

# ENVIRONMENTAL IMPACT ASSESSMENT STUDY REPORT

## LOCATION

L.R. 1/440/Nairobi  
Along Kindaruma Road

## GPS

Latitude: -1.297968°  
Longitude: 36.792165°  
Alt: 1783 m

## PROPOSED BUILDING IN NAIROBI



Aerial view of site (marked)

## PROPONENT

Grapestone Limited

## FIRM OF EXPERTS

Mazingira & Engineering  
Consultants Limited

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Proposed building of View of neighbouring structures from site

**CERTIFICATION**

This project report for development of a building and associated infrastructure on L.R. 1/440/Nairobi along Kindaruma Road has been prepared by Mazingira and Engineering Consultants Limited which is a NEMA registered and licensed firm of experts.

This report has been done with reasonable skills, care and diligence in accordance with the Environmental Management and Coordination Act, 1999 and the Environmental Impact Assessment and Audit Regulations 2003.

The firm of experts and the client certify that the particulars given in this report are correct to the best of our knowledge. The proponent agrees to abide by the recommendations of the report regarding conservation of the environment and is willing to implement the proposed Environmental Management Plan.

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## ACRONYMS

CO <sub>2</sub>	- Carbon Dioxide
COD	- Chemical Oxygen Demand
DOSH	- Directorate of Occupational Safety and Health
EHS	- Environmental, Health and Safety
ESIA	- Environmental Impact Assessment
EMCA	- Environmental Management & Coordination Act
ISO	- International Standard Organization
NEMA	- National Environmental Management Authority
NO <sub>x</sub>	- Nitrogen oxide
PPE	- Personal Protective Equipment

## EXECUTIVE SUMMARY

Environmental Impact Assessment (ESIA) is a tool which has been incorporated in environmental legislation to ensure that development activities that have a bearing on the environment have a positive and sustainable interaction with the environment. The main purpose of the ESIA is to identify all probable environmental impacts and propose methods of addressing those impacts. The ESIA process is guided by Environmental (Impact Assessment and Audit) Regulations made under the Environmental Management and Coordination Act.

The proposed project will involve construction of a multi-level apartment building on three quarters of an acre of land with a frontage on Kindaruma Road.

The ESIA was carried out at the site of the proposed project which had an old vandalized single dwelling house at the time of assessment. The project proponent is Grapestone Limited which is a locally incorporated firm who are also the owner of the property and also a registered building contractor.

The Firm of Experts was appointed to carry out the ESIA to address possible environmental impacts and design an Environmental Management Plan (EMP) to address the environmental impacts associated with the proposed development. The ESIA was carried out using a combination of methods including physical examination, literature review and interviews with stakeholders e.g. neighbours, workers and government departments concerned.

In writing this report, literature on statutory and industry requirements was reviewed and has been quoted. The report contains an Environmental Management Plan which will assist the proponent to mitigate any potential impacts which were identified and which may arise during implementation of the project.

The report in different sections contains a brief overview of the project and offers recommendations on the findings of the ESIA process, the methodology used and scope of the study. It also describes the legal and policy framework guiding environmental law in Kenya and relevant to the proposed project. The report also has details on baseline information on which assessments were based and also highlights the responses from the public regarding the proposed project and possible impacts and or solutions. The report also contains the Terms of Reference (TOR) and the annexes.

## 1.0 INTRODUCTION

### 1.1 Background

Nairobi is the country's economic and political capital of Kenya. Nairobi is the centre of commercial, manufacturing and industrial development in East Africa. Like most modern cities, Nairobi has crowded markets and trading areas, middle class suburbs, and spacious mansions for the rich and powerful. It also has vast overcrowded tenements and slums, exploitation, and high unemployment. The city suburbs and industrial and business concerns are trying to move further away from the city centre and the proposed development is an attempt to create space for commercial activities by the proponent.

The development will have manageable negative impacts on the environment and numerous positive impacts. The interaction with the environment is the main reason behind the undertaking of an ESIA.

### 1.2 Conclusion

ESIA findings indicated that there would be manageable negative environmental impacts associated with the proposed project. The positive impacts are related to enhancement of aesthetic value and security and attraction of investments. Public consultations confirmed that the neighbours do not anticipate negative effects from the proposed project. It was therefore concluded that the proposed project will not compromise the environment.

### 1.3 Recommendations

On the strength of the findings of the ESIA, the proposed project should be approved subject the following conditions:-

- Contractor/proponent to use serviceable vehicles and heavy equipment.
- Overburden removed from the site should be dumped in designated areas.
- Ensure there is minimal interference with traffic flow on the roads.
- The construction should take the minimum period possible.
- Comply with all set standards in health and safety of workers and the public during construction works.
- Ensure implementation of the proposed mitigation measures and compliance with Environmental Management Plans.



## **2.0 OBJECTIVE, SCOPE AND CONTENT OF THE STUDY**

### **2.1 Project justification**

The proposed project comprises construction of an apartment building on three quarters of an acre of land adjacent to similar blocks of apartments in a leafy suburb of Nairobi popular for mixed use developments. The project will be on three quarter acre of land occupied by a dilapidated vandalized single dwelling house. The site was easily accessible from Kindaruma Road and the proposed development will improve the value of the property and provide exclusive, high cost accommodation.

### **2.2 Objective**

The purpose of this ESIA process was identification of potentially negative environmental impacts and recommendation of mitigation measures formulated in an EMP. The other objective on the other hand was to ensure that all environmental concerns are integrated in development activities in order to contribute to sustainable development.

#### **Specifically the objectives are:-**

- Identify potential environmental impacts and their significance.
- Propose preventive mitigating and compensative measures for the negative impacts.
- Present results of the ESIA in a format that can guide informed decision making.
- Prepare an Environmental Management Plan (EMP) for the proposed project.

### **2.3 Scope**

The ESIA was conducted at the proposed site of the apartment building and the neighbourhood. The ESIA was conducted with physical examination, interviews and consultations. The process included a systematic examination of proposed activities such as planning, excavations, transportation, construction, and landscaping, decommissioning and operation.

### **2.4 Criteria**

The Environmental Impact Assessment was carried out in light of the environmental management; statutory and regulatory requirements in Kenya as outlined in section 3 of this report, the Environmental (Impact Assessment and Audit) Regulations 2002 and best practice guidelines on safety and health as per Occupational Safety and Health Act 2007.

### 3.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

#### 3.1 General Overview

The government's environmental policy aims at integrating environmental aspects into national development plans. The broad objectives of the national environmental policy include:

- Optimal use of land and water resources to improve quality of human environment;
- Sustainable use of natural resources to meet the needs of the present generations, while preserving their ability to meet the needs of future generations;
- Meeting national goals and international obligations by conserving bio-diversity, arresting desertification, mitigation effects of disasters, protecting the ozone layer and maintaining an ecological balance on earth.

Kenya has numerous statutes that guides on environmental management and conservation which are amended from time to time to reflect changes in governance, awareness and industry demands within and without of the country. Most of these statutes are sector specific, covering issues such as public health, soil conservation, protected areas conservation and management, endangered species, public participation, water rights, water quality, air quality, excessive noise control, vibration control, land use among other issues.

The National Environment Management Authority (NEMA) in conjunction with the various lead agencies review proposed projects to ensure all aspects of the proposed project adhere to framework statute, the Environmental Management and Coordination Act 1999 as amended in 2019.

