outdoor spaces including walkways, gardens, and parking areas.
- ✓ Waste and debris- Construction waste such as scrap materials, packaging, and debris, to be recycled or disposed of.
- ✓ Environmental impact - Potential impacts on air quality, noise, and surrounding ecosystems, which shall be managed through mitigation efforts.

3. BASELINE INFORMATION

3.1 Background information

Nairobi County is one of the 47 Counties of Kenya. Nairobi County was founded in 2013 on the same boundaries as Nairobi Province, after Kenya's 8 provinces were subdivided into 47 counties. Nairobi city is located at 1°17′S 36°49′E / 1.283°S 36.817°E / -1.283; 36.817 and occupies 684 square kilometers.

Nairobi is divided into a seventeen constituencies; these are Westlands, Dagoretti North, Dagoretti South, Langata, Kibra, Roysambu, Kasarani, Ruaraka, Embakasi South, Embakasi North, Embakasi Central, Embakasi East, Embakasi West, Makadara, Kamkunji, Starehe and Mathare. Most of the upmarket suburbs are situated to the west of Nairobi; these include Karen, Kitisuru, Lavington and Highridge, although Kangemi and Dagoretti are lower income areas. Most low and lower-middle income estates are located in eastern Nairobi and they include Kariokor, Dandora, Kariobangi, Embakasi and Huruma.

3.2 Project area description

The proposed project is in Ngara West - Starehe Constituency which is located in the central part of Nairobi City County and forms part of the city's core administrative and commercial zone. The sub-county covers approximately 20–21 km² and hosts a mix of high-density residential areas, commercial business districts, public institutions, and transport hubs. According to the 2019 Kenya Population and Housing Census, Starehe has a population of approximately 210,000 people, with high daily population inflows due to business, governmental and commercial activity. The constituency includes established neighbourhoods such as Nairobi Central, Ngara, Pangani, Ziwani/Kariokor, Landimawe and parts of South B, each exhibiting varied land uses and socio-economic characteristics that influence planning and development considerations.

The topography of Starehe is generally flat to gently undulating, characteristic of the Nairobi Plateau. The area lies at an elevation of approximately 1,700–1,800 metres above sea level, resulting in mild climatic conditions. Due to the highly urbanised environment, much of the natural terrain has been modified through road construction, building development, drainage works and infrastructure installation. The flat terrain allows for ease of construction, but also requires careful stormwater drainage planning to prevent localized flooding, which is common during peak rainfall periods especially near road junctions and low-lying built-up zones.

Starehe experiences a moderate, subtropical highland climate, with relatively stable temperatures throughout the year. Average daily temperatures range between 12°C and 26°C, while mean annual rainfall averages 600–1,000 mm, distributed mainly during the long rains (March to May) and the short rains (October to December). Humidity levels and precipitation intensity can vary significantly due to the urban heat island effect associated with dense building and paved surfaces. Weather patterns directly influence construction scheduling, dust control, stormwater management and landscaping decisions for new developments.

The subsurface geology consists predominantly of weathered volcanic rocks overlain by red to brown lateritic and clay soils. Within the central urban zones, many development sites contain anthropogenic fill material resulting from decades of building demolition, road expansion, and utility trenching. These mixed backfill soils may contain rubble, construction waste, or compacted fill, necessitating a geotechnical investigation before foundation design. Soils in some sections are moderately erodible when exposed, meaning that construction sites require controlled earthworks, proper compaction, and stormwater management to prevent sediment discharge into storm drains.

Starehe forms part of the Nairobi River Basin, and several drainage channels and stormwater culverts pass through the constituency. In some zones, runoff drains towards Mathare River and Nairobi River channels. Due to high levels of urban surface sealing (roads, rooftops, pavements), rainfall runoff is rapid and can cause localized flooding where drainage is insufficient or blocked. Groundwater in the area generally occurs in shallow perched layers, though most developments rely on the municipal water supply network. Protection of riparian corridors, management of stormwater discharge, and prevention of silt and oil pollution into drainage systems are important considerations for any new construction project.

Land use in Starehe is diverse and dynamic, reflecting its role as a central administrative and commercial hub. The constituency hosts high-density residential estates, office buildings, retail centres, markets, schools, health facilities, government offices, transport stations and light commercial activities. Road infrastructure is well-developed, though traffic congestion is common, particularly during peak hours and near major junctions. Water supply and sewerage services are provided by Nairobi City Water and Sewerage Company, while electricity is supplied by Kenya Power. Solid waste management is carried out by licensed private collectors under county regulation. Due to dense land occupation and redevelopment pressure, new construction projects must consider service line capacity, traffic impacts, construction waste management, and structured building safety compliance.

3.2.1 Water supply

The proposed project site and surrounding area is supplied with piped water from the Nairobi City Water and Sewerage Company. Although around 50 % of Nairobi households are connected to piped water, only 40 % receive continuous supply with the area receiving intermittent-service. Supply disruptions and aging network infrastructure increase the risk of contamination, often prompting residents to boil or filter their water before use. It should also be noted that many multistorey commercial and residential buildings around the area have drilled their own boreholes to augment water supply during water shortages.

3.2.2 Sewerage

Most properties within the area connected to the Nairobi City Water and Sewerage Company sewer mains. Currently there are fears that the capacity of the sewer may soon be overwhelmed however these fears have been assuaged by Nairobi Water as necessary adjustments are made according to future projections. It was reported that sewer blockages and spillages are not frequent within the area.

3.2.3 Roads and traffic

The site is located along Prof. Wangari Maathai Road which is a dual carriageway. The road serves as a direct link between Thika Road and Waiyaki Way/Uhuru Highway. A Traffic Assessment Report for the proposed project was carried out whereby traffic volumes along the road were found to be moderate to high. The report concluded that the generated traffic from the proposed development will have minimal effects on the operations of Prof. Wangari Maathai Road and that no modifications were deemed necessary to accommodate the generated traffic from the development.

3.2.4 Air quality

Air quality in Starehe Constituency is influenced primarily by high vehicular traffic, commercial activity, ongoing construction works, and localized waste burning common in parts of the inner city. Data from monitoring stations in central Nairobi indicate that the area generally records moderate air quality levels, with particulate matter ($PM_{2.5}$ and PM_{10}) being the most significant pollutants. Studies and citywide assessments show that Nairobi's average $PM_{2.5}$ concentrations often exceed the World Health Organization (WHO) recommended limits, largely due to emissions from diesel

vehicles, dust from unpaved or busy roads, industrial processes, and informal burning of waste.

In Starehe, these pollutants tend to accumulate because of dense building structures and limited natural ventilation corridors. While routine air quality monitoring is limited, available data and satellite-based assessments suggest that air pollution levels may vary throughout the day, typically peaking during morning and evening traffic periods. Given the urbanized context, any new construction activities in the area have the potential to temporarily increase dust levels, making dust suppression, equipment maintenance, and controlled material handling necessary mitigation measures during the construction phase.

3.3 Climate

At 1,795 metres (5,889 ft) above sea level, Nairobi enjoys a moderate climate. The altitude makes for some chilly evenings, especially in the June/July season when the temperature can drop to 10 C. The sunniest and warmest part of the year are from December to March, when temperatures average the mid-twenties during the day. The mean maximum temperature for this period is 24 C. There are two rainy seasons, but rainfall can be moderate. The cloudiest part of the year is just after the first rainy season, when, until September, conditions are usually overcast with drizzle. As Nairobi is situated close to the equator, the differences between the seasons are minimal. The seasons are referred to as the wet season and dry season.

3.4 Physical and topographic features

On the eastern side of the County the terrain gently rolls but is divided by steep valleys towards the city boundaries. To the north, there is the Karura forest which is characterized by steep sided valleys. The Karen - Lang'ata area is characterized by plains surrounded by Nairobi National Park on the east and Ngong Forest on the south. Several streams with steep-sided valleys covered with vegetation are a dominant landscape feature of the County. The main rivers in the County are Nairobi River, Ngong River and Kabuthi River while Nairobi dam, which is along the Ngong River, and Jamhuri dam are the main water reservoirs in the County. The main types of soils are the black cotton and the red soils that form patches in different parts of the County. There are three forests in the County namely Ngong Forest to the south, Karura Forest to the north and the Nairobi Arboretum. The three forests have a total coverage of 23.192 Km^2.

3.5 Ecological conditions

Nairobi County is predominantly a terrestrial habitat that supports a diverse web of biodiversity ecosystems. It is home to about 100 species of mammals, 527 bird species and a variety of plant species. Although it is endowed with some permanent rivers, the aquatic ecosystems are largely choked by the effects of pollution from different sources. Currently, efforts are underway to ensure a sustainable clean Nairobi River basin.

3.6 Environment

Nairobi is well endowed with a pleasant environment that preserves much of its pristine natural beauty. Ponds, seasonal springs, rivers, flooded grasslands, and swamps abound. Unlike other major cities, Nairobi is not situated on a large river or near the sea. Nevertheless, several streams criss-cross the city. Streams running from the Ngong Hills to the south and the ridges to the north become the Athi and Nairobi Rivers. Natural springs feed a number of small swamps in secluded hollows. In addition, temporary wetlands are created with the coming of each rainy season. The planting of eucalyptus trees, however, has drained most of these springs. Nairobi National Park is another preservation of natural environment. It is covered by a highland forest of hardwoods. A spectrum of birds and animals find their home in the park. The Park itself was established in 1948 as an effort by the government to preserve the remaining natural beauty of Nairobi.

3.7 Water resources

Nairobi area is supplied by water by the Nairobi City Water and Sewerage Company a major supplier of water to most business enterprises and household. The water is sourced from rivers flowing from the Mt. Kenya regions in central province. Various Nairobi enterprise owners and residents have however ventured into the sinking of boreholes within their premises or compounds so as to supplement the water supply whenever there is a shortage or for other credible reasons.

Increase in population in the County has resulted to more pressure on the existing water infrastructure leading to serious shortage of the commodity. Over the years, demands for water for domestic and industrial processes have been steadily increasing, while the water catchment areas remain limited. Water catchment areas are increasingly being degraded due to the large volume of industrial and other wastes from human activities being disposed of to the environment without much treatment. Further downstream, there is pollution of water sources in the County. Under these circumstances, water management practices have to be efficient in order to ensure a continued adequate water supply for present and future needs. Maintenance and expansion of the water supply infrastructure will be critical to the continued development of the County.

3.8 Economic activities

The major economic activities in Nairobi include Finance and Banking: Nairobi hosts the Nairobi Securities Exchange (NSE), one of the largest and most advanced stock exchanges in Africa. It serves as a financial center for both local and international businesses, and many major banks and financial institutions have their headquarters or branches in the city. Nairobi has a growing services sector, including IT, software development, business process outsourcing, and digital innovation. The city has been dubbed "Silicon Savannah" due to its emerging tech industry and the presence of numerous tech startups. Tourism: Nairobi is often a gateway for tourists visiting Kenya's famous national parks and wildlife reserves. The city has various attractions such as the Nairobi National Park, Giraffe Centre, Karen Blixen Museum, and the David Sheldrick Wildlife Trust, which contribute to the local economy through tourism-related activities.

