ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR PROPOSED RESIDENTIAL APARTMENT AND BOREHOLE ON LAND PARCEL PLOT LR. NO. 26806/12, LOCATED AT SOUTH C AREA, NAIROBI COUNTY.

PROJECT PROPONENT

C. MARANGA HOLDINGS LIMITED
P.O. BOX 46300 – 00100
NAIROBI.

FIRM OF EXPERTS

INTER ARCHITECTS LIMITED
P.O. BOX 5015-00506
NAIROBI.

GENERAL PROJECT SUMMARY

PROJECT TITLE

Environmental Impact Assessment report for proposed residential apartment and borehole on land parcel plot lr. no. 26806/12, located at South C Area, Nairobi County.

PROJECT LOCATION

The project site located at South C area, Lang'ata constituency in Nairobi County. The project land parcel is plot lr. no. 26806/12 and it lies on coordinates latitude: $1^0$19'00.8" south and longitude: $36^0$49'29.5" east.

PROJECT PROPONENT

C. Maranga Kenya Holdings Limited
P.O. Box 40238
Nairobi

CONTACT PERSON

Charles M. Maranga
0722 837 371

PROJECT ESTIMATE BUDGET

Kshs. 190,450,000/=

PIN NUMBER

A000122935A

LEAD EXPERT

Patrick Mugo Karugo,
NEMA Reg. No. 0742,
0722 515 475

ASSOCIATE EXPERT

Gladwell Waithira Kiarie
NEMA Reg. No. 9022
0722 287 316

COORDINATES

Latitude: $1^0$19'00.8" South
Longitude: $36^0$49'29.5" East

ELEVATION

1,662 meters

CERTIFICATION

The report has been done with reasonable skills, care and diligence in accordance with the Environmental Management and Coordination Act No. 8 of 2015, and the Integrated Environmental Impact Assessment Regulations, 2018.

We certify that the particulars given in this report are correct to the best of our knowledge.

CONSULTANT FIRM

INTER ARCHITECTS LIMITED

Firm of Expert .....

P.O BOX 5015-00506 NAIROBI

Address

.....

interarchitects@gmail.com or interarchitects2019@gmail.com

E-mail. .....

NEMA/EIA/ERPL/5676

NEMA License No. .....

1727

NEMA Registration No. .....

14/10/2021

Stamp ..... Date .....

LEAD EXPERT

PATRICK M. KARUGO

Lead Expert Name .....

Patkarugo@gmail.com

E-mail .....

0742

NEMA REG. Certification No .....

14/10/2021

Signature ..... Date .....

PROPONENT

C. MARANGA KENYA HOLDINGS LIMITED

Names .....

P.O BOX 40238, NAIROBI.

Address .....

E-mail .....

14/10/2021

Signature..... Date.....

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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AIPS	Affected and Interested Parties
CBD	Central Business District
CCTV	Closed Circuit Television
CPP	Consultations and Public Participation
EA	Environmental Audit
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
ERC	Energy Regulatory Commission
ERP	Emergency Response Plan
ESH	Environmental Sanitation and Hygiene
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
GDP	Gross Domestic Product
GHG	Green House Gases
HIV	Human Immuno-deficiency Virus
ILO	International Labor Organization
ISWMS	Integrated Solid Waste Management System
KBS	Kenya Bureau of Standards
KEBS	Kenya Bureau of Standards
KPLC	Kenya Power and Lighting Company
LED	Light Emitting Diode
LPG	Liquified Petroleum Gas
NCA	National Construction Authority
NCCRS	National Climate Change Response Strategy
NCSWC	Nairobi County Sewerage and Water Company
NEAP	National Environmental Action Plan
NEC	National Environment Council

NEMA	National Environmental Management Authority
NET	National Environment Tribunal
NGO'S	Non-Government Organisations
NLC	National Land Commission
NPEP	National Poverty Eradication Plan
OSHA	Occupational Safety and Health Act
PAP	Project Affected Persons
PEP's	Personal Protective Equipment's
SDG	Sustainable Development Goals
SPSS	Statistics Packages for Social Sciences
STDs	Sexually Transmitted Diseases
STIs	Sexually Transmitted Infections
UN	United Nations
UNCED	United Nations Conference on the Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WCC	Waste Collection Centre
WIBA	Work Injury Benefit Act

EXECUTIVE SUMMARY

Introduction

Environmental Impact Assessment is a tool for environmental conservation and has been identified as a key component in new project implementation. According to section 58 of the Environmental Management and Coordination Act (EMCA) No.8 of 1999 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 Management Authority (NEMA) for approval and issuance of relevant certificates. This was necessary as many forms of developmental activities cause damage to the environment and hence the greatest challenge today is to maintain sustainable development without interfering with the environment. We live in an urbanizing world. Though rates of urban growth and conditions inside cities vary enormously, the proportion of the global population who live in urban areas continues on the rise everywhere. According to current projections, by the turn of the century more than three billion people - one half of the world's population - will live and work in towns and cities.