#### 3.2 Legal Aspects

The key national laws that govern the management of environment resources in the country have been briefly discussed in the following paragraphs. Note that wherever any of the laws contradict each other on environmental issues, the Environmental Management and Coordination Act prevails.

##### 3.2.1 Environment Management and Coordination Act (EMCA), 1999

The Environmental Management and Co-ordination Act (EMCA) is an act of parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and for related matters. Part II of the Act, states that every person is entitled to a clean and healthy environment in accordance to the constitution and relevant laws and has the duty to safeguard the same. It is worth noting that the entitlement to a clean and healthy environment carries a correlative duty. The act also states that "every person shall cooperate with state organs to protect

and conserve the environment and to ensure the ecological sustainable development and use of natural resources".

National Environment Management Authority is a body established under the Act. NEMA has the legal authority to exercise general supervision and co-ordination over all matters relating to the environment, and is the principal instrument of the Government charged with the implementation of all policies relating to the environment.

According to section 58 of the act, an environmental impact assessment study needs to be carried out on all projects specified in the second schedule of the act that are likely to have a significant impact on the environment. It states that the proponent of any project specified in the Second Schedule shall undertake a full environmental impact assessment study and submit an environmental impact assessment study report to the Authority prior to being issued with any license by the Authority: Provided that the Authority may direct that the proponent forego the submission of the environmental impact assessment study report in certain cases.

Notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya, being a proponent of a project, shall, before financing, commencing, proceeding with, executing or conducting or causing to be financed, proceeded with, carried out, executed or conducted by another person any undertaking specified in the second schedule of this Act, submit a project report to the Authority, in the prescribed form, giving the prescribed information. The proponent of a project shall undertake or cause to be undertaken at his own expense an ESIA and after studying the report, NEMA would make a decision.

Environmental Audit and Monitoring - The Environmental Management and Coordination Act requires that environmental audits for existing projects be carried out at the instance of the National Environmental Management Authority (NEMA) as the Authority may deem necessary to ensure that no negative environmental impacts arise from a project once established and if any, the impacts are mitigated as necessary.

Effluent discharge - Section 72 (1) of the EMCA prohibits the discharge of poisonous, toxic, noxious or obstructing matters, radioactive waste or other pollutants or into the aquatic environment.

Disposal of pesticides and other harmful substances - Section 93(1) of EMCA prohibits the discharge of any waste substance, chemical, oil or mixture containing oil into any water or any other segment of the environment contract to the provisions of the Act and regulations there under.

The Authority may, at any time after the issue of an environmental impact assessment license direct the holder of such license to submit at his own expense a fresh environmental impact assessment study, evaluation or review report within such time as the Authority may specify where;

- (a) there is a substantial change or modification in the project or in the manner in which the project is being operated;
- (b) the project poses environmental threat which could not be reasonably foreseen at the time of the study, evaluation or review; or
- (c) It is established that the information or data given by the proponent in support of his application for an environmental impact assessment license under section 58 was false, inaccurate or intended to mislead.

Where the Authority has directed that a fresh environmental impact assessment be carried out, or that new information is necessary from the project proponent, any environmental impact assessment license that has been issued may be cancelled, revoked or suspended by the Authority.

The Authority may, after the issuance of an environmental impact assessment license cancel, revoke or suspend such license, for such time, not more than twenty four months, where the licensee contravenes the provisions of the license. (1A) Where the Authority cancels, revokes or suspends a license in accordance with the Act; the reasons for such action shall be given to the licensee in writing.

The ESIA process starts after the completion and submission of sufficient copies of the ESIA project report to NEMA. The authority then reviews the report and distributes copies of the same to relevant government ministries. If the project meets the requirements then it's approved and license is granted. If otherwise, then the client through the consultant is advised to revise the project according to the reviewed comments. This is done within 42 days after submission of the ESIA report for the said assessment.

On right to information, the Act states that subject to the law relating to access to information, every person has the right to access any information that relates to the implementation of this Act that is in the possession of the Authority, lead agencies or any other person. (2) A person desiring the information referred to in subsection (1) shall apply to the Authority or a lead agency and may be granted access to such information on payment of the prescribed fee.

On protection of the environment, the act states that 'no person shall, without prior written approval of the Director-General given after an environmental impact assessment, in relation to a river, lake or wetland in Kenya, carry out any of the following activities'

- Erect, reconstruct, place, alter, extend, remove or demolish any structure or part of any structure in, or under the river, lake or wetland;
- Excavate, drill, tunnel or disturb the river, lake or wetland;
- Introduce any animal whether alien or indigenous in a lake, river or wetland;
- Introduce or plant any part of a plant specimen, whether alien or indigenous, dead or alive, in any river, lake or wetland;
- Deposit any substance in a lake, river or wetland or in, on, or under its bed, if that substance would or is likely to have adverse environmental effects on the river, lake or wetland;
- Direct or block any river, lake or wetland from its natural and normal course; or
- Drain any lake, river or wetland.

(2) The Minister may, by notice in the Gazette, declare a lake shore, wetland, coastal zone or river bank to be protected area and impose such restrictions as he considers necessary, to protect the lake shore, wetlands, coastal zone and river bank from environmental degradation.

Under EMCA, NEMA has gazetted several regulations some of which are listed below;

- Environmental (Impact Assessment and Audit) Regulations, 2003
- Environmental Management and Co-ordination (water quality) Regulations, 2006
- Environmental Management and Coordination (Waste management) Regulations, 2006 Legal Notice No. 121
- The Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 Legal Notice No. 61
- The Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2009 Legal Notice No. 30
- The Environment Management and Co- ordination (Conservation of Biodiversity Diversity and Resources Access to Genetic Resources and Benefit Sharing), Regulations, 2006
- The Environment Management and Co- ordination (Fossil Fuel Emission Control), Regulations, 2006
- The Environment Management and Co- ordination (Controlled Substances) Regulation, 2007
- The Environment Management and Co- ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009.

On Environmental audit and Monitoring, the Authority or its designated agents shall be responsible for carrying out environmental audit of all activities that are likely to have significant effect on the environment. An environmental inspector appointed under this Act may enter any land or premises for the purposes of determining how far the activities carried out on that land or premises conform to the statements made in the environmental impact assessment study report issued in respect of that land or those premises under section 58(2).

The act makes it mandatory for the first time for every lead agency to establish an environmental unit to implement the provisions of this Act.

### **3.2.2 Constitution of Kenya 2010**

Promulgated on the 27<sup>th</sup> of “August 2010, the constitution of Kenya in its preamble declares that the people of Kenya are respectful to the environment, which is their heritage and they are determined to sustain it for the benefit of future generations.

The constitution which is based on the bill of rights as its backbone, states in article 42 that every person has a right to a clean and healthy environment and subsection 1 adds that this includes the right to protect environment for the benefit of present and future generations through legislative and other measures. Article 43 follows declaring economic and social rights of every Kenyan and they include in subsections: (a) the right to the highest attainable standard of health, which includes the right to health care services, including reproductive health care and (d) the right to clean and safe water in adequate quantities. Section 2 of article 43 adds that no one shall be denied emergency medical care.

The constitution also endorses the national land policy and states that “land in Kenya will be held, used and managed in a manner that is equitable, efficient, productive and sustainable”. Article 60 and article 61 declare that all land in Kenya belongs to the people of Kenya collectively.