Manufacturing and Industry: The city hosts various manufacturing industries, including food and beverage processing, textile production, and light industrial activities. Industrial areas like Industrial Area and Athi River host a range of factories and production facilities. Retail and Wholesale Trade: Nairobi has a vibrant retail sector with numerous shopping malls, markets, and street vendors. It serves as a major distribution point for goods destined for various regions in Kenya and neighboring countries.

Real Estate and Construction: The city has seen significant growth in real estate and construction projects, including residential, commercial, and infrastructure developments. In Education and Research, Nairobi is home to several universities, research institutions, and educational centers, contributing to its status as an educational hub in the region. Nairobi's strategic location has made it a key transport and logistics center for both domestic and regional trade. It is well-connected by road, rail, and air to other parts of Kenya and neighboring countries. Nairobi houses some of the best medical facilities in East Africa, attracting patients from across the region seeking specialized healthcare services.

4. LEGISLATIVE AND REGULATORY FRAMEWORK

4.1 Introduction

According to Sections 58 and 138 of the Environmental Management and Coordination Act Cap 387 and Section 3 of the Environmental (Impact Assessment and Audit) Regulations 2003, new projects require an Environmental Impact Assessment study report prepared and submitted to the National Environment Management Authority (NEMA) for review and eventual Licensing before the development commences.

The significance of an Environmental Impact Assessment is to promote a safe environment, and sound, sustainable development, by measuring the environmental impact likely to be caused by projects. EIA shows impact levels on species, land, plants, animals, microorganisms, and non-living organisms. It also identifies safer methods, and proposes appropriate alternative measures to be undertaken before decision making and implementation.

4.2 Environmental Policy Framework

Environmental Impact Assessment (EIA) is a methodology used to identify the actual and probable impacts of the projects and programmes on the environment and to recommend alternatives and mitigating measures. The assessment is required at all stages of project development with a view to ensuring environmentally sustainable development for both existing and proposed public and private sector development ventures. The National EIA regulations were issued in accordance with the provisions of Environmental Management and Coordination (Amendment) Act of 2015. The EIA Regulations must be administered, taking into cognizance provisions of EMCA 2015, subsidiary legislation and other relevant national laws. The intention is to approve and license only those projects that take into consideration all aspects of concern to the public as they impact on health and the quality of the environment.

4.3 The Constitution of Kenya

Article 42 of the Bill of Rights of the Kenyan Constitution provides that every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. Under Chapter 5 (Land and Environment), Part 1 is devoted to land. It requires that land be used and managed in 'a manner that is equitable, efficient, productive and sustainable, and in accordance with the following principles:

(i) Equitable access to land;
(ii) Security of land rights;
(iii) Sustainable and productive management of land resources;
(iv) Transparent and cost-effective administration of land; and
(v) Sound conservation and protection of ecologically sensitive areas.

Part 2 of Chapter 5 of the Constitution is dedicated to Environment and Natural Resources. Article 69 in Part 2 provides that the state shall;

(i) Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
(ii) Work to achieve and maintain tree cover of at least ten per cent of the land area of Kenya;
(iii) Encourage public participation in the management of, protection and conservation of the environment;
(iv) Protect genetic resources and biological diversity;
(v) Establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
(vi) Eliminate processes and activities that are likely to endanger the environment; and

(vii) Utilize the environment and natural resources for the benefit of the people of Kenya.

Further, Article 70 states that if a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress.

4.4 Institutional Framework

At present there are several institutions and departments which deal with environmental issues in Kenya. The Ministry of Environment and Forestry in conjunction with several semi-autonomous government agencies are mandated to protect, conserve and manage the environment and natural resources for socio-economic development. These agencies include the National Environment Management Authority (NEMA), Kenya Water Towers Agency (KWTA), Kenya Forest Service (KFS), Kenya Forest Research Institute (KEFRI) and National Environment trust Fund (NETFUND). There are also local and international NGOs involved in environmental issues in the country.

4.4.1 National Environmental Management Authority (NEMA)

The National Environment Management Authority (NEMA) is a government regulatory body formed by an act of parliament, The Environmental Management and Coordination Act (CAP 387). The object 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.

4.5 Environmental Legal Framework

4.5.1 Environmental Management and Co-ordination Cap 387

Environmental Management and Co-ordination Act as the principal act has since been providing a legal and institutional framework for the management of the environmental related matters. It is the framework law on environment, which was enacted on the 14th of January 1999 and commenced in January 2002. The Act has since been amended and replaced by Environmental Management and Co-ordination (Amendment) Act, 2015 which was enacted into a law on 3rd January 2015.

Section 58 of the Second schedule of the Act requires the proponent of a project to submit study reports to NEMA before financing, commencing, proceeding with, carrying out, executing or conducting projects. The Second Schedule to the Act specifies the projects for which an EIA and EA must be carried out. According to Section 68 of the Act, all projects listed in the Second Schedule of the Act must undertake an environmental audit, keep accurate records and make annual reports to NEMA or as NEMA may, in writing, require.

The main objectives of the Act are to:-

- ✓ Provide guidelines for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya;
- ✓ Provide a framework legislation for over 70 statutes in Kenya that contain environmental provisions; and
- ✓ Provide guidelines for environmental impact assessment, environmental audit and monitoring, environmental quality standards and environmental protection orders.

There are several regulations under the Act which include:-

- ✓ Environmental (Impact Assessment and Audit) Regulations, 2003
- ✓ Environmental Management and Co-Ordination (Water Quality) Regulations, 2006

- ✓ Environmental Management and Co-Ordination (Waste Management) Regulations, 2006
- ✓ Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009
- ✓ Environmental Management and Co-Ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006
- ✓ Environmental Management and Co-Ordination (Controlled Substances) Regulations, 2007
- ✓ Environmental Management and Co-Ordination (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations, 2009
- ✓ Environmental Management and Coordination (Air Quality) Regulations. 2014

4.5.2 Environmental Management and Co-Ordination (Impact Assessment and Audit) Regulations, 2003

The Environmental (Impact Assessment and Audit) Regulations, 2003 give guidelines to the conduct of Project Reports, Environmental Impact Assessment Study Exercise and Reports as well as Environmental Audit and Monitoring. The regulations Schedules also provide for issues to be considered in EIA, Guidelines for carrying out an EIA and criteria for EIA experts and various environmental fees.

Section 4(1) of the regulations states that:

"...no proponent shall implement a project:

a) likely to have a negative environmental impact; or
b) for which an environmental impact assessment is required under the Act or these Regulations;

unless an environmental impact assessment has been concluded and approved in accordance with these Regulations..."

4.5.3 Environmental Management and Co-Ordination (Waste Management) Regulations, 2006

The Environmental Management and Co-Ordination (Waste Management) Regulations, 2006 gives provisions for waste management (solid waste, industrial waste, hazardous waste, pesticides and toxic substances, biomedical waste and radioactive substances) including waste generators responsibilities, categorization of various types of waste, licensing and permitting procedures as well as offences and penalties for violating provisions of the regulations.

Part II of the Waste Management Regulations 4 (1) states that no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated receptacle. Regulation 4 (3) further states that any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose of such waste in a designated waste disposal facility.

4.5.4 Environmental Management and Co-Ordination (Water Quality) Regulations, 2006

The Environmental Management and Co-Ordination (Water Quality) Regulations, 2006 provide guidelines for the protection of sources of water for domestic, industrial and agricultural use as well as standards for effluent discharge into the aquatic environment, land and public sewers and monitoring procedures. The act also provides for quality standards for sources of domestic water, irrigation and recreational waters.

Part II of the Water Quality Regulations 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 no person shall

throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

Regulation 6 (b) further states that no person shall abstract ground water or carry out any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of the water, without an Environmental Impact Assessment license issued in accordance with the provisions of the Act; or (c) cultivate or undertake any development activity within a minimum of six meters and a maximum of thirty meters from the highest ever recorded flood level, on either side of a river or stream, and as may be determined by the Authority from time to time.

4.5.5 Environmental Management and Co-Ordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

The Environmental Management and Co-Ordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 provides guidelines to noise and vibration generation by providing standards for permissible noise levels, noise measurement and control methods and licensing procedures for certain activities. Part II of the regulations, 3 (1) states that Except as otherwise provided in these Regulations, 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.

Regulation 4: - states that except as otherwise provided in the Regulations, no person shall- (a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or (b) cause to be made excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 metres from any moving source. Regulation 11 on Machinery: - states that any person wishing to (a) operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device; or (b) Engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations shall carry out the activity or activities within the relevant levels prescribed in the First Schedule to the Regulations.

Regulation 16. License states that (1). Where a sound source is planned, installed or intended to be installed or modified by any person in such a manner that such source shall create or is likely to emit noise or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, such person shall apply for a license to the Authority.

4.5.6 Environmental Management and Co-Ordination (Air Quality) Regulations. 2014

The Environmental Management and Coordination (Air Quality) Regulations. 2014 provides for provides guidelines to air quality standards, air quality levels and permissible levels and occupational air quality limits. The regulations also provide for methods of measurement and analysis of air pollutants, inspection, monitoring and licensing procedures for certain activities. Regulation 5 (1)states that No person shall (a) act in a way that directly or indirectly causes, or is likely to cause immediate or subsequent air pollution; or (b) emit any liquid, solid or gaseous substance or deposit any such substance in levels exceeding those set out in the First Schedule of the Regulations.

4.5.7 Climate Change Act 2016

Climate Change Act 2016 is an Act that is applied for the development, management, implementation and regulation of mechanisms to enhance climate change resilience and low carbon development for the sustainable development of Kenya. The Act is applied in all sectors of the economy by national and county governments to

mainstream climate change responses into development planning, decision making and implementation; enhance adaptive capacity to impacts of climate change formulate programmes to enhance resilience of human and ecological systems to impacts of climate change; mainstream climate change disaster risk reduction into strategies and actions of public and private entities; provide incentives in achieving low carbon climate resilient development and promote low carbon technologies, improve efficiency and reduce emissions amongst other functions.

The Act establishes a Climate Change Council which ensures the mainstreaming of the climate change functions by the national and county governments amongst other functions. It also establishes a Climate Change Directorate which is the lead agency of the government on national climate change plans and actions to deliver operational co-ordination and reports to the Cabinet Secretary. The Act provides for the formulation of a National Climate Change Action Plan in accordance with Article 10 of the Constitution and section 3 of the Climate Change Act 2016. The Act sets out the obligation for public participation when developing strategies, laws and policies relating to climate change by emphasizing that public consultations shall be undertaken in a manner that ensures the public contribution makes an impact on the threshold of decision making.

4.5.8 Sustainable Waste Management Act 2022

The Sustainable Waste Management Act 2022 is an act of Parliament to establish the legal and institutional framework for the sustainable management of waste; to ensure the realization of the constitutional provision on the right to a clean and healthy environment and for connected purposes. The objectives of the act are to promote sustainable waste management; improve the health of all Kenyans by ensuring a clean and healthy environment; reduce air, land, fresh water and marine pollution; promote and ensure the effective delivery of waste services; create an enabling environment for employment in the green economy in waste management, recycling and recovery; establish an environmentally sound infrastructure and system for sustainable waste management; promote circular economy practices for green growth and to mainstream resource efficiency principles in sustainable consumption and production practices

Part 4 of the Act sets the general principles of this Act as (a) promoting the right to a clean and healthy environment; (b) the precautionary principle where the lack of scientific certainty shall not be used to postpone measures to prevent environmental degradation; (c) the polluter pays principle in which the cost of cleaning up any element of the environment that has been damaged by pollution shall be paid by the polluter; (d) payment for ecosystem services or payment for ecological services (e) zero waste principle in which products and processes are designed and managed to reduce the volume and toxicity of waste and materials and (f) achieving sustainable waste management goals.