Currently the rates of urbanization and population growth worldwide are increasing fast and with it come the need for improvement in service provision especially in our urban areas. Kenya being a developing country is urbanizing very fast and hence experiencing the challenges of urbanization.

Kenya's rates of urbanization are escalating and being a developing country; most of its urban population is forced to live in slums. It's in line with this thus there's need for improved provision of housing services and especially low cost housing to cater for the low and middle income earners who can't afford to build their own houses. This is a goal that is to be achieved through deliberate policies and plans that are aimed at spurring economic growth and social development. With the ever increasing rates of urbanization and increasing population growth rates, the housing sector in Kenya if not well addressed is bound to impact negatively on the environmental attributes of the project areas and its surroundings.

The Habitat Agenda states that "Adequate shelter means more than a roof over one's head. It also means adequate privacy; adequate space; physical accessibility; adequate security; security of tenure; structural stability and durability; adequate lighting, heating and ventilation; adequate basic infrastructure, such as water-supply, sanitation and waste-management facilities; suitable environmental quality and health-related factors; and adequate and accessible location with regard to work and basic facilities: all of which should be available at an affordable cost." Adequate shelter is thus not only a matter of the quality of the structure in which people live. In 1990, it was estimated that 17 per cent of the world's stock of housing was one-room units, of which some three quarters were in developing countries. Some 42 per cent of rural and 35 per cent of urban dwellings in Africa are single-roomed. In Kenya for example, 59.3 per cent of all urban dwellings in the eight largest cities/towns were single-roomed by 2002. Housing is thus an obvious and pressing human need in Kenya. Until recently, when NEMA was established, the formidable task of providing sufficient housing for a burgeoning urban population has overshadowed environmental considerations.

Housing Schemes are large-scale housing projects with multiple units designed as integrated schemes on single tracts of land. During and after the implementation of such projects,

experience suggests that negative environmental impacts may be severe due to less enforcement of environmental regulatory standards. The Kenyan government has attempted to provide decent housing to its urban population through several strategies one of which is through the private sector. This is intended to stimulate economic and social development of the residents through provision of social amenities and services that would make life both meaningful and honorable.
This Environmental Impact Assessment examined the potential positive and negative impacts of the project on the immediate surroundings with due regard to all the phases from construction, occupation and decommissioning. It encompassed all aspects pertaining to the physical, ecological, socio-cultural, health and safety conditions at the site and its environs during and after construction.
Environment, Health and Safety (EHS) section addresses environmental, health and safety concerns during projects' cycle. The main objective of the EHS on the proposed project is to develop guidelines for protecting, managing and responding, processes, situations/conditions that might compromise health, safety and security of workers and ecological wellbeing. To avoid or reduce negative environmental impacts, mitigation measures were proposed and an environmental, social monitoring and management plan (ESMMP) formulated. The proponent is also expected to observe recommendations in the ESMMP and carry out annual environmental audits once the project is in operation.

Scope of the Study

The scope of the study covered the construction development works of the project proposed, which include ground preparation, masonry, and installation of service lines as well as the other necessary utilities.
The output of this work was a comprehensive Environmental and Social Impact Assessment study report for the purposes of applying for an EIA license.
The consultant on behalf of the proponent conducted the study by incorporating but not limited to the following terms of reference:

i). The proposed location of the proposed development and its associated infrastructure.
ii). A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
iii). The objectives of the proposed project.
iv). The technology, procedures and processes to be used, in the implementation of the project.
v). The materials to be used in the construction and implementation of the project.
vi). The products, by-products and waste to be generated by the project.
vii). A description of the potentially affected environment.
viii). The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
ix). To recommend a specific environmentally sound and affordable wastewater management system.
x). Analysis of alternatives including project site, design and technologies.

xi). An environmental and social monitoring and management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including cost, timeframe and responsibility to implement the measures.
xii). Provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out the development activities.
xiii). Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies.
xiv). An identification of gaps in knowledge and uncertainties, which were encountered in compiling the information.
xv). An economic and social analysis of the project
xvi). Such other matters as the Authority may require.

Anticipated Projects Impacts and Mitigation Measures

There are both negative and positive impacts associated with the proposed project. In general, the following positive and negative impacts are expected to be associated with the proposed project.

Positive Impacts

- Creation of jobs and employment opportunities
- Increase of housing facilities
- Maximum utilization of the available land as a resource
- Improvement in landscape view of the area
- Fulfilment of proponents' desires
- Improved growth and boost of the economy
- Increased business opportunities
- Increased revenue to national and local governments amongst others
- Improved local area security and lighting.