Article 69 states that “the state will ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits”. The following subsections give regulations in terms of forest cover, biodiversity, cultural resources, indigenous knowledge, systems for environmental impact assessment and prevention of activities that may harm the environment.

Section 2 states that every person has a duty to cooperate with state organs and other persons, to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources. Article 70 deals with enforcement of environmental rights and everyone who feels their right to a clean and healthy environment has been denied has the obligation to go to court to seek redress. Article 71 and 72 deal with agreements relating to natural resources and legislation relating to the environment respectively, where parliament is given this authority.

Article 42 on Environment states that every person 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, particularly those contemplated in Article 69; and to have obligations relating to the environment fulfilled under Article 70.

### **3.2.3 Environment and Land Court Act**

This is an Act of Parliament which gives effect to article 162(2)(b) of the constitution to establish a superior court to hear and determine disputes relating to the environment and the use and occupation of, and title to land and to make provision for its jurisdiction, functions and powers and for connected purposes.

### **3.2.4 Public Health Act**

The Act aims at protecting and promotes human health and the prevention, limitation or suppression of infectious, communicable or preventable diseases within Kenya. It seeks to advise and direct County Governments on matters public health and to promote or carry out researches and investigations in connection with the prevention and treatment of human diseases. It gives regulations to waste management, pollution and human health.

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

Such nuisance or conditions are defined under section 118 as waste pipes, sewers, drains or refuse pits in such a state, situated or constructed as, in the opinion of the medical officer of health, to be offensive or injurious to health. Any noxious matter or waste water flowing or discharged from any premises into Public Street or into the gutter or side channel or watercourse, irrigation channel or bed not approved for discharge is also deemed as a nuisance.

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

### **3.2.5 Physical Planning Act, 1999**

This is an Act of Parliament to provide for the preparation and implementation of physical development plans and for connected purposes. If in connection with a development application a County Government is of the opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other

development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environmental impact assessment report.

This Act provides for the preparation and implementation of physical development plans for connected purposes. It establishes the responsibility for the physical planning at various levels of Government in order to remove uncertainty regarding the responsibility for regional planning.

It provides for a hierarchy of plans in which guidelines are laid down for the future physical development of areas referred to in specific plan. The ostensible intention is that the three-tier order plans, the national development plan, regional development plan, and the local physical development plan should concentrate on broad policy issues.

The Act also promotes public participation in the preparation of plans and requires that in preparation of plans, proper consideration be given to the potential for economic development, socio-economic development needs of the population, the existing planning and future transport needs, the physical factors which may influence orderly development in general and urbanization in particular, and the possible influence of future development upon natural environment. The innovation in the Act is the requirement for Environmental Impact Assessment (ESIA). Any change of use of the actual development without authority constitutes an offence.

The act states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respective County Government.

### **3.2.6 Occupational Safety and Health Act, 2007**

This is an Act of Parliament that provides for the safety, health and welfare of workers and all persons lawfully present at work places to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. Section 3 (1) states “that the Act shall apply to all workplaces where any person is at work, whether temporarily or permanently”.

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.

Part V of the Act provides for the registration of workplaces. Section 43 states that “the Director shall keep a register of workplaces in which he shall cause to be entered such particulars in relation to every workplace required to be registered under this Act as he may consider necessary”. Section 44 (1) further states that “Before any person occupies or uses any premises as workplace, he shall apply for the registration of the premises by sending to the Director a written notice containing the particulars set out in the fourth schedule” Section 44 (2) states that “Upon receipt of the notice referred to in subsection (1), the Director shall take such steps as may be necessary to satisfy himself that the premises are suitable for use as a workplace of the nature stated in the notice, and upon being so satisfied, shall cause the premises to be registered and shall issue to the applicant, upon payment of the prescribed fee, a certificate of registration in the form set out in the Fifth Schedule”.

The Occupational Safety and Health Act, 2007, address provisions concerning health. These provisions are:

- (i) Cleanliness;
- (ii) Overcrowding;
- (iii) Ventilation;
- (iv) Lighting;
- (v) Drainage of floors; and
- (vi) Sanitary conveniences.

These provisions are to be enforced by the Directorate of Occupational Safety and Health Services. According to the scale for sanitary accommodation issued by Director of Occupational Safety and Health, LD280, the table below shows the guides for scale for sanitary accommodation:

Ladies WC		Gents WC		Gents Urinals	
No. of staff	No. of facilities	No. of staff	No. of facilities	No. of staff	No. of facilities
1 - 12	1	1 - 15	1	1 - 6	0
13 - 20	2	15 - 35	2	7 - 20	1
21 - 40	3	36 - 65	3	21 - 45	2
41 - 57	4	66 - 100	4	46 - 70	3
58 - 77	5	101 - 200	Add 3%	71 - 100	4

78 - 100	6	Over 200	Add 2.5%	101 - 200	Add 3%
101 - 200	Add 5%			Over 200	Add 2.5%
Over 200	Add 4%				

Section 55 requires all plant, machinery and equipment whether fixed or mobile for use at work place to be used for designed work and operated by a competent person. Part VIII of the Occupational Safety and Health Act, 2007 describes safety general provisions. Section 74 (1) provides for storage. It states that “all goods, articles and substances stored in a workplace shall be stored or stacked.

- (a) In such a manner as will ensure their stability and prevent any fall or collapse of the stack;
- (b) in such manner as not to interfere with the adequate distribution of the natural or artificial light, the natural ventilation systems, the proper operation of machines or other equipment, the unobstructed use of passageways, gangways or traffic lanes, and the efficient functioning of sprinkler systems, the unobstructed access to other fire extinguishing equipment within the workplace; and (c) On firm foundations not liable to overload any floor” .

Section 74 (2) further states that “No goods, articles or substances shall be stored or stacked against a wall or partition unless the wall or partition is of sufficient strength to withstand any pressure caused thereby” .

Section 76 provides for ergonomics at the workplace. Section 76 (1) states that Machinery, equipment, personal protective equipment, appliances and hand tools used in all workplaces shall comply with the prescribed safety and health standards and be appropriately installed, maintained and safe guarded” .

Section 76 (2) states that “Every employer shall take necessary steps to ensure that workstations, equipment and work tasks are adapted to fit the employee and the employee’s ability including protection against mental strain” .

According to Section 76 (3) “Every manufacturer, importer and supplier or an agent of a manufacturer, importer and supplier of the machinery and equipment referred to in paragraph (1) shall ensure that the equipment complies with the safety and health standards prescribed under this Act and shall provide adequate and appropriate information including hazard warning signs” .

Section 76 (4) further states that “An employer shall not require or permit any of his employees to engage in the manual handling or transportation of a load which by reason of its weight is likely to cause the employee to suffer bodily injury” .

Section 97 prohibits employers to employ persons below the age of 18 years at the work place or perform work by which its nature it's likely to harm the persons safety or health. The Act has several subsidiary legislations made through powers conferred to the Cabinet Secretary in charge of Labour. Some are discussed in the following sections.

**(i) Safety and Health committee rules of 2004**

These rules state that any employer/proponent/occupier who employs more than twenty persons must establish a committee to address the health, safety and welfare of workers. The employer must also cause to be carried out a health and safety audit of all his operations on an annual basis by a registered health and safety advisor who should forward such a report to the Director of Occupational Health and Safety Services.