The Act sets out the functions of the National Environment Management Authority in regard to the Act which includes developing standards and guidelines on sustainable waste management and enforcing waste management legislation in consultation with county governments amongst other functions. The Act also sets out the functions of County Governments in regard to the Act. Other provisions include Waste classification and segregation; Extended producer responsibility; Materials recovery facilities; Waste management plans; Duties of private sector entities and Duties of waste service providers. The Act sets out a general penalty for persons who contravene provisions of the Act for which a penalty has not been prescribed to a fine of not less than two million shillings and not more than four million shillings or to imprisonment for a term not exceeding four years or to both.

4.5.9 The National Construction Authority Act NO. 41, 2011

The National Construction Authority Act NO. 41, 2011 is an act of Parliament that provides for the establishment, powers and functions of the National Construction Authority and its connected purposes. The Act sets out the functions of the authority which is to oversee the construction industry and coordinate its development. Among its function are to prescribe the qualifications or attributes required for registration of contractors, promote and ensure quality assurance in the construction industry, enforce the prescribed Building Code, accredit and register contractors, certify skilled construction workers and construction site supervisors as well as the appointment of investigating officers amongst others.

Section 22 of the provides for inquiry into conduct of contractors by stating that 'The Board may institute an inquiry into the conduct of a contractor on its own initiative or upon receipt of a complaint addressed to the Board in writing, made by or on behalf of any person alleging unprofessional conduct on the part of a registered person. Section 23 states that 'the Authority shall undertake mandatory inspections at any time on sites under constructions in accordance with the Act'. The Act provides the Board with powers to suspend any contractor if such or (a) is convicted of an offence under this Act; (b) is found guilty of any act or omission amounting to improper, disgraceful conduct or gross professional misconduct, after due inquiry held by the Board; or (c) has breached the regulations or by-laws of the Authority.

4.5.10 The National Construction Authority Regulations, 2014

The National Construction Authority Regulations, 2014 is a subsidiary legislation of the National Construction Authority Act NO. 41, 2011 that sets out the criteria, conduct and evaluation for the registration of contractors and joint ventures; the identification and reporting of construction works contracts or projects by owner; The certification and accreditation of skilled construction workers and construction site supervisors; and collection and payment of construction levy with associated enforcement fees and penalties. The act also spells out the classes of skilled construction workers and the classes of construction site supervisors with criterion for their eligibility for accreditation.

4.5.11 The Water Act, 2016

The Water Act 2016 provides for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes in Kenya. Section 9 (1) of this Act states that every person has the right to access water resources, whose administration is the function of the national government as stipulated in the Fourth Schedule to the Constitution. The Act establishes the Water Resources Authority (WRA) whose functions include formulating and enforcing standards, procedures and Regulations for the management and use of water resources and flood mitigation as well as regulate the management and use of water resources amongst other functions. Section 36 of the Act spells out purposes for which a water permit of required as well as ground water abstraction requirements and the penalties for non-compliance. The Act establishes the Water Tribunal though which water related disputes shall be resolved.

4.5.12 The Occupational Safety and Health Act, 2007

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

Section 21 provides that the employer or self-employed person to notify the occupational health and Safety Officer of any accidents, dangerous occurrence, or occupational poisoning which has occurred at the workplace. Section 32 gives power to the occupational safety and Health officer to enter inspects examine by day or night, a workplace which he has reasonable cause to believe to be a workplace and any part of any building of which forms a workplace. Section 55 requires all plant, machinery and equipment whether fixed or mobile for use at workplace to be used for designed work and operated by a competent person. Section 97 prohibits employers to employ persons below the age of 18 years at the workplace or perform work by which its nature its likely to harm the persons safety or health.

Relevant subsidiary legislation which are operational under the OSHA Act include:- The Factories and Other Places of Work (Health & Safety Committees) Rules 2004; The Factories and Other Places of Work (Medical Examination) Rules 2005; The Factories and Other Places of Work (Noise Prevention and Control) Rules 2005, The Factories and Other Places of Work (Fire Risk Reduction) Rules 2007 and The Factories and Other Places of Work (Hazardous Substances) Rules 2007.

4.5.13 Public Health Act (Cap. 242)

Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health.

Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drainers or refuse pits in such state, situated or constructed as in the opinion of the medical officer of health to be offensive or injurious to health. Any noxious matter or wastewater flowing or discharged from any premises into the public street or into the gutter or side channel or watercourse, irrigation channel, or bed not approved for discharge is also deemed as nuisance. Other nuisances are accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

4.5.14 Physical and Land Use Planning Act, 2019

Section 3 of the Physical and Land Use Planning Act, 2019 gives the objects of the act which include providing (a) the principles, procedures and standards for the preparation and implementation of physical and land use development plans at the national, county, urban, rural and cities level; (b) the administration and management of physical and land use planning in Kenya; (c) the procedures and standards for development control and the regulation of physical planning and land use; (d) a framework for the co-ordination of physical and land use planning by county governments; (e) a mechanism for dispute resolution with respect to physical and land use planning; (f) a framework for equitable and sustainable use, planning and management of land amongst other functions.

4.5.15 Urban and Cities Act, 2011

The Act came into function with regard to Article 184 of the Constitution providing regulations on the classification, governance and management of urban areas and cities and further providing the criteria of establishing urban areas. Part III of the Act gives the regulations and functions of every city or municipality with regard to integrated development plans, which shall include but not limited to environmental plans and disaster preparedness, within the area of jurisdiction in achieving objects of devolved governments under section 174 of the constitution while maintaining the socio-economic rights of the people. The first schedule of the Act enlists the services the services that the any municipality shall provide to its residents which include but not

limited to traffic control and parking, water and sanitation, refuse collection, solid waste management, pollution abatement services among others.

4.5.16 Public Roads and Roads of Access Act (Cap. 399)

Sections 8 and 9 of the Act provides for the dedication, conversion or alignment of public travel lines including construction of access roads adjacent lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent landowners seeking permission to construct the respective roads.

*A compliance plan matrix for the Legislative and Regulatory Frameworks is hereby attached within the appendices.

5. PUBLIC CONSULTATION

5.1 Sources of Information

One of the key information sources used during the Environmental Impact Assessment exercise was public participation. Views from the would be affected people were sought from the public through the following means:-

1. The administration of pre-designed questionnaires during the project study exercise
2. Public consultation meetings held on:-
   - ✓ 18th October 2025
   - ✓ 25th October 2025
   - ✓ 1st November 2025
3. Direct interviews with stakeholders and members of the public.

The objective of the consultation and public participation was to:-

1. Disseminate and inform the stakeholders about the project with special reference to its key components and location
2. Gather comments, suggestions and concerns of the interested and affected parties
3. Propose and discuss solutions and mitigation measures to the potential negative impacts and various concerns
4. Incorporate the information collected in the EIA study report

In addition, the Environmental Impact Assessment public consultation exercise enabled:-

- ✓ The establishment of a communication channel between the general public and the team of consultants, the project proponents and the Government.
- ✓ The concerns of the stakeholders be known to the decision-making bodies at an early phase of project development

The exercise was conducted by a team of experienced registered environmental experts. This reports appendices contain copies of the completed questionnaires administered to the public, written submissions, public meetings register, public meeting minutes, public meeting posters, public meeting invite newspaper advertisements and photographic evidence of public consultations.

Photo 2: One of the public meetings held at the project site

5.2 Issues raised and comments

This Sub-Section covers the views and opinions of the key stake holders (local leaders, surrounding, neighbours/institutions/organizations, interested persons or groups). It highlights the negative socio-economic and environmental impacts anticipated during the construction and operational phases of the project. Each is followed by suggested mitigation measures that the developer should incorporate to mitigate the impact and promote sustainable development.

5.2.1 Summary of issues raised and responses

Issue raised	Response provided and mitigation measures
Excavation safety and prevention of neighbouring wall collapse.	The contractor will adopt controlled mechanical excavation supported by professional structural shoring, sheet piling, and retaining systems designed by a registered structural engineer. Continuous geotechnical monitoring will be in place throughout excavation works to safeguard workers and adjacent buildings.
Traffic management during construction and operation.	A Traffic Management Plan will be implemented in consultation with County authorities. Measures will include signage, trained traffic marshals, delivery scheduling, temporary access control, and designated entry/exit points. During operation, adequate on-site parking and controlled vehicle circulation will minimize congestion.
Soil and cement spill management during transportation.	All trucks transporting cement, sand, ballast, and excavated materials will be covered with tarpaulins, and loading/offloading will be conducted on designated paved or contained areas. Any spills will be cleaned immediately and waste will be disposed through licensed handlers.
Tree preservation and landscaping.	Any existing trees that can be retained will be preserved. Upon completion, the project will implement site landscaping with native and ornamental species to improve aesthetics and support local biodiversity.
Dust and noise control during construction.	Measures include regular water sprinkling, covering of loose materials, use of well-maintained equipment, scheduling of noisy operations during daytime, and erecting dust nets and noise barriers around the site.
Incident and accident management.	The contractor will implement a Construction Safety and Emergency Response Plan, including first aid facilities, safety officers, incident reporting procedures, and linkages with the nearest medical facility.
Arrangements for food vendors on-site.	Food vendors will be allocated a designated and hygienically managed area outside active construction zones. Food handling will follow public health regulations.
Personal Protective Equipment (PPE) and WIBA.	All construction workers will be provided with appropriate PPE and insured under the Work Injury Benefits Act (WIBA). Safety training and daily toolbox talks will be conducted.
Grievance redress mechanism.	A Grievance Redress System will be established. Stakeholders may present complaints through a documented reporting system managed by site administration and community representatives, with timely feedback measures.
Borehole depth and location.	The borehole will be approximately 350 meters deep while the exact borehole location will be determined subject to hydrogeological confirmation.
Building setbacks from plot boundaries.	The project observes a 6-meter front building line and 3 meters on the remaining boundaries, in compliance with applicable planning regulations.
Status of required approvals.	The project has obtained/is pursuing approvals from NEMA, Nairobi County Government (Building and Planning), Nairobi Water and Sewerage Company, KPLC (transformer and electricity connection), Water Resources Authority (borehole abstraction permit), and DOSH (Workplace Registration).
Non-interference with existing	The project design shall ensure no interference with the adjacent power distribution post, water supply line, and sewer line. All utility connections will be carried out in

Issue raised	Response provided and mitigation measures
service infrastructure.	coordination with relevant agencies to avoid service disruption.
Timely construction	The proponent shall adhere to all licensing conditions including construction timelines and shall apply for license in case timelines are exceeded.
Boundary wall and hoarding.	A secure perimeter wall and hoarding will be erected to protect site workers, neighbouring properties, and the public.
Worker identification and documentation.	All workers will be registered, documented, and issued with IDs, and their credentials logged before engagement.
Local employment and inclusivity.	The project will prioritize employment of local community members, including equitable opportunities for women, youth, and persons living with disabilities.