**(ii) First Aid Rules**

These have details on first aid requirements in terms of facilities and capacity building among non-medical workers.

**(iii) Hazardous Substances Rules**

These regulate the handling, transportation and use of certain listed chemicals which may have negative effects on the body when one is exposed.

**(iv) Noise Prevention and Control Rules of 2005**

These rules have set minimum maximum exposure limits beyond which workers and members of the public should not be exposed to noise without adequate means of protection. The rules also have limits for exposure out of workplaces. The rules have several recommendations on a comprehensive noise control program for workplaces that includes a requirement for medical examination of workers who are exposed to noise.

**(v) Medical Examination Rules**

The rules offer a guide on the need and target of workers who have to undergo regular medical examination to identify the symptoms of hazardous exposures on the body. This is with a sole purpose of monitoring exposure for remedial action.

**(vi) Building Operations and Works of Engineering Rules**

These guide health and safety matters in building/construction and civil engineering works. They state that it is the duty of the proponent to ensure health, safety and welfare of workers and authorized visitors to the site before commencement of operations. The rules have specific sections on excavations, transport, demolitions, formwork and scaffolds, lifting and lifting equipment and other safety measures.

### **3.2.7 Occupier's Liability Act Cap. 34**

The act regulates the duty that an occupier of premises owes to his visitors in respect of dangers due to the state of the premises or to things done or omitted to be done on them. It requires that the occupier warn the visitors of the likelihood of dangers within his premises to enable the visitor to be reasonably safe.

### **3.2.8 The Water Act of 2002**

The Kenya Water Act of 2002 was enacted to ensure equitable and sustainable use of water resources in the country. It establishes the Water Resource Management Authority to manage water resources in the country that are vested in the state.

The Minister also formulates, and publishes in the Gazette, the national water resources management strategy in accordance with which the water resources of Kenya are being managed, protected, used, developed, conserved and controlled, the Water Resources Authority (WRA) in turn formulate a catchment management strategy through which water catchment areas are managed.

The main contractor will be required to implement necessary measures to ensure water conservation and also to prevent potential for water contamination during the implementation phase.

### **3.2.9 The Electricity Power Act, 1997**

Section 55 (1) in the execution of works in connection with the installation, modification, maintenance or operation of an electric supply line or apparatus or conductor connected thereto, every licensee shall:-

In no way injure the works, conveniences or property belonging to any such other such authority, company or person, nor obstruct or interfere with public traffic, except with the previous consent of the board. Take adequate precautions to protect from danger any person engaged upon such works by the provision and maintenance in safe and efficient conditions of the necessary safety appliances for the use of such persons and by ensuring their proper use, or by other means approved by the board.

### **3.2.10 County Governments Act 2012**

This act gives effect to Chapter Eleven of the Constitution, which provides the county governments the powers to function and take responsibilities for the delivery of services within their designated counties including management of environment and natural resources among other responsibilities. The functions provided for in Article 186 of the constitution and as assigned in the Fourth Schedule of the Constitution. These include management of water resources, biodiversity, forests, and National Reserves

among others.

### **3.2.11 Work Injury Benefits Act**

This Act provides guideline for compensating employees on work related injuries and diseases contacted in the course of employment and for connected purposes. The act includes compulsory insurance for employees. The act defines an employee as any worker on contract of service with employer.

This Act requires that all workers contracted during the project implementation phase have the required insurance covers so that they can be compensated in case they get injured while working.

### **3.2.12 Employment Act 2007**

The Act constitutes minimum terms and conditions of employment of an employee and any agreement to relinquish vary or amend the terms set will be null and void. The act stipulates that no person will use or assist any other person, in using forced labour. Clause 5 of the act states that its will be the duty of the Minister, Labour officer, the National Labour Court and the subordinate labour courts to; Promote equality of opportunity in employment in order to eliminate discrimination in employment; Promote and guarantee equality of opportunity for a person who, is a migrant worker or a member of the family of the migrant worker lawfully within Kenya.

No employer will discriminate directly or indirectly, against an employee or prospective employee or harass an employee or prospective employee on the following grounds; race, colour, sex, language, religion, political or other opinion, nationality, ethnic or social origin, disability, pregnancy, mental status or HIV status. An employer will pay his employees equal remuneration for work of equal value.

The provisions of this part and part VI constitute basic minimum and conditions of contract of service. The employer will regulate the hours of work of each employee in accordance with provisions of this Act and any other written law. Subsection (2) of section 27 states that an employee will be entitles to at least one rest day in every period of seven days. An employee will be entitles to not less than twenty one working days of leave after every twelve consecutive months.

Section twenty nine of the Act stipulates that a female employee will be entitled to three months maternity leave with full pay. Subsection 8 of section 29 further states that no female employee will forfeit her annual leave entitlement on account of having taken her maternity leave.

### **3.2.13 Standards Act Cap 496**

This Act is implemented by the Kenya Bureau of Standards who provides standards on the requirements of equipment and project materials. Standards regulating plant installation and product quality have to be observed during the installation and operation of the project. The proponent is required to implement the requirements of this Act especially those on standardization of project inputs and equipment in order to reduce waste and pollution.

### **3.2.14 Food, Drugs and Chemical Substances Act**

This is an Act of Parliament to make provision for the prevention of adulteration of food, drugs and chemical substances and for matters incidental thereto and connected therewith.

The act also prohibits adulteration of chemical substances or those containing any filthy, putrid, disgusting, rotten, decomposed or diseased substance or foreign matter. It also makes it an offence to label, package, treat, process, sell or advertise any chemical substance in contravention of any regulations made under this Act, or in a manner that is false, misleading or deceptive as regards its character, value, quality, composition, merit or safety, shall be guilty of an offence.

Where a standard has been prescribed for a chemical substance, any person who labels, packages, sells or advertises any other substance in such a manner that it is likely to be mistaken for that chemical substance shall be guilty of an offence unless the substance complies with the prescribed standard for such chemical substance.

Any person who uses or disposes of any chemical substance in a manner likely to cause contamination of food or water for human consumption or in a manner liable to be injurious or dangerous to the health of any person shall be guilty of an offence. Any person who sells any chemical substance which, when used according to the instructions of the manufacturer or under such conditions as are customary or usual, might cause injury to the health of any person shall be guilty of an offence.

Any person who sells, prepares, preserves, packages, stores or conveys for sale any chemical substance under insanitary conditions shall be guilty of an offence.

## **3.3 Regulatory Framework**

### **3.4.1 Environmental Impact Assessment and Audit regulations, 2003**

The regulations apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act.

The regulation state as follows:

4. (1) 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.

(2) No licensing authority under any law in force in Kenya shall issue a licence for any project for which an environmental impact assessment is required under the Act unless the applicant produces to the licensing authority a licence of environmental impact assessment issued by the Authority under these Regulations.

(3) No licensing authority under any law in force in Kenya shall issue a trading, commercial or development permit or license for any micro project activity likely to have cumulative significant negative environmental impact before it ensures that a strategic environmental plan encompassing mitigation measures and approved by the Authority is in place.

### **3.3.3 EMCA (Waste Management) Regulations 2006**

These are described in Legal Notice No. 121 of the Kenya Gazette Supplement No. 69 of September 2006. These Regulations apply to all categories of wastes as provided in the Regulations. The Regulations outline requirements for handling, storing, transporting, and treatment / disposal of all waste categories.

### **3.3.4 EMCA (Water Quality) Regulations 2006**

These are described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 68 of September 2006. They apply to drinking water, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purposes. This includes the following:

- Protection of sources of water for domestic use;
- Water for industrial use and effluent discharge;
- Water for agricultural use.

These Regulations outline:

- Quality standards for sources of domestic water;
- Quality monitoring for sources of domestic water;
- Standards for effluent discharge into the environment;
- Monitoring guide for discharge into the environment;
- Standards for effluent discharge into public sewers;
- Monitoring for discharge of treated effluent into the environment

### 3.3.5 Conservation of Biological Diversity (BD) Regulations 2006

These regulations are described in Legal Notice No. 160 of the Kenya Gazette Supplement No. 84 of December 2006. These Regulations apply to conservation of biodiversity which includes Conservation of threatened species, Inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.

### 3.3.6 Fossil Fuel Emission Control Regulations 2006

These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement no. 74, October 2006. The regulations include internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnerships to control fossil fuel emissions. The fossil fuels considered are petrol, diesel, fuel oils and kerosene.

### 3.3.7 Noise and Excessive Vibration Pollution) (Control) Regulations, 2009

Section 14 (1) says, where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority may impose requirements on how the work is to be carried out including but not limited to requirements regarding -

(a) Machinery that may be used, and

(b) The permitted levels of noise as stipulated in the Regulations.

(2) The relevant lead agency shall ensure that mines and quarries **where** explosives and machinery used are located in designated areas and not less than two kilometers away from human settlements.

(3) Any person carrying out construction, demolition, mining or quarrying work shall ensure that the vibration levels do not exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source. On Permissible noise levels, section 5 say No person shall make, continue or cause to be made or continued any noise in excess of the noise levels set in the First Schedule to these Regulations, unless such noise is reasonably necessary to the preservation of life, health, safety or property.

Section 15: Any person intending to carry out construction, demolition, mining or quarrying work shall, during the Environmental Impact Assessment studies-

- Identify natural resources, land uses or activities which may be affected by noise or excessive vibrations from the construction, demolition, mining or quarrying;
- Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction, demolition, mining or quarrying noise or vibration impacts;
- Incorporate the needed abatement measures in the plans and specifications.



Section 16 (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.

### **3.4 Institutional Framework**

#### **3.5.1 Institutions**

The Government established the following institutions to implement the EMCA 1999.

##### **(i) National Environmental Council**

The National Environmental Council (NEC) is responsible for policy formulation and directions for the purposes of the Act. The NEC also sets national goals and objectives and determines policies and priorities for the protection of the environment.

##### **(ii) National Environmental Management Authority**

The responsibility of the National Environmental Management Authority (NEMA) is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies relating to the environment. In addition to NEMA, the Act provides for the establishment and enforcement of environmental quality standards to be set by a technical committee of NEMA known as the Standards and Enforcement Review Committee.

##### **(iii) County and District Environmental Committees**

Environmental Committees also contribute to decentralized environmental management to enable participation of communities. The committees consist of the following:

- Representatives from all ministries;
- Representatives from local authorities within the province/district;
- Two farmers/pastoral representatives;
- Representatives from NGOs involved in environment in the province/district;
- A representative of each regional development authority in the county

##### **(iv) Public Complaints Committee**

Act established a Public Complaints Committee providing administrative mechanisms for addressing environmental impacts. The committee has mandate to investigate complaints relating to environmental damage or degradation. Its members include representatives from the Law Society of Kenya, NGOs and the business community.

##### **(v) Standards and enforcement Review Committee**

Part VIII of the Act deals with environmental quality standards. It establishes a Standards and Enforcement Review Committee (SERC) whose functions include the establishment of standards for all environmental media. Standards have been established as regulations to the Act as presented above. Standards for the following are still scheduled for release:

- Air quality;
- Chemicals;
- Land use;
- Economic instruments.

### 3.4.3 Water Resources Authority

The Water Resources Authority (WRA) is of particular relevance to the project. Its mandate covers some sectoral issues which are applicable to environmental management, such as use of water resources, human settlement and administration of activities in the scheme.

Part III of the Water Act 2002 defines the powers and functions of WRA which include:

- Develop principles, guidelines and procedures for allocation of water resources;
- Monitoring the national water resources management strategy;
- Receiving and determining applications for permits for water use;
- Monitoring and enforcing conditions attached to permits for water use;
- Regulating and protecting water resources quality from adverse impacts;
- Managing and protecting water catchments.
- 

### 3.6 International Conventions and Treaties

Kenya has ratified or acceded to numerous international treaties and conventions. Those that have implications on the project are described below:

**Convention on Biological Diversity (CBD) 1993:** This adopts a broad approach to conservation. It requires parties to adopt national strategies, plans and programs for conservation of biological diversity, and to integrate the conservation and sustainable use of biological diversity into relevant sectoral and cross-sectoral plans, programs and policies. The project is expected to conserve biodiversity, especially the rare and endangered species in the project area and its environs in compliance with the Environmental Management and Co-ordination (Conservation of Biological Diversity) Regulations, 2006.

**United Nations Framework Convention on Climate Change 1992:** Sets an ultimate objective of stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system. Development projects in Kenya such as the project are expected to take

climate change considerations into account, to the extent possible, in their relevant social, economic and environmental policies and actions.

**United Nations Convention to Combat Desertification 1994:** Addresses the problem of the degradation of land by desertification and the impact of drought, particularly in arid, semi-arid and dry semi-humid areas. This convention is domesticated in EMCA 1999 via Section 46 where District Environment Committees are required to identify areas that require re-forestation as well as to mobilize the locals to carry out these activities.

### **3.7 Proponent's knowledge and awareness on relevant legislation**

The proponent is aware of EMCA, Occupational Safety and Health Act, Public Health Act, Penal Code, Water Act among others and their requirements in addressing negative environmental impacts related to construction works.

The proponent is aware of the legal requirement to conduct an Environmental Impact Assessment study and submit a report on the same to the authority before commencement for approval. It was on this basis that the authors of this document were appointed to conduct an environmental impact assessment study on the proposed project.

## 4.0 PROJECT DESCRIPTION

### 4.1 The location of the project

The proposed site is situated in Nairobi City along Kindaruma Road near the junction with Kaburu Drive from Ngong Road. The site is near the junction of Kindaruma Road with Kaburu Drive. The plot neighbors large and medium sized plots with mixed use characteristics with a growing trend for high rise commercial facilities. The project will occupy three quarters of an acre of land fronting Kindaruma Road. There were some trees and shrubs on site and debris from previous occupation was scattered on site. Refer to pictures and attached documents for reference.

### 4.2 Design and layout

The project comprises construction of two basement floors, one ground and thirteen upper floors on a rectangular three quarters acre piece of land occupied by a dilapidated house and a servant quarter, a few trees and a Ki apple fence with a gate facing Kindaruma Road.

The following summary describes proposed;

- Total unit number : 140 units.
- 3 bed room with servant quarter ( 56 units )
- 2 bed room with servant quarter ( 28 units)
- 2 bed room (56 units)
- 1 parking lot for each unit
- 2 basement floor.
- 1 ground floor
- Generator
- Dual lifts for each floor.
- Kids playing area in between two blocks.

The area is served by a sewer line and water mains from Nairobi Water and Sewerage Company as well as a good road network off Kindaruma Road and this will be the access Road. Neighbours are residential and commercial development some facing Ngong Road. .  
(Copies of building plans are attached).