6. ANALYSIS OF PROJECT ALTERNATIVES

6.1 Project site alternatives

6.1.1 No project alternative

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will, however, involve several losses specifically to the landowner / developer as he will continue to pay land rent/rates on the plot while the property remains underutilized. The No Project Option is the least preferred from the socio-economic perspective.

6.1.2 Relocation option

Relocation option to a different site is an option available for the Project implementation. However, at present the landowner/developer does not have an alternative site. This means that an alternative project site shall have to be sought. Searching for the land to accommodate the scale and size of the project and completing official transaction on it may take up valuable time although there is no guarantee that the land would be available. New studies, designs and approvals will have to be sought since design and planning has to be suitable to site conditions which will lead to new costs. Whatever has been achieved and paid for to date will be counted as a loss to the developer.

The time spent on these deliberations would cause delays that the proponent may not be able to afford. This may also lead to a situation like no project alternative option. The other consequence of this is that it would discourage private investors especially in the commercial development sector. In consideration of the above concerns and assessment of the current proposed site, relocation of the project is an undesirable option for the proponent.

6.1.3 Licensing of the proposed development

Under the proposed Project alternative, the proponents of the proposed project would be issued with an EIA License clearly stating various Licensing conditions that the proponent must adhere to. In issuing the license, NEMA would approve the proponent's proposed development, provided all Licensing conditions are complied with during the construction period and occupation phases. This alternative consists of the applicant's final proposal with the inclusion of the NEMA regulations and procedures as stipulated in EMCA to the maximum extent practicable. This is the most suitable option.

6.2 Waste water management alternatives

6.2.1 Connection to the sewer system

Connection to an existing main sewer line will solve the wastewater management issue at a very minimal cost and in an environmental efficient manner. Currently this option is available and considered the best option since there is an existing sewer line within the area.

6.2.2 Use of septic tanks

This involves the construction of underground concrete-made tanks to store the sludge with soak pits. Regular emptying in large discharge points like the multi-storey residential building development is required. Given the scale of liquid waste emanating from the proposed project this option is not preferred since it will be uneconomical and inefficient.

6.2.3 Construction of a sewage treatment plant

This involves the construction of a treatment plant or the installation of prepackaged treatment plants. Whereas this is a viable option such STPs have proved to be a challenge in such setups as apartment blocks due to various reasons such as: lack of sufficient land (space), nuisance of bad odour to tenants and neighbours; non-compliance with set effluent discharge standards and frequent breakdowns and malfunctions which may also lead to other environmental problems such as emission of raw effluent to the environment. Considering the above cons, this option is not viewed as suitable.

6.3 Solid waste management alternatives

Residential solid waste management typically follows a hierarchy of practices and strategies aimed at minimizing the environmental impact of waste generation and maximizing resource recovery. This hierarchy prioritizes the most environmentally friendly and sustainable approaches.

Standard hierarchy of waste management involves five crucial steps: prevention, reuse, recycling, recovery and disposal. This hierarchy aims for waste generators to extract the maximum practical benefits from products and to generate the minimum amount of waste emphasizing on reducing, reusing, and recycling as key activities of sustainable materials management.

Recognizing that several of the hierarchy steps are best undertaken by professionals, it is imperative that the waste is collected by a licensed solid waste handler who in turn can sort the waste for energy recovery, treatment, recycling and appropriate disposal.

6.4 Analysis of alternative construction materials and technology

There are several innovative construction technologies and alternatives that can be considered for the building construction. These technologies aim to improve efficiency, reduce environmental impact, and enhance the overall quality of the building. Some of the technologies can be used jointly or incorporated into one another for a perfect fit. Some of the alternatives include:-

- ✓ Traditional concrete and steel construction using modern, locally and internationally accepted materials to achieve environmental, public health, safety and security requirements.
- ✓ Prefabrication and modular construction which involves manufacturing building components off-site and then assembling them on-site. Modular construction takes this concept further by creating entire modules in a factory and then stacking them to form the building. This approach can significantly reduce construction time and waste while maintaining high quality.
- ✓ Green and sustainable construction: Implementing green building practices involves using energy-efficient materials, renewable energy sources, and sustainable construction methods. This can result in lower energy costs and a reduced impact on the environment.
- ✓ Smart building technologies: Incorporating smart technologies into apartment buildings can enhance comfort and energy efficiency. This includes systems for lighting, heating, ventilation, and security that can be controlled remotely.
- ✓ Recycled and reclaimed materials: Using recycled and reclaimed materials, such as reclaimed wood or salvaged bricks and building blocks, can reduce the demand for new resources and give buildings unique character.

When choosing construction technology, factors such as local regulations, building codes, cost considerations, site conditions, and project goals should all be taken into account. It's also important to consider the long-term sustainability and environmental impact of the chosen technology.

7. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

7.1 Introduction

This Section identifies and discusses both positive and negative impacts associated with the proposed project as well as their respective mitigation measures. The potential impacts from the proposed project area are identified and assessed based on the nature, magnitude and merits/or demerits of the various activities associated with the Project. This Chapter therefore describes the anticipated positive and negative impacts of the proposed project due to project location and during construction, operation and decommissioning phases.

7.2 Negative impacts during construction phase

7.2.1 Unsustainable extraction and use of building materials

Building materials such as hard core, ballast, cement, rough stone and sand required for the construction of the proposed project will be obtained from quarries and sand harvesters. Since substantial quantities of these materials will be required for construction of the proposed project, the availability and sustainability of such resources at the extraction sites will be negatively affected-as they are not renewable in the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts.

Proposed mitigation measures

- ✓ Source building materials from registered quarry and sand mining firms, whose extraction sites have undergone satisfactory environmental impact assessment/ audit and received NEMA approval.
- ✓ Order for what will be required through accurate budgeting and estimation of actual construction requirements.
- ✓ Consider reuse of building materials and use of recycled building materials where applicable.

7.2.2 Destruction of existing vegetation

Vegetation destruction during building construction can have a range of negative effects on the environment, ecosystem, and surrounding community including soil erosion, loss of biodiversity and loss of green spaces amongst others. Mitigating vegetation destruction is thus crucial for preserving the environment and maintaining a healthy ecosystem.

Proposed mitigation measures

- ✓ Thorough site assessment and planning should be carried out such that planning of the building layout and construction activities avoid disturbing existing vegetation as much as possible.
- ✓ Preserve existing vegetation by designing the building layout around existing trees and vegetation to minimize their removal.
- ✓ Consider transplanting valuable trees to a different location within the site or to another suitable location before construction begins.
- ✓ Incorporate a comprehensive landscaping plan that includes native and adaptive plants after construction is complete.

7.2.3 Noise pollution and vibration

Significant increases in noise and vibration levels may be expected during construction of the proposed project. Such noise and vibrations may be generated by construction

machinery and vehicles as well as construction workers. The impact of noise and vibrations on the surrounding community depends upon the characteristics of the noise and vibrations source (instantaneous, intermittent, or continuous in nature); time of day at which noise and vibrations occur; and the location of noise and vibrations source with respect to sensitive receptor.

Though the level of discomfort caused by noise and vibrations is subjective, the most commonly reported impacts of increased noise levels are interference in oral communication, hearing loss, anxiety and disturbance of sleep. Vibration impacts may include the cracking of nearby existing structures such as foundations, walls and water reservoirs. Noise and vibrations may also have health impacts on the workers in the proposed project.

Proposed mitigation measures

- ✓ Apply for a License from NEMA whereby maximum permissible noise levels are to be exceeded.
- ✓ Prescribe noise reduction measures if appropriate e.g. restricted working hours and transport hours and noise buffering.
- ✓ Install portable barriers to shield compressors and other small stationary equipment where necessary and locate stationary noise sources as far from existing sensitive receptors as possible.
- ✓ Use quiet equipment (i.e. equipment designed with noise control elements such as mufflers).
- ✓ Limit trucks and other small equipment to minimize idling time and switch off idle engines whenever possible.
- ✓ Ensure use of well serviced and maintained vehicles and equipment.

7.2.4 Air quality degradation

Potential impacts on the air quality during the construction stage will be due to the fugitive dust and the exhaust gases generated in and around the construction site. Fugitive dust (depending on the timing of construction) and vehicular emissions are the major components of air pollution. The following construction related activities are generally associated with these emissions: Site clearance, excavation and use of heavy vehicles and machinery/equipment at construction site; transportation of construction materials such as sand, cement, steel, masonry stone to the construction site; and operating of construction machinery and equipment

During the period of maximum construction activity, the fuel consumption is expected to rise significantly and the background concentrations of suspended particulate matter (SPM), respirable particulate matter (RPM), sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and carbon monoxide (CO) are also expected to rise. These emissions if not appropriately mitigated may have significant respiratory and cardio-pulmonary effects on the local population, the health effects may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac conditions.

Proposed mitigation measures

- ✓ Provide 2.4-meter-high hoarding along site boundary.
- ✓ Provide effective dust screen, sheeting or netting where a scaffolding is erected around the perimeter of a building under construction, from the ground floor level of the building to the highest level of the scaffolding.
- ✓ Water active construction areas when necessary.
- ✓ Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard.
- ✓ Down wash of trucks (especially tyres) prior to departure from site.
- ✓ Use of electrically operated construction machinery to avoid externalities produced by diesel engines.

- ✓ Rapid on-site construction so as to reduce duration of traffic interference and therefore reducing emissions from traffic delays.

7.2.5 Solid waste generation

Construction activities create solid wastes that need to be disposed. Such wastes include excavated spoil, concrete, gravel, stones, tiles, plastics, paper, wood, metals, glass, and cleared biomass among others. These wastes if handled inappropriately may have a direct impact on the local community. Disposal of the same solid wastes off-site could also be a social inconvenience if done in wrong places. The off-site effects could be un-aesthetic view, pest breeding, unhygienic conditions, choking of nearby drains and pollution of physical environment. The severity of such impacts will depend upon the magnitude and type of construction waste.

Proposed mitigation measures

- ✓ All construction waste should be disposed in sites approved by the Nairobi City County by NEMA licensed firms.
- ✓ Construction waste should be recycled or reused to ensure that materials that would otherwise be disposed of as waste are diverted for productive uses.
- ✓ Measures to ensure that construction materials requirements are carefully budgeted should be put in place and the amount of construction materials left on site after construction is kept minimal.
- ✓ Consider the use of recycled or refurbished construction materials.
- ✓ Use of durable, long- lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time.
- ✓ Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements
- ✓ Use of building materials that have minimal packaging to avoid the generation of packaging waste.

7.2.6 Deep excavation risks

Construction excavation involves inherent risks that must be carefully managed to ensure the safety of workers and the stability of surrounding structures. These risks include soil instability leading to collapse, groundwater infiltration causing flooding and erosion, potential damage to neighboring properties, and the need to implement robust shoring and support systems. The excavation process can also disrupt underground utilities, pose challenges for proper ventilation and lighting, and require effective dewatering techniques to manage groundwater levels.