## 5.0 METHOD OF ASSESSMENT

The following activities were undertaken during the ESIA process.

### 5.1 Consultation and scoping

Screening and marking were undertaken to identify and define the scope of key environmental issues using both local and international standards. This assisted in allocation of study areas to members of the ESIA team. Public consultation using structured questionnaires was conducted to determine the acceptance by and impacts if any of the proposed project activities to the affected and interested parties.

### 5.2 Defining the baseline, assessing impacts and their mitigation

The conditions existing in and around the site prior to the proposed project were documented to provide a baseline scenario against which possible impacts of the proposed project were to be assessed. Likely changes in different environmental parameters were analyzed against the established baseline information and the impacts described in both quantitative and qualitative terms. Mitigation measures were derived for each environmental parameter and a mitigation plan, responsible persons and implementation schedule developed to be followed by the proponent to ensure sustainable utilization of available natural resources during the construction and operation of the proposed project.

### 5.3 Analysis of Project Alternatives

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

#### 5.3.1 The NO Project Alternative

The **No Project option** in respect to the proposed project implies that the status quo is maintained. The land would stay bare and unutilized since it had no other use despite its prime location. The aesthetic value of the facility will also remain low. If the option is replicated to other sectors Vision 2030 may not be achieved.

The **No Project Option** is not an option.

#### 5.3.2 Solid waste management alternatives

Solid wastes will be generated from the proposed project during the construction in the form of excess building materials, debris and organic wastes. Wastes will also be generated during routine maintenance and occupation. The proponent will give priority to reduction at source of the materials or containment of wastes. For sewage, a sewer line served the facility.

## 6.0 ENVIRONMENTAL BASELINE DATA

### 6.1 Landscape/Visual observation

Proposed project setting is on previously developed land occupied by a single dwelling two floor unit and a servant quarter all occupying three quarters of prime land on the second row from Ngong Road. The plot had a slight slope to the north but drains towards Kindaruma Road which is on its western side. It was occupied by some ornamental bamboo trees and other exotic trees which will be removed to pave way for the development. The property also has a Ki apple perimeter fence around which will be replaced with concrete. The surrounding areas are mostly used for commercial and residential purposes. The area was well vegetated with mature trees and Ki apple fences. Vehicular access to the project site will be from Kindaruma Road.

### 6.2 Climate

The proposed project site is located Nairobi City along Kindaruma Road which has generally high rainfall and is well vegetated. The rainfall pattern was bimodal with the short rains during the months of October to November and the long rains in March to May. The rainfall average is 1500 mm per year. The months of January, February and March are very dry and hot while the months of June, July and August are cold and wet with temperatures average at 24<sup>0</sup> Celsius.

The average rainfall ranges between 1000 mm - 2,400mm. The area experiences Equatorial rainfall due to its location and being within the highland equatorial zone of Kenya. Winds along the surface are predominantly easterly throughout the entire year.

### 6.3 Surface water

Storm water drains towards a seasonal stream on the western side of the plot which drains northeastwards. Major rivers that cross the City include Nairobi, Ruaraka, Ngong, Athi and Mathare River. The site was drained by Rui Ruaka River flowing eastwards at the foot of the plot. As the rivers pass through the City, industrial effluents, waste and siltation heavily pollute them.

### 6.4 Soil and Geology

The bedrock in this area is volcanic rock, which has weathered into red volcanic soils which are deep and well drained. Ground conditions on site were a site surrounded by largely developed grounds covered with grass and ornamental trees though some plots were undeveloped or with old houses.

### **6.5 Air Quality, dust and noise**

The air quality was affected by heavy vehicular movement and this is unlikely to change with the proposed development. Suspended dust was expected to increase due to building activities and unloading of material such as cement, stones and sand.

The existing noise climate is normal below the threshold limits that can be tolerated by the human ear. The sources of noise are human activities and vehicular movement. This may change during construction works but go back to normal during occupation.

## 7.0 IMPACT ASSESSMENT (IDENTIFICATION)

### 7.1 Approach to Assessment

Site visit to the proposed project area was conducted on various days in May 2019. During these visits a detailed examination of the ecological settings and assessment of several parameters of the area were done to set the baseline info. The environmental conditions existing in the proposed project area were documented to provide the baseline data. The possible impacts of the proposed project activities were assessed against the documented baseline data.

### 7.2 Public consultation

The consultation process included to a large extent public consultation through structured interviews with interested and affected parties. Non-structured interviews were administered to all interested and affected parties. Respondents expressed their expectations regarding the proposed development and its effects on the immediate environment. Some of the respondents filled structured forms and copies are attached in the appendix.

The overall conclusion from the interviews and analysis of the questionnaire led to determination of the following:

- The project was not previously known to most respondents.
- The project will increase employment opportunities.
- Other similar projects exist in the area and do not have negative impacts.

The proponent was willing to comply with recommendations of this ESIA report regarding mitigation of significant environmental impacts.



## 8.0 POTENTIAL IMPACTS AND MITIGATION MEASURES

The impacts have been discussed as those probable during the operation and decommissioning phases of the project. Mitigation is for negative impacts only. The report encourages all measures that enhance positive impacts. The site reconnaissance focused on observation of the ecological status of the site, the vegetative cover, the soils, the landscape and other environmental conditions. The anticipated impacts were identified and grouped for the planning, operation and decommissioning\recovery phases of the project and were rated numerically using numbers and indicated as positive (+) or negative (-) as follows;

Rating	Description
-1	High impact
0	Low impact
1	Medium impact
2	Positive impact

High impacts were considered significant; medium impacts less significant and low impacts as of no consequence.

### 8.1 Demolition

An old existing house will be demolished together with its structures to pave way for the new building. Other structures will be used in construction of form work but most will be removed from the site together with undergrowth and shrubs. Red soil will be used in landscaping. There were no indigenous trees.

Dumping of wastes will follow laid down procedures by the Nairobi County Government and will be done in designated places using proper means that will not allow spills along the roads. Heaping of such material will be avoided as much as possible.

### 8.2 Operational Impacts

#### 8.2.1 Construction works

Red volcanic soils which cover the entire will be excavated for columns and foundations and a wall erected. Red volcanic soils would be dumped on the fringes of the wall and will be landscaped later. Potential impacts will include destruction of soil structure and clogging of storm drains. There may be increased sediment load in surface water. Thirdly there may grease and oil spillage from equipment and vehicles leading to oil pollution to surface water and soils. There will also be noise from trucks bringing in materials.

Oil pollution was rated high (-1) and considered significant, as this may cause harm to fauna and flora in surface water. Noise pollution may be rated high and significant. Traffic accidents may occur due to narrow roads. There may be interference with natural drainage systems near the site leading to flooding and stagnation of water.

There will be increased human activity at the site which may cause damage to the existing drainage system through generation of wastes. Accidents may also occur due to congestion of materials and activities. Persons may fall from heights. Workers health may be affected by exposure to dusts, paints and other building materials. Tools or building materials may fall on persons on lower sections including pedestrians and vehicles on the road. Form work/support structures like scaffolds may fail. All these are significant impacts

### **Mitigation**

- Trucks transporting materials soil to and from site should do so during the day.
- Only serviceable vehicles and equipment should be used during transportation.
- Minimize damage to existing drainage systems during transportation.
- Drivers and operators to observe traffic rules.
- Ensure that all excavations are stabilized or sloped to prevent caving in.
- Ensure that suitable first aid facilities are available on site.
- Insure workers.
- Ensure that only the critical numbers of workers are hired during construction phase
- Ensure that there are elaborate programs of waste removal frequently.
- Scaffolds should be constructed as per the standard with safe means of access to prevent falls.
- A safety supervisor should be appointed as per OSHA 2007.
- Workers should be provided with appropriate personal protection devices.
- Site should be secured to prevent unauthorized entry by day or at night.
- Proponent should notify the DOSH about proposed project.
- Construction materials should be taken to the site on demand to avoid piling up.
- Wastes should be cleared from the site on a daily basis.

#### **a) Decommissioning**

The contractor/proponent will demolish the site office, temporary buildings and move unused materials away from the site for disposal. The impacts generated during this phase will be waste and unused building materials scattered all over the compound and will be rated high (-1) and significant. The wastes and unused building material may be washed by surface water into the drainage systems and cause clogging.

### **Mitigation**

- Ensure that waste and unused building materials are removed safely from the site.
- Rehabilitate the site before commissioning.

### 8.2.2 Operational impacts

The potential impacts that will be generated during the operation phase will include the following:

#### a) Use of apartments

Apartments will be leased or sold out and managed centrally through a management company. Wastes will be generated and common facilities such as a generator or lifts, sewage system subjected to immense pressure. Solid waste management facilities will be put to test by occupation of 140 units. Maintenance will expose workers to safety and health hazards.

#### Mitigation

- Clear the compound and dispose wastes in an environmentally friendly manner.
- Site should have litter bins for trash and solid wastes.
- Ensure regular disposal of solid wastes (trash) to NCC collection points.
- Access to heights where persons may fall should be restricted and secured.

### 8.3 Decommissioning and Closure

The decommissioning of the project may occur as a result of various factors such as noncompliance with approved building plans leading to condemnation and demolition or collapse. The negative aspects that may be brought about by decommissioning can be divided into;

- Environmental Aspects
- Socioeconomic Aspects

#### 8.3.1 Environmental Aspects

- Interference with surface drainage.
- Abandoned premise could be vandalized and become an eyesore.

#### Mitigation

- Structures should be removed and site rebuilt or converted to another use.
- Drainage channels should be maintained.
- If condemned, demolition and clearance should be done for change of user to be possible.

## 9.0 PROPOSED ENVIRONMENTAL MANAGEMENT PLAN

### 9.1 Significance

Significance has been determined in terms of context and intensity of an action. **Context** refers to geographical scale; local, national or global while **intensity** is defined by the severity of the impact; i.e. the magnitude of deviation from background conditions, the size of the area affected, the duration of the effect, violation of legal compliance and the overall likelihood of occurrence.

### 9.2 Environmental Management Plan (EMP)

The **EMP** allows measures to be implemented that will avert/prevent negative impacts. The proponent must ensure that all the proposed mitigation measures are implemented in time. Simple monitoring tools will involve a checklist to record information relating to any mentioned environmental aspects.

The **EMP** in the table below shows the impacts, mitigation measures, and implementation, period, the required resources and the responsible persons to take the action.

**ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

	COMPONENT	PROJECT ACTIVITIES	NEGATIVE IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	APPROX. COST KSHS	TIME FRAME
<b>CONSTRUCTION PHASE</b>	Site preparation	- Excavations	- Soil disturbance and blocking of drainage. - Flooding - Accidents	- Orderly removal and immediate disposal of silt. - Provide of dust masks to workers. - Safe work procedures. - Provision of first aid facilities	Proponent	60,000	Once
		-Transport and storage of building materials.	- Destruction of drainage system. - Oil spills - Accidents - Dust	- Ensure safe work procedures are followed. - Ensure use of serviceable equipment - Avoid vehicle service on site. - Ensure traffic rules are obeyed. - Employ experienced workers to handle and work with equipment. - Insure workers (Work Injury Benefits Act)	Proponent	None	Once
	Construction	Excavations	- Fall accidents - Noise	- Stabilize excavations to prevent caving in. - Construction should take shortest time possible. - Appoint safety supervisor and insure workers	Proponent	20,000	3 months
		Construction of form work	- Fall injuries to workers	- Ensure safe construction of form work - Provide PPE to workers.	Proponent	10,000	Annually

	COMPONENT	PROJECT ACTIVITIES	NEGATIVE IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	APPROX. COST KSHS	TIME FRAME
		Increased Human activities	<ul style="list-style-type: none"> <li>- Injuries</li> <li>- Wastes</li> </ul>	<ul style="list-style-type: none"> <li>- Hire only critical number of workers.</li> <li>- Provide PPE such as dust masks to workers.</li> <li>- Provide waste collection bins - Provide sanitary facilities for the workers during construction.</li> <li>- Avail first aid facilities.</li> </ul>	Proponent	10,000	Annually
		Site closure	<ul style="list-style-type: none"> <li>- Construction wastes</li> <li>- Dust during clearance</li> <li>- Clogging of drains</li> </ul>	<ul style="list-style-type: none"> <li>- All wastes should be collected for safe disposal or reuse elsewhere.</li> <li>- Clear all storm drainages</li> </ul>	Proponent	10,000	Once

	COMPONENT	PROJECT ACTIVITIES	NEGATIVE IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	APPROX. COST KSHS	TIME FRAME
OPERATION	Occupation of houses	<ul style="list-style-type: none"> <li>- Leasing</li> <li>- Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>- Solid and liquid waste generation which are potential pollutants.</li> <li>- Fire</li> <li>- Poor sanitation</li> <li>- Drainage/erosion</li> </ul>	<ul style="list-style-type: none"> <li>- Provide sanitary facilities during construction.</li> <li>- Encourage segregation of wastes between recyclable and organic wastes.</li> <li>- Connect to sewer line</li> <li>- Erect erosion structures</li> <li>- Contract licensed waste agents to handle wastes.</li> <li>- Encourage segregation of wastes by providing separate bins and collecting them regularly.</li> <li>- Provide enclosed waste receptacles and include waste handling in lease agreements to encourage occupier responsibility.</li> <li>- Use fire resistant materials where possible</li> <li>- Provide suitable fire appliances and measures to address prevention, control and emergency procedures including fire escapes and signs.</li> <li>- Install low noise generators and provide proper exhausts away from occupied sections.</li> </ul>	Proponent	No added cost	On occupation

	COMPONENT	PROJECT ACTIVITIES	NEGATIVE IMPACTS	MITIGATION MEASURES	RESPONSIBILITY	APPROX. COST KSHS	TIME FRAME
<b>DECOMMISSIONING</b>	Environmental issues	Clearing of unused materials	- Accidents/ dust exposure	- Workers should be provided with protective clothing to protect from diseases and injury/ death	Proponent	5000	After closure
		Dismantling of equipment	- Accidents and related hospital expenses - Loss of investment income	- Ensure safe work procedures are followed - Sell scrap and other useful pieces as second hand to recover some capital.	Proponent	None	After site closure
		Site withdrawal	- Interference with ground water and surface drainage.	- Drainage channels could be maintained if the structure is converted or demolished.	Proponent	None	Once



## **9.3 Conclusion and Recommendation**

### **9.3.1 Conclusion**

The results of this ESIA report have indicated that there will be very few significant negative impacts likely to be generated by the project since it will only a perimeter wall in an area that is not along a drainage channel or course way. The proposed development is a welcome investment which will offer accommodation and is a major investment opportunity for the proponent.