Proposed mitigation measures

- ✓ Conduct a thorough geotechnical investigation to assess soil conditions, groundwater levels, and potential risks before excavation begins.
- ✓ Implement appropriate shoring and support systems such as soldier piles, sheet piles, secant piles, or retaining walls to stabilize excavation walls and prevent collapse.
- ✓ Implement effective groundwater control methods, such as wellpoints, dewatering wells, or sumps, to manage water inflow during excavation.
- ✓ Regularly inspect and maintain the stability of the excavation walls and slopes.
- ✓ Utilize a construction sequence that minimizes the duration and extent of open excavation faces to reduce exposure to risk.
- ✓ Develop a detailed emergency response plan that outlines procedures to follow in case of unexpected ground movement, structural instability, or other emergencies.

7.2.7 Soil erosion and water logging

Soil erosion is likely to occur during construction at the site once exposed by excavation works especially during rainy and windy seasons. Considering the land clearing, excavation and other construction processes, soil will be exposed to erosion agents

leading to soil/land degradation hence impacting negatively on the environment. Water logging of the proposed site may also occur in the event of heavy rainfall during excavation.

Proposed mitigation measures

- ✓ The stockpiling of construction materials should be properly controlled and managed at the site.
- ✓ Leveling and ripping off compacted areas of the project site to reduce run-off velocity and increase infiltration of storm water into the soil.
- ✓ Channel trenches and cut off drains into peripheral storm water drainages.
- ✓ A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structures will be designed.

7.2.8 Surface and ground water quality degradation

Construction activities for the proposed development can have impacts on hydrology and ground water quality of the area. Changes in surface hydrology can occur due to landscaping; construction of impervious surfaces such as parking lots, roads and buildings (buildings increase the volume and rate of runoff, resulting in habitat destruction, increased pollutant loads, and flooding); blockage of existing drainages can also influence groundwater hydrology (i.e. recharge rates, flow, conditions).

Potential sources of impacts on hydrology and ground water quality during the construction phases are as follows: Soil run-off from the site leading to off-site contamination- particularly during rainy season: The excavated area, if linear, could act as a conduit to extend groundwater contamination to new areas. Improper disposal of construction debris leading to offsite contamination of water resources or blocking of drainages leading to flooding. Spillage of oil and grease from the vehicles and wastewater stream generated from on-site activities can lead to contamination.

Proposed mitigation measures

- ✓ Prepare a hazardous substance control systems and emergency response plans that will include preparations for quick and safe cleanup of accidental spills.
- ✓ Ensure adequate storm water management facilities are put in place

7.2.9 Increased water demand

During the construction phase, both the construction works, and the construction workers will create additional demand for water in addition to the existing local demand. Water will mostly be used in the creation of concrete for construction works and for wetting surfaces or cleaning completed structures. It will also be used by the construction workers for washing and drinking.

Proposed mitigation measures

- ✓ Connect to the existing NCWSC main supply.
- ✓ Harness rainwater for construction activities usage where applicable.
- ✓ Install a discharge meter at all water outlets to determine and monitor total water usage.
- ✓ Promptly detect and repair of water pipes and tank leakages.
- ✓ Ensure taps are not running when not in use.

7.2.10 Increased insecurity

The proposed project may cause an increase in insecurity during the construction phase due to the increased number of transient workers and suppliers within and around the project site. Construction sites are known to attract large numbers of semi-skilled and un-skilled labour searching for job openings. Others may also use such opportunities to scout for potential robbery or burglary targets.

Proposed mitigation measures

- ✓ Unattended public access to the construction site shall be restricted and only one entry/exit point should be used.
- ✓ The project site should be accessed through a designated entry/exit point during the transportation of all raw materials.
- ✓ Security shall be enhanced by ensuring security guards are always posted within and around the project site and strategic placement of security lights around the site.
- ✓ A roster of all construction workers shall be kept while measures shall be put in place to ensure that loitering by itinerant workers is discouraged.

7.2.11 Increased traffic

Obstruction by construction transport vehicles and construction activities adjacent to the nearby roads during the construction phase may lead to the increase traffic along the access road. This may be exacerbated if these activities time/schedule coincide with Peak Traffic hours.

Proposed mitigation measures

- ✓ Ensure that the Entry/Exit to the project site is located where it will cause minimal traffic along adjacent roads.
- ✓ Ensure all construction vehicles to and from the construction site use the designated Entry/Exit to the project site.
- ✓ All transportation of construction raw materials and excavated materials are to be conducted at traffic off peak hours only.
- ✓ Sensitize truck drivers to avoid unnecessary road obstruction.
- ✓ Cover all trucks hauling soil, sand and other loose materials to avoid spillage and dust emissions that may interfere with smooth motoring.
- ✓ Access to driveways will be maintained at all times unless other arrangements are made.

7.2.12 Privacy intrusion

The proposed height of the building will overlook neighbours properties impacting privacy and obstruct natural light.

- ✓ Observe building requirement setbacks of a 3 meter building line along the property boundary.
- ✓ Where possible trees, shrubs, and green spaces shall be utilized to create natural buffers that soften the visual impact
- ✓ Comply with local zoning regulations and building codes that govern building setbacks, height, and privacy requirements.

7.2.13 Worker's accidents and public safety

In any civil works, public as well as construction staff safety risks can arise from various construction activities such as falls into deep excavations; accidents due to operation and movement of heavy equipment and vehicles; injuries from falling objects; Injuries from hand tools amongst others. Because of the duration and complexity of the construction phase of the proposed project, such activities need to be controlled and consequently the associated risks will be reduced.

Proposed mitigation measures

- ✓ Personal protective equipment (PPE) -Workers must wear appropriate PPE, including hard hats, steel-toe boots, and fall protection gear. Regular inspections to ensure PPE is in good condition.
- ✓ Fall prevention and protection - Install guardrails, safety nets, and use fall arrest systems for work at heights. Workers should receive fall prevention training and use proper equipment.

- ✓ Safe use of lifting equipment - Certified personnel must operate cranes and lifts, adhering to load limits. Use tag lines to guide loads and keep workers clear of lifting operations.
- ✓ Working at heights - Ensure secure access with ladders and fall protection gear. Establish restricted zones below overhead work areas to prevent accidents.
- ✓ Fire safety - Provide fire extinguishers, clear escape routes, and store flammable materials safely. Regular inspections and fire drills are essential.
- ✓ Electrical safety - Use Lockout/Tagout (LOTO) for electrical systems. Conduct regular equipment inspections.
- ✓ Proper signage and communication - Install clear hazard signs and maintain communication systems for emergencies. Hold regular safety briefings to update workers on site risks.
- ✓ Safe material handling - Use mechanical aids for lifting and store materials securely to prevent tipping. Workers must be trained in safe lifting techniques.
- ✓ Dust and noise control - Control dust with water spraying and use noise protection for workers. Monitor levels and provide protective gear as needed.
- ✓ Health and welfare facilities - Ensure access to clean washrooms, washing stations, and first aid. Provide hydration and rest breaks, especially in extreme conditions.
- ✓ Emergency preparedness - Develop an emergency response plan with evacuation routes and regular drills. Ensure workers are familiar with assembly points and procedures.
- ✓ Training and awareness - Conduct site-specific safety training and toolbox talks. Continuously update workers on evolving risks and equipment usage.
- ✓ Health monitoring - Regular health screenings and fitness assessments ensure workers can perform tasks safely, especially in hazardous conditions.
- ✓ Site security and access control -Establish controlled access points and secure the perimeter with fencing. Implement visitor protocols to ensure safety compliance.
- ✓ Waste Management - Implement a waste management plan focusing on recycling and safe disposal. Regular site cleaning ensures a clutter-free and safe environment.

7.3 Positive impacts during construction phase

There are a number of positive impacts that shall be associated with the proposed project during construction phase. These are as discussed below.

7.3.1 Employment opportunities

The construction of the proposed project is expected to provide direct and indirect employment to a number of workers. These range from unskilled casual workers, semi-skilled and skilled employees.

7.3.2 Provision of market for supply of building materials

The proposed project will require supply of large quantities of building materials most of which will be sourced locally in the surrounding areas. Producers and suppliers of materials will thus get a ready market for their merchandise.

7.3.3 Improving growth of the economy

Through the use of locally available materials during the construction phase of the project, the project will contribute towards growth of the economy by contributing to the gross domestic product. The consumption of these materials, fuel oil and others will attract taxes including VAT which will be payable to the government hence increasing government revenue while the cost of these raw materials will be payable directly to the producers.

7.4 Negative impacts during operation phase

The following negative impacts are associated with the proposed project during its operation phase.

7.4.1 Increased traffic

It is expected that the number of vehicles around the project site shall increase hence leading to the possibility of commensurate increase in traffic around the adjacent access roads. This shall be dependent on the location of the building's car park entry/exit, traffic control measures in place, number of tenants/visitors to the building, the nature of activities within the building amongst other factors.

Proposed mitigation measures

- ✓ Traffic management/parking personnel shall be provided to monitor parking and ensure smooth motoring along the building's adjacent roads.
- ✓ Access to driveways will be maintained at all times.
- ✓ Any work that disturbs normal traffic operations shall be coordinated with the relevant authorities.

7.4.2 Water use

During operation of the proposed Project, a lot of water will be used. Water use is driven by the number of uses and users within the buildings. Water will be sourced from the Nairobi City Water and Sewerage Company mains supply line, a borehole to be drilled onsite and several rainwater storage tanks.

Proposed mitigation measures

- ✓ Install water meters where applicable.
- ✓ Identify activities and areas that cause high consumption.
- ✓ Install water-saving devices in the appropriate places (flow regulators, water flow sensors, self-closing taps, low-flush toilets).
- ✓ Avoid leaving taps running unnecessarily and cleaning with high pressure hoses.
- ✓ Regularly maintain plumbing fixtures and piping in order to avoid losses.
- ✓ Replace defective seals and repair damage to water pipes.

7.4.3 Electricity consumption

During operation, the building will use a lot of electrical energy mainly for purposes which include lighting, running of electrical gadgets including air conditioning equipment, refrigeration systems, pumping water into tanks/reservoirs. Since electricity generation involves utilization of natural resources, excessive electricity consumption will strain the resources and negatively impact on their sustainability.

Proposed mitigation measures

- ✓ Use energy-saving bulbs, especially in high consumption areas.
- ✓ Install motion detector lighting to reduce lighting time in selected locations such as emergency staircases.
- ✓ Reduce general lighting during daytime and make sure that exterior lighting is switched on only at night.
- ✓ Organize preventive maintenance of the electric network and equipment, including heating and air conditioning systems.

7.4.4 Solid waste generation

During the operation phase, solid waste generation is expected to occur from various sources and activities carried out within the building. Solid waste impacts maybe significant in the absence of a proper waste management plan i.e. improper disposal of waste may have adverse environmental effects.

Proposed mitigation measures

- ✓ Daily sweeping and collection of waste from common areas such as lobbies, staircases, entrances shall be done by management appointed cleaners.
- ✓ Segregate wastes at source; organize the segregation of wastes at source.
- ✓ Dispose of non-reusable and non-recyclable wastes using appropriate methods
- ✓ Do not burn waste outdoors, do not disperse them in nature or bury them
- ✓ Recycle electric and electronic appliances and donate unwanted appliances that are still working to local associations instead of disposing them.
- ✓ Dispose waste responsibly by using NEMA licensed waste handlers.

7.5 Positive impacts during operation phase

Just as in the construction phase, there are positive impacts associated with the proposed project during operation phase. These positive impacts are discussed below.

7.5.1 Employment opportunities

Employment opportunities are one of the long-term major impacts of the proposed Project. A number of people will be employed in various capacities in different professional and non-professional areas at the building.

7.5.2 Increase in revenue to national and local governments

The commissioning of the proposed project will result in positive gains for numerous authorities - Kenya Revenue Authority (KRA), KPLC, and Nairobi City Government through payment of relevant taxes, rates and fees to the respective institutions. Higher property tax revenues can help support local infrastructure, services, and public projects.

7.5.3 Increased housing Supply

More residential units availability will help address housing shortages in urban areas, providing more options for people to find suitable and affordable housing.

7.5.4 Optimal use of land

Change in land use from single use to land on which a modern multiuser building blocks shall be erected will optimize land use. Apartments allow more efficient use of land, making better use of available space and minimizing the need for extensive suburban development.

7.6 Negative impacts during decommissioning phase

The negative impacts discussed below are associated with the proposed Project during decommissioning phase.

7.6.1 Noise and vibration

The demolition works will lead to significant deterioration of the acoustic environment within the proposed project site and the surrounding areas. This will be as a result of the noise and vibrations that will be experienced during demolition.

Proposed mitigation measures

- ✓ Significant impacts on the acoustic environment will be mitigated as described in Section 7.2.3.

7.6.2 Air quality degradation

Dust will be generated during demolition works of the proposed project from the demolition activities. This will mainly affect demolition workers. In addition, soil will be used in rehabilitation and re-instatement to pre-project status, this will add to the amount of dust that will be generated during rehabilitation. Exhaust emission will also be experienced during decommissioning from the trucks that will be transporting the demolished objects to the disposal sites and storage areas. Large quantities of dust will

be generated during demolition works. This will affect both demolition staff as well as the neighbouring establishments.

Proposed mitigation measures

- ✓ Dust and gaseous emissions resulting from demolition or dismantling works will be minimized as described in Section 7.2.4.

7.6.3 Solid waste generation

Demolition of the proposed Project will result in large quantities of solid waste. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment.

Proposed mitigation measures

- ✓ Solid waste resulting from demolition or dismantling works will be managed as described in Section 7.2.5.

7.6.4 Health and safety

Risk of accidents and ill health as a result of the demolition activities is likely to be experienced. This could be as a result of accidents due to operation and movement of heavy equipment and vehicles; injuries from falling objects; Injuries from hand tools amongst others.

Proposed mitigation measures

- ✓ Risk of accidents and ill health as a result of demolition activities, shall be mitigated by ensuring that appropriate health and safety measures are applied in all activities; fence all unsafe and dangerous areas; and continue to monitor environmental health (air quality, water quality, vegetation, noise) at all main receptor points around the site until site handover.

7.7 Positive impacts during decommissioning phase

In the event that the building is to be relocated, found to be economically unviable or condemned as structurally unstable. It can be abandoned and/or demolished. The following are positive impacts associated with decommissioning of the proposed Project.

7.7.1 Rehabilitation

Decommissioning will involve phasing out the envisaged operations of the building. This may involve conversion of the facility to other uses or rehabilitation of the project site in line with the projected plans. This may involve new landscaping schemes and demolition of some structures within the facility.

7.7.2 Employment opportunities

For demolition to take place properly and in good time, several people will be involved. As a result, large number of jobs will be created in various positions both in supervisory and non-supervisory positions.

7.8 Climate Risk And Vulnerability Assessment And Mitigation Measures

Climate Change Vulnerability Assessments are emerging tools that can be used as an initial step in the adaptation planning process. It is a systematic process that evaluates the potential impacts of climate change on a specific system, region, community, or sector. It aims to identify the extent to which these entities are susceptible to the adverse effects of changing climate conditions, such as rising temperatures, changing precipitation patterns, sea level rise, and increased frequency of extreme weather events. The assessment considers various factors, including social, economic, and environmental aspects, to determine the level of vulnerability and help inform strategies for adaptation and resilience-building.

When it comes to tackling climate change to prevent the impacts it causes in the different systems of the planet, two types of measures are applied i.e: mitigation and adaptation. Mitigation measures are those actions that are taken to reduce and curb greenhouse gas emissions, while Adaptation measures are based on reducing vulnerability to the effects of climate change. Mitigation, therefore, attends to the causes of climate change, while adaptation addresses its impacts.

Considering the scale of the proposed development several interventions should be implemented to alleviate the causes of climate change. The following mitigation measures should be taken to avoid the increase of pollutant emissions.

7.8.1 Climate risk and vulnerability mitigation measures

Practice energy efficiency
Energy efficiency is the use of less energy in a building to perform the same operation as buildings that consume energy inefficiently. It should be considered during the design stage, selection of construction materials, construction process, and operation of the building. Adopting passive solar house design strategies at the design stage is the first step toward an energy-efficient structure.

Low-energy building materials and less energy-consuming construction equipment should be used during the construction process. As far as building operation is concerned, utilities for renewable energy systems have to be integrated into the building for water heating, photovoltaic electrification, etc. This involves using energy-efficient equipment in a building that requires the lowest possible energy, such as LED lights, fans, air-conditioners, and refrigerators. Energy star-approved fluorescent bulbs are highly desirable because they are more durable, and their maintenance cost is 75% less than conventional bulbs. Also, using a lighting control mechanism improves energy efficiency because it automatically turns off lights and eliminates waste of energy.

Use of renewable energy
Renewable energy and related technologies relevant to the built environment and buildings such as the proposed project include:-

Electricity generation
- ✓ Rooftop photovoltaic (PV) systems, which generate electricity directly from the sun using solar panels usually mounted on the roof
- ✓ Building integrated PV systems, which generate electricity directly from the sun using solar panels that are integrated into building structures, either on the roof, walls or even windows (using transparent panels) in some cases

Hot water systems
- ✓ Solar thermal systems, which heat water directly from the sun
- ✓ Heat pumps, which heat water using warmth from the surrounding air, water or ground

Solar heating and cooling systems
- ✓ Solar thermal cooling, which uses the heat of the sun to drive cooling and/or dehumidification processes
- ✓ Solar heating systems such as heat pumps, which draw and boost heat from the surrounding air, water or ground
- ✓ 'Passive' solar design solutions, which naturally heat or cool buildings without the need for 'active' heating and cooling systems

Energy storage systems such as batteries and thermal storage including hot water storage and storage of warmth and "cool" in building structures. Control systems that manage the flow of energy into and out of properties to increase the total amount of renewable energy used can also be implemented.

Water conservation:
Install water-efficient fixtures, like low-flow toilets and faucets, and promote responsible water use among residents.

Green spaces
Plan for and preserve any vegetation within the high-rise development or in close proximity.

Traffic management
Implement traffic management strategies during construction and operational phases as indicated in chapter 7.

Sustainable design
Adopt sustainable building practices that focus on energy efficiency, green materials, and reduced environmental impact throughout the building's lifecycle.

Waste management
Implement efficient waste management systems, including recycling programs and waste reduction strategies, to minimize the environmental impact of high-rise buildings.

7.8.2 Climate risk and vulnerability adaptation measures

In terms of adaptation measures, there are several actions that may help in reducing vulnerability to the consequences of climate change. They include:-

Landscape restoration
Land restoration includes the process of cleaning up and rehabilitating a site that has sustained environmental degradation, such as those by natural cause (desertification) and those caused by human activity. For the proposed project landscaping activities can be used to make the development more attractive by adding ornamental features, and planting indigenous trees, shrubs, flowers and grasses.

Preventive and precautionary measures
Several aspects of a health and safety program should be incorporated into the building and its management operations, designed to control hazards, prevent accidents and health risks at the development. These may include:-

- ✓ A functional fire protection system including strategically mounted firefighting equipment (fire hose reels, portable fire extinguishers, fire blankets, smoke detectors, water sprinklers, fire alarm and intercom system etc)
- ✓ Emergency response and evacuation procedures (written evacuation procedures, emergency exits,)
- ✓ Emergency exit routes (self-closing doors, staircase with handrail, signage, emergency lighting and free from any obstruction)
- ✓ A designated of a fire assembly point
- ✓ Stocked and readily accessible first aid boxes located in several convenient and prominent locations within the building
- ✓ Fire evacuation sign and floor plans showing nearest exits with instructions

Post-Construction Monitoring
Conduct post-construction assessments to evaluate the impact of the high-rise development on the local environment, infrastructure, and community, making necessary adjustments as needed.

7.9 Action Plan for Accident Prevention and Hazard Management

The provision of a comprehensive action plan for the prevention and management of foreseeable accidents and hazardous activities is crucial to ensuring the safety and well-being of all stakeholders involved in the development project. The table below outlines

proactive measures and strategies to mitigate potential risks, safeguard the environment, and protect workers and the surrounding community during the course of project activities.

Table 2: Accident prevention and hazard management action plan

ACCIDENTS AND HAZARDOUS ACTIVITIES PREVENTION AND MANAGEMENT ACTION PLAN	
1.	**Risk identification and assessment**
	Objective: Identify all potential hazards and assess risks associated with construction activities.
	✓ Conduct a comprehensive risk assessment before project commencement. ✓ Classify risks (e.g., falls, equipment hazards, fire, exposure to chemicals). ✓ Regularly review and update risk assessments during the project.
2.	**Worker training and certification**
	Objective: Ensure all personnel are trained in safety practices and handling of hazardous materials and equipment.
	✓ Conduct mandatory safety induction for all workers. ✓ Provide specific training on equipment operation, fire safety, and chemical handling. ✓ Ensure workers are certified for specialized tasks (e.g., crane operation, welding). ✓ Implement continuous safety training and drills.
3.	**Personal protective equipment (PPE)**
	Objective: Ensure the availability and proper use of PPE for all workers.
	✓ Provide PPE such as helmets, gloves, safety glasses, steel-toed boots, and high-visibility vests. ✓ Enforce strict rules for wearing PPE at all times in designated areas. ✓ Conduct regular checks to ensure PPE is in good condition.
4.	**Safety monitoring and supervision**
	Objective: Maintain ongoing supervision of safety protocols and hazard management.
	✓ Appoint safety officers to oversee daily operations and enforce safety standards. ✓ Conduct regular safety inspections and audits of the site. ✓ Ensure supervisors and workers report unsafe conditions immediately. ✓ Maintain communication channels for reporting hazards or near-miss incidents.
5.	**Equipment maintenance and inspection**
	Objective: Prevent equipment-related accidents by ensuring all machinery is safe and well-maintained.
	✓ Establish a routine maintenance schedule for all machinery and tools. ✓ Conduct pre-use inspections of cranes, excavators, scaffolding, and power tools. ✓ Immediately remove faulty equipment from service and repair or replace it.
6.	**Hazardous materials management**
	Objective: Safely handle, store, and dispose of hazardous materials
	✓ Provide clear labeling and storage for chemicals, fuels, and other hazardous substances. ✓ Train workers on the proper handling and disposal of hazardous materials. ✓ Maintain Material Safety Data Sheets (MSDS) on-site and accessible to all workers. ✓ Implement spill containment procedures and emergency response protocols.
7.	**Emergency response plan**
	Objective: Prepare for and manage emergencies such as fires, chemical spills, or accidents.