All negative environmental impacts should be adequately mitigated to reduce the damage to the environment and where positive impacts are identified they should be enhanced appropriately. Most of the potential negative impacts from the proposed project have been rated as low (0) and those rated as high (1) are of positive nature and beneficial to all the effected stakeholders. Those impacts rated as high (-1) may be adequately mitigated and therefore may not be grounds for not approving the project.

It is therefore concluded that the proposed project will not compromise the wellbeing of the residents of Nairobi City or environmental conditions but will instead create employment and investment opportunities.

### **9.3.2 Recommendations**

It was therefore recommended that the proposed project be approved subject to the following conditions:-

- The proponent will adhere to proper environmental practices.
- The proponent will comply with the laws of the country.
- Construction will take the minimum period possible.
- Proponent will ensure implementation of the proposed EMP.

## 10.0 ANNEXES AND THE TERMS OF REFERENCE

### 10.1 Terms of reference (TOR)

#### 10.1.1 Activities by the Firm of Experts

- The Firm of Experts shall conduct an ESIA as per guidelines by NEMA
- The firm shall recommend appropriate measures to mitigate the potential negative impacts
- The firm shall provide an ESIA report in a format that is acceptable to the National Environment Management Authority (NEMA)

#### 10.1.2 Expected outputs

- ESIA report and an Environmental Management Plan (EMP).

#### 10.1.3 Responsibility of the client

- Pay for samples tests applicable to the ESIA.
- Pay consultancy fees for the ESIA to the Firm of Experts

### 10.2 List of Annexes

- Standards for discharge into the Environment
- Standards for effluent discharge into public sewers.
- Recommended insurance schemes
- Copies of Signed questionnaires
- Copies of building plans
- Copy of approved Terms of Reference
- Copy of ownership documents

## REFERENCES

- (a) UNEP and ACTS (2001). Making of a framework environmental law in Kenya. ACTS press, Nairobi
- (b) Environmental Legislation in Kenya (Various Acts of Parliament with bearing on the proposed project.
- (c) Kenya gazette supplement number 56, (Environmental Impact Aspects and Audit Regulations 2003). Government printer, Nairobi

**Quality Standards for sources of domestic water (First Schedule)**

<b>Parameter</b>	<b>Guide Value (max allowable)</b>
pH	6.5 – 8.5
Suspended solids	30 (mg/L)
Nitrate-NO <sub>3</sub>	10 (mg/L)
Ammonia -NH <sub>3</sub>	0.5 (mg/L)
Nitrite -NO <sub>2</sub>	3 (mg/L)
Total Dissolved Solids	1200 (mg/L)
Scientific name (E.coli)	Nil/100 ml
Fluoride	1.5 (mg/L)
Phenols	Nil (mg/L)
Arsenic	0.01 (mg/L)
Cadmium	0.01 (mg/L)
Lead	0.05 (mg/L)
Selenium	0.01 (mg/L)
Copper	0.05 (mg/L)
Zinc	1.5 (mg/L)
Alkyl benzyl sulphonates	0.5 (mg/L)
Permanganate value (PV)	1.0 (mg/L)

Nil means less than limit of detection using prescribed sampling and analytical methods and equipment as determined by the Authority.

**And any other parameters as may be prescribed by the Authority from time to time**

## Standards for effluent discharge into the environment

Parameter	Max Allowable(Limits)
1,1,1-trichloroethane (mg/l)	3
1,1,2-trichloroethane (mg/l)	0.06
1,1-dichloroethylene	0.2
1,2-dichloroethane	0.04
1,3-dichloropropene (mg/l)	0.02
Ammonia, ammonium compounds, NO <sub>3</sub> compounds and NO <sub>2</sub> compounds( Sum total of Ammonia-N times 4 plus nitrate-N and Nitrite-N) (mg/l)	100
Arsenic (mg/l)	0.02
Arsenic and its compounds (mg/l)	0.1
Benzene (mg/l)	0.1
Biochemical Oxygen Demand (BOD 5days at 20 <sup>o</sup> C) (mg/l)	30
Boron (mg/l)	1.0
Boron and its compounds - non marine (mg/l)	10
Boron and its compounds -marine (mg/l)	30
Carbon tetrachloride	0.02
Chemical Oxygen Demand (COD (mg/l)	50
Chromium VI (mg/l)	0.05
Chloride (mg/l)	250
Chlorine free residue	0.10
Chromium total	2
cis -1,2- dichloro ethylene	0.4
Copper (mg/l)	1.0
Dichloromethane (mg/l)	0.2
Dissolved iron (mg/l)	10
Dissolved Manganese(mg/l)	10
E.coli (Counts / 100 ml)	Nil
Fluoride (mg/l)	1.5
Fluoride and its compounds (marine and non-marine) (mg/l)	8
Lead (mg/l)	0.01
Lead and its compounds (mg/l)	0.1
n-Hexane extracts (animal and vegetable fats) (mg/l)	30
n-Hexane extracts (mineral oil) (mg/l)	5

Oil and grease	Nil
Organo-Phosphorus compounds (parathion,methyl parathion, methyl demeton and Ethyl parantrophyenyl phenylphosphorothroate, EPN only) (mg/l)	1.0
Polychlorinated biphenyls, PCBs (mg/l)	0.003
pH ( Hydrogen ion activity----marine)	5.0-9.0
pH ( Hydrogen ion activity--non marine)	6.5-8.5
Phenols (mg/l)	0.001
Selenium (mg/l)	0.01
Selenium and its compounds (mg/l)	0.1
Hexavalent Chromium VI compounds (mg/l)	0.5
Sulphide (mg/l)	0.1
Simazine (mg/l)	0.03
Fluoride (mg/l)	1.5
Total Suspended Solids, (mg/l)	30
Tetrachloroethylene (mg/l)	0.1
Thiobencarb (mg/l)	0.1
Temperature (in degrees Celsius) based on ambient temperature	± 3
Thiram (mg/l)	0.06
Total coliforms ( counts /100 ml)	30
Total Cyanogen (mg/l)	Nd
Total Nickel (mg/l)	0.3
Total Dissolved solids (mg/l)	1200
Colour in Hazen Units (H.U)	15
Detergents (mg/l)	Nil
Total mercury (mg/l)	0.005
Trichloroethylene (mg/l)	0.3
Zinc (mg/l)	0.5
Total Phosphorus (mg/l)	2 Guideline value
Total Nitrogen	2 Guideline value

And any other parameters as may be prescribed by the Authority from time to time

#### Remarks

Standard values are daily/monthly average discharge values. Not detectable (nd) means that the pollution status is below the detectable level by the measurement methods established by the Authority.

**Recommended insurance schemes**

<b>Item No</b>	<b>Type of insurance policy</b>	<b>Scope of coverage</b>
<b>1</b>	Work injury benefits (common law)	Covering employers legal liability under common law
<b>2</b>	Work Injury Benefits Act	Covering employer's legal liability under the Work Injury Benefits Act.
<b>3</b>	Group personal accident	Covering site managers supervising engineer etc
<b>4</b>	Public liability	Covering third party liability to death, or bodily injury and property damage at the insured's premises or anywhere else where the insured may be carrying out their work.