ACCIDENTS AND HAZARDOUS ACTIVITIES PREVENTION AND MANAGEMENT ACTION PLAN	
	✓ Develop and communicate an emergency response plan, including evacuation routes and first-aid stations. ✓ Ensure fire extinguishers, first-aid kits, and emergency communication systems are readily available. ✓ Conduct regular emergency drills to ensure preparedness. ✓ Appoint a first-response team trained in first aid and CPR.
8.	**Fall prevention and scaffold safety**
	Objective: Prevent falls from heights.
	✓ Install guardrails, harnesses, and safety nets where required. ✓ Ensure scaffolding is properly erected, inspected, and maintained. ✓ Restrict access to elevated areas to authorized personnel only.
9.	**Traffic and site access management**
	Objective: Safely manage vehicular and pedestrian movement on the construction site.
	✓ Designate specific routes for vehicles and pedestrians. ✓ Use traffic management personnel to guide vehicles and equipment. ✓ Place visible signs, barriers, and lights in high-traffic areas.
10.	**Continuous monitoring and reporting**
	Objective: Monitor safety performance and continually improve safety practices.
	✓ Regularly track safety performance using key indicators (e.g., accident rates, near-misses). ✓ Hold daily and weekly safety meetings to discuss potential hazards and safety improvements. ✓ Encourage workers to report safety concerns and provide feedback for improvements. ✓ Investigate all incidents to determine root causes and prevent recurrence.
11.	**Compliance with regulatory standards**
	Objective: Ensure the project complies with local, national, and industry safety regulations.
	✓ Stay updated on applicable safety laws and building codes. ✓ Work closely with relevant authorities to ensure inspections and approvals are in place. ✓ Address any non-compliance issues immediately and effectively.
12.	**Post-accident procedures and rehabilitation**
	Objective: Provide swift response to accidents and ensure proper recovery for injured workers.
	✓ Ensure immediate medical attention for any injured personnel. ✓ Investigate accidents to determine causes and implement corrective measures. ✓ Support injured workers with rehabilitation programs and safe return-to-work protocols.

8. ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

8.1 Introduction

This chapter presents the Environmental Impact and the associated Environmental Management and Monitoring Plan (EMP) developed for the proposed project. The purpose of this chapter is to identify, evaluate, and manage potential environmental impacts throughout the life cycle of the project from construction through to operation and eventual decommissioning.

The Environmental Management and Monitoring Plan has been developed to assist the Proponent in systematically mitigating and managing these impacts. The EMP serves as a foundation for the implementation of an Environmental Management System (EMS), following ISO 14001 principles. It outlines a structured approach for integrating environmental considerations into project planning, execution, and closure.

Recognizing that key factors and processes may evolve over time, the EMP has been designed with a degree of flexibility. This ensures it remains relevant and effective as the project progresses. The EMP will be subject to a regular schedule of reviews and updates, ensuring continuous improvement and responsiveness to changing environmental and regulatory conditions.

Tables 3, 4, and 5 form the operational core of the EMP, detailing specific management measures for the construction, operational, and decommissioning phases respectively. These tables identify potential environmental, health, and safety risks; describe corresponding mitigation and monitoring measures; assign responsibilities; and estimate the financial costs associated with implementation. The EMP will also serve as a key reference during future environmental audits and inspections, functioning as a checklist for ensuring regulatory compliance and performance evaluation.

Table 3: Environmental management and monitoring plan for the construction phase of the proposed project

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
Minimize extraction site impacts and ensure efficient use of raw materials in construction				
High demand of raw material/ Unsustainable supply	✓ Source building materials from local suppliers who use environmentally friendly processes in their operations.	Project Manager & Contractor	Lack of waste and damaged material	500,000
	✓ Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered.			
	✓ Ensure that damage or loss of materials at the construction site is kept minimal through proper storage.			
	✓ Use recycled, refurbished or salvaged materials to reduce the use of raw materials and divert material from landfills			
Minimize vegetation destruction				
Destruction of existing vegetation	✓ Preserve existing vegetation by designing the building layout around existing trees and vegetation	Project Manager & Contractor	Preservation of some existing vegetation/ Landscaping program	2,000,000
	✓ Transplant valuable trees to a different location within the site or to another suitable location before construction begins.			
	✓ Incorporate a comprehensive landscaping plan that includes native and adaptive plants after construction			
Minimize noise and vibration				
Noise and vibration	✓ Instruct construction vehicle drivers and machinery operators to switch off engines of vehicles or machinery not being used	Project Manager & Contractor	No complaints from employees, neighbours and general public	800,000
	✓ Use quiet equipment (i.e. equipment designed with noise control elements such as mufflers)			
	✓ Install portable barriers to shield noisy equipment where necessary and locate stationary noise sources as far from existing sensitive receptors as possible			
	✓ Ensure that construction machinery are kept in good condition to reduce noise generation			
	✓ Ensure that all generators and heavy-duty equipment are insulated to minimize noise generation			

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
Reduce dust emissions around the project site				
Dust emission	✓ Provide 2.4 m high hoarding along site boundary	Project Manager & Contractor	Presence of hoarding and dust screens Routine Inspections No complaints from neighbours/ public	3,500,000
	✓ Provide effective dust screen, sheeting or netting where a scaffolding is erected around the perimeter of a building			
	✓ Water all active construction areas when necessary			
	✓ Cover all trucks hauling soil, sand and other loose materials			
	✓ Down wash of trucks (tyres) prior to departure from site			
	✓ Ensure personal protective equipment is worn by all staff members			
Minimize exhaust emissions				
Exhaust emission	✓ Alternatively fueled construction equipment shall be used where feasible and equipment shall be properly tuned and maintained	Project Manager & Contractor	No complaints from neighbours/ public	200,000
	✓ Instruct truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off vehicle engines at these points			
Reduce stormwater, runoff and soil erosion				
Increased storm water, runoff and soil erosion	✓ Apply soil erosion control measures such as leveling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil.	Civil Engineer, Mechanical Engineer and Project Manager	Presence of storm water management plan and installations Routine site inspection regime	800,000
	✓ Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site.	Civil Engineer and Project Manager		
	✓ Ensure that any compacted areas are ripped to reduce run-off.			
	✓ Site excavation works to be planned such that a section is completed and rehabilitated before another section begins.	Project Manager		
	✓ Open drains all interconnected will be provided on site.	Civil Engineer		
	✓ Construction of water storage tanks to collect storm water for construction use.	Civil Engineer		

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
Minimize deep trenching and excavation hazards				
Trench collapse or cave-in	✓ Conduct a thorough geotechnical investigation to assess soil conditions, groundwater levels, and potential risks before excavation begins.	Civil Engineer and Project Manager	Presence of excavation/trench management facilities No incidents or accidents Routine site inspection regime	3,500,000
	✓ Implement appropriate shoring and support systems such as soldier piles, sheet piles, secant piles, or retaining walls to stabilize excavation walls and prevent collapse.			
	✓ Implement effective groundwater control methods to manage water inflow during excavation.			
	✓ Excavated material should not be placed less than 600mm from the edge of a trench to minimize risk of collapse due to the weight of the spoil.			
	✓ Regularly inspect and maintain the stability of the excavation walls and slopes.			
	✓ Develop a detailed emergency response plan that outlines procedures to follow in case of unexpected ground movement, structural instability, or other emergencies.			
Persons falling from height	✓ A barricade at least 900mm high must be erected around a trench that is 1 meter or deeper unless it is not possible only workers involved in the trench will be in the area; or another form of barrier exists (such as excavated materials near the trench).			
Safe access and exit	✓ Ladders must be provided no more than 9 meters apart in the area where work will be carried out			
Minimize solid waste generation and ensure efficient solid waste management during construction				
Increased solid waste generation	✓ Use of an integrated solid waste management system i.e. through a hierarchy of options including Source reduction, Recycling, Reuse, Combustion and Sanitary land filling.	Project Manager & Contractor	Presence of construction material storage facility	600,000

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
	✓ Through accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed		No waste material at the project site Waste disposed of at designated sites	
	✓ Ensure that damaged or wasted construction materials will be recovered for refurbishing and use in other projects.			
	✓ Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements			
	✓ Use construction materials containing recycled content when possible and in accordance with accepted standards.			
	✓ Dispose waste responsibly by dumping at designated dumping sites or use of licensed waste handlers.			
Reduce energy demand				
Increased energy consumption	✓ Ensure electrical equipment, machinery and lights are switched off when not being used	Project Manager & Contractor	Low electric bills	300,000
	✓ Install energy saving lights at all lighting points to reduce energy consumption			
	✓ Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts			
	✓ Monitor energy use during construction and set targets for reduction of energy use			
Reduce water demand and ensure efficient water use				
High water demand	✓ Connect to the existing NW&SCo main supply	Mechanical Engineer and Project Manager	Water meter available Low water bills	50,000
	✓ Harness rainwater for construction activities usage			
	✓ Install a discharge meter at all water outlets to determine and monitor total water usage	Project Manager & Contractor		3,000 per unit
	✓ Promptly detect and repair of water pipe and tank leaks			10,000 per unit
	✓ Ensure taps are not running when not in use	Site foreman		4,000

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
Ensure the general safety and security of the construction site and surrounding				
Safety and security	✓ Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction site.	Project Manager & Contractor	Presence of security installations	250,000/ month
Minimize hydrology and water quality degradation				
Surface and groundwater contamination	✓ Hazardous substance control and emergency response plan that will include preparations for quick and safe cleanup of accidental spills.	The Mechanical Engineer	No indication of contamination	200,000
	✓ Hazardous-materials handling procedures to reduce the potential for a spill during construction to be prescribed			
	✓ Identify areas where refueling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted			
	✓ Ground water, will be collected during construction contained and disposed of in accordance with all applicable regulations			
Minimize traffic around the project site and adjacent roads				
Increased traffic, obstruction	✓ Ensure all construction vehicles to and from the construction site use the designated Entry/Exit to the project site	Project Manager, Contactor & site foreman	No traffic and obstruction Traffic management plan	500,000
	✓ All transportation of construction raw materials and excavated materials are to be conducted at traffic off peak hours only			
	✓ Instruct truck drivers to avoid unnecessary road obstruction			
	✓ Cover all trucks hauling soil, sand and other loose materials to avoid spillage and dust emissions that may interfere with smooth motoring			
Minimize occupational health and safety risks				
Approval of building plans	✓ Ensure that all building plans are approved by the Local Authority and the Local Occupational Health and Safety Office	Developer	Approved plans	-

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
Incidents, accidents and dangerous occurrences.	✓ Ensure that provisions for reporting incidents, accidents and dangerous occurrences using prescribed forms from Occupational Health and Safety Office	Project Manager, Developer & Contractor	Presence of safety officer General register	500/month
	✓ Enforce adherence to safety procedures and prepare contingency plan for accident response in addition safety education and training.	The Site Safety Officer		10,000
Site organization	✓ Develop a clear site organization plan and construction schedule	The Contractor, Project Manager& Site Safety Officer	Site plan available	300,000
	✓ Deliver and store materials at appropriate locations			
	✓ Hire the right number of workers with clear work schedule and appropriate dress gear			
Sanitary conveniences	✓ Suitable, efficient, clean, well-lit and adequate sanitary conveniences should be provided for construction workers	Project Manager	Sanitary facilities available	20,000
	✓ Mobile toilets, changed regularly, to be provided on site or latrines	Project Manager	No raw effluent spillage	20,000-30,000 per month
Machinery/ equipment safety	✓ Ensure that machinery, equipment, personal protective equipment, appliances and hand tools comply with the prescribed safety and health standards, are appropriately installed, maintained and safeguarded	Project Manager, Developer & Contractor	Routine inspections Inspection and maintenance records available Training records available	-
	✓ Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain	Project Manager & Contractor		-
	✓ All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury	Project Manager		150,000
	✓ Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations	Project Manager		5,000 per training
	✓ Equipment should be examined by an authorized agency. The equipment may only be used if a certificate of examination has been issued	Project Manager		Per examination

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
	✓ Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register	Project Manager		
Storage of materials	✓ Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse	Project Manager	Routine inspections	100,000
	✓ Ensure that items are not stored/stacked against weak walls and partitions			
Safe means of access and safe place of employment	✓ All floors, steps, stairs and passages of must be of sound construction and properly maintained	Project Manager & Contractor	Routine inspections Incident records	2,500,000
	✓ Securely fence or cover all openings in floors			
	✓ Provide all staircases within the building with suitable handrails on both sides			
	✓ Ensure that construction workers are not locked up such that they would not escape in case of an emergency			
	✓ All ladders used in construction works must be of good construction and sound material of adequate strength and be properly maintained			
	✓ All of scaffolds and work platforms shall be erected, altered and dismantled by competent persons			
	✓ All uprights must be provided with base plates (and, where necessary, timber sole plates) or prevented in some other way from slipping or sinking			
	✓ All scaffolds must be secured to the building in enough places to prevent collapse			
	✓ Guard rails or equivalent protection to be in place to stop falls from open edges on scaffolds, mobile elevating work platforms, buildings, gangways, excavations, etc.			
	✓ Enough barriers must be erected at rooftop edges to protect workers or materials falling from roofs			
Emergency preparedness and	✓ Provide documented emergency preparedness and evacuation procedures to be used during any emergency	Project Manager & Contractor	Routine inspections Accident and Incident records	120,000
	✓ Procedures tested at regular intervals			

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
evacuation procedures	✓ Ensure provisions are in place to immediately stop any operations where there in an imminent and serious danger to health and safety and to evacuate workers			
	✓ Provide measures to deal with emergencies and accidents including adequate first aid arrangements			
First Aid	✓ Well stocked first aid box which is easily available and accessible should be provided within the construction site	Project Manager & Contractor	Presence of First Aid Box	30,000
	✓ Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body.		Presence of Trained First Aiders	
Fire protection	✓ Firefighting equipment such as fire extinguishers should be provided at strategic locations.	Project Manager & Contractor	Routine inspections	80,000
	✓ Regular inspection and servicing of the equipment must be undertaken by a reputable service provider and records of such inspections maintained			
	✓ Emergency notices must be prominently displayed within the construction site.			
Ventilation	✓ Enough space must be provided within the premises to allow for adequate natural ventilation through circulation of fresh air	Project Manager & Contractor	Routine inspections	0
Lighting	✓ There must be adequate provision for artificial or natural lighting in all parts the super structure in which persons are working or passing	Project Manager & Contractor	Routine inspections	0
Electrical Safety	✓ Circuits must not be overloaded	Project Manager & Contractor	Routine inspections	100,000
	✓ Distribution board switches must be clearly marked to indicate respective circuits and pumps			
	✓ There should be no live exposed connections			
	✓ Electrical fittings near all potential sources of ignition should be flame proof			
	✓ All electrical equipment must be earthed			
Supply of clean drinking water	✓ Ensure that construction workers are provided with an adequate supply of wholesome drinking water which should be maintained at suitable and accessible points.	Project Manager & Contractor	Potable water available	-

Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
Washing facilities	✓ Ensure that conveniently accessible, clean, orderly, adequate and suitable washing facilities are provided and maintained within the site	Project Manager & Contractor	Washing facilities available	-

Table 4: Environmental management and monitoring plan for the operation phase of the proposed project

Negative impact	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
Minimize solid waste generation and ensuring efficient solid waste management				
Solid waste generation	✓ Provide solid waste handling facilities such as waste bins and skips	Building management	Presence of waste collection facilities	50,000
	✓ Ensure that solid waste generated at the building is regularly disposed by licensed waste handlers	Building management	Absence of waste and presence of NEMA Licensed Waste handler	50,000/month
Minimize risks of sewage release into environment				
Raw effluent discharge	✓ Provide adequate and safe means of handling sewage generated (i.e. NW&SCo sewer mains)	Property management	Connection to existing sewer main	-
	✓ Conduct regular inspections for sewage pipe blockages or damages and fix appropriately	Building management	Absence of effluent	3000 per inspection
Minimize energy consumption				
Energy resource utilization	✓ Switch off electrical equipment, appliances and lights when not being used	Staffs/ Building management	Low energy bills Presence of energy saving devices	–
	✓ Install occupation sensing lighting at various locations such as storage areas which are not in use all the time	Building management		10-40 % higher than ordinary lighting
	✓ Install energy saving lights at all lighting points within the building instead of bulbs which consume higher electric energy	Building management		10-40 % higher than ordinary lighting
	✓ Sensitize tenants and employees to use energy efficiently	Management/ Tenants		500/month
Minimize water consumption and ensure efficient and safe water use				
Water consumption	✓ Promptly detect and repair water pipe and tank leaks	Building management	Low water bills Presence of water conservation devices	2,000/month
	✓ Encourage tenants and staffs to conserve water	Building management		-
	✓ Ensure taps are not running when not in use			-
	✓ Install water conserving taps that turn-off automatically when water is not being used	Building management		10-40 % higher than ordinary

Negative impact	Recommended Mitigation Measures	Responsible Party	Monitoring Indicators	Cost (Ksh)
	✓ Install a discharge meter at water outlets to determine and monitor total water usage	Building management	Presence of water meters	3,000 per meter
Minimize traffic around adjacent road				
Traffic generation	✓ "NO PARKING" signs will be posted around the building where Parking is prohibited and likely to cause obstruction as well as other necessary traffic signs ✓ Access to driveways will be maintained at all times ✓ Any work that disturbs normal traffic signal operations shall be coordinated with the relevant authorities	Building Management & Traffic/Parking Attendant Security personnel	No traffic Presence of traffic management plan and measures in place	-
Ensure the general safety and security of the premises and surrounding areas				
✓ Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises.		Proponent	No crime/ Presence of security installations	300,000/month
Environmental monitoring of the project				
✓ An Initial Environmental Audit will be conducted in the first year of operation/occupation to confirm the efficacy and adequacy of the EMP and to propose a comprehensive operational Phase EMP in harmony with the building's custom fittings		Proponent, Firm of Experts and NEMA	Adherence to EIA License conditions Initial Environmental Audit conducted	-

Table 5: Environmental management plan for the decommissioning phase of the proposed project

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Monitoring Measures	Cost (Ksh)
Generation of large amounts of waste	✓ Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary land filling.	Project Manager & Contractor	Absence of complaints from neighbours Absence of Debris Safety Measures in place	5,000,000
	✓ All buildings, machinery, equipment, structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible			
	✓ All foundations must be removed and recycled, reused or disposed of at a licensed disposal site			
	✓ Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site			
	✓ Donate reusable demolition waste to charitable organizations, individuals and institutions			
	✓ Rehabilitate accordingly	Project Manager		
Noise generation	✓ Use appropriate noise management techniques	Project Manager & Contractor	No complaints from neighbours and public	
Air quality degradation	✓ Use appropriate dust management measures			

9. CONCLUSION AND RECOMMENDATION

Conclusion

In conclusion, the Environmental and Social Impact Assessment conducted for the proposed residential development underscores the commitment to responsible and sustainable urban development. The assessment has provided a holistic understanding of the potential environmental implications associated with the project, allowing for informed decision-making and the implementation of necessary mitigation measures. By addressing key concerns related to air and water quality, noise levels, waste management, health and safety and sustainable resource utilization, this EIA has paved the way for the integration of environmentally sound practices into the construction and operation of the proposed project.

As the process moves forward, it is crucial to remain steadfast in the execution of the recommended mitigation strategies outlined in this report. Regular monitoring and adaptive management will be essential to ensure that any unforeseen environmental impacts are promptly identified and effectively managed. By adhering to the principles of sustainable development and embracing innovative technologies where applicable, the proposed project can serve as a model for responsible urban growth that harmonizes the needs of the community with the protection of the natural environment.

Recommendations

- Consult all relevant service providers and authorities (i.e. NEMA, NCG, KPLC, NCWSC, KURA amongst others) to harmonize the projects infrastructural and socio-economic developments with existing facilities
- Adhere to all conditions within the NEMA License once it is obtained.
- Adopt a waste minimization strategy by promoting recycling, reducing construction waste, and implementing proper disposal mechanisms for hazardous materials.
- Incorporate energy-efficient systems, renewable energy sources (such as solar panels), and water-saving technologies (e.g., rainwater harvesting) into the building design.
- Ensure an elaborate landscaping program is put in place as the construction phase is being concluded so as to replenish vegetation around the project site by planting trees, flowers and lawns where applicable.
- Provide supervision, information and training of employees on safety procedures including how to operate equipment safely, how to handle any hazardous materials, how to respond to emergencies and proper use of PPE.
- Use compliance standards guidelines outlined in Tables 3 and 4: Environmental Management Plan to mitigate against any negative environmental, safety, health and social impacts associated with the construction and operational impacts of the project.

REFERENCES

- ✓ Climate Change Act 2016
- ✓ Environmental Management and Coordination Act (Cap 387).
- ✓ Environmental Management and Coordination (Impact Assessment and Audit) Regulations 2003.
- ✓ Environmental Management and Coordination (Water Quality) Regulations, 2006.
- ✓ Environmental Management and Coordination (Waste Management) Regulations, 2006.
- ✓ Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) Regulations, 2009.
- ✓ Environmental Management and Co-Ordination (Air Quality) Regulations. 2014
- ✓ National Construction Authority Act NO. 41, 2011
- ✓ National Construction Authority Regulations, 2014
- ✓ Occupational Safety and Health Act, 2007.
- ✓ Physical and Land Use Planning Act, 2019
- ✓ Public Health Act (Cap. 242).
- ✓ Public Roads and Roads of Access Act (Cap. 399)
- ✓ Sustainable Waste Management Act 2022
- ✓ Urban and Cities Act, 2011
- ✓ Water Act, 2016.

APPENDICES