Negative Impacts

Table 1: Anticipated Potential Negative Impacts and Mitigation Measures

Potential Negative Impacts	Mitigation Measures
Increased generation of solid and liquid waste	❖ Proper disposal of construction waste in designated and approved sites ❖ Provision of waste management facilities such waste bins at designated areas. ❖ Contract the services of NEMA registered waste collectors to dispose the waste at designated areas approved by County Government of Nairobi in consultation with NEMA. ❖ Comply with the Waste Management Regulations 2006
Air pollution	❖ Regular monitoring of the quality of air during the construction period ❖ Screening of the construction site to trap construction-

Potential Negative Impacts	Mitigation Measures
	related dust. ❖ Dust minimization through watering dusty areas during the construction. ❖ Exposed stockpiles of e.g., sand, shall be covered ❖ Regular maintenance of construction machinery and equipment to minimize generation of hazardous emissions. ❖ Comply with EMCA (Air quality) Regulations 2014.
Noise pollution and excessive vibrations	❖ Construction works shall be carried out during the day between 8.00am to 6.00pm ❖ Provide and enforce use of Personal Protective Equipment (PPEs) e.g., earmuffs and helmets during construction. ❖ The use of noise shields on noisy equipment. ❖ Monitor Noise and Excessive Vibrations levels especially during excavation
Increased water demand and use	❖ Use water from bowsers and tankers from external sources during construction. ❖ Provide roof and underground water storage tanks ❖ Provide alternative sources of water borehole, rain water harvesting and adequate storage facilities.
Increased energy demand and use	❖ Use energy efficient electrical appliances and fixtures such as bulbs. ❖ Use of solar energy as alternative energy supply for the project. ❖ Install water heating systems as per the Solar Water Heating Regulations, 2012
Work related accidents and injuries	❖ Employ skilled and trained workers, provide protective clothing. ❖ Prepare clear work schedule and the organization plan. ❖ Have adequate worker insurance cover ❖ Enforce occupational health and safety standards.
Oil leakage and spills	❖ All machinery shall be keenly inspected not to leak oils on the ground. This can be ensured through regular maintenance. ❖ Install oil trapping equipment in areas where there is a likelihood of oil spillage ❖ Maintenance will be carried out in a well-designed and protected area and where oils/grease is completely restrained from reaching the ground. Such areas should be covered to avoid storm from carrying away spilled

Potential Negative Impacts	Mitigation Measures
	oils into the soil/water systems. ❖ All oils/grease and materials will be stored in a site's store, in the contractor's yard. ❖ Proper disposal of oil handling materials such as drums, oily clothes/papers/materials and cans. ❖ All drainage facilities shall be fitted with adequate functional oil-water separators and silt traps. ❖ Collect the used oils and re-use, re-sell, or dispose of appropriately using expertise from contracted licensed waste handlers;
Emergence and spread of social vices	❖ To minimize project effects on local social set up, the proponent will; ❖ The contractor shall ensure that there is adequate street lighting and a security guard within the site to help curb with issues that may arise from theft. Also installing 24hr operating CCTV surveillance, which will be monitored regularly. ❖ It is recommended that the contractor employs workers from the immediate area where possible to avoid social conflict ❖ Conduct periodic sensitization forums for employees on ethics, morals, general good behaviour and the need for the project to co-exist with the neighbours. ❖ Offer awareness, guidance and counselling on HIV/AIDS and other STDs to employees; ❖ Provide safety tools such as condoms to employees ❖ Ensure enforcement of relevant legal policy on sexual harassment and abuse of office.
Surface Run-off and Storm Water Drainage	❖ Semi permeable materials will be used for construction of pavements.

Potential Negative Impacts	Mitigation Measures
	❖ After completion of construction, the proponent shall embark on comprehensive landscaping. ❖ Drainage channels shall be covered; say with gratings, to avoid occurrence of accidents and entry of dirt. ❖ Construct gently sloping drains to convey water at non-erosive speed.

Conclusions and Recommendation

In conclusion, results from EIA study show that the proposed residential apartment development project has significant impacts on the environment. Implementation of an Environmental and Social Monitoring and Management Plan (ESMMP) will assist in dealing with environmental and social issues during the project cycle. There are also guidelines for addressing environmental health and safety. This project is recommendable for approval by the National Environment Management Authority (NEMA) for issuance of an EIA license subject to annual environmental audits after operating for one year. This will be in compliance with the Environmental Management and Coordination Act of 1999 and the Environmental Impact Assessment and Audit regulations, 2003.

INTRODUCTION

1.1 General Overview

The Kenyan constitution which is the supreme law of the country empowers every citizen with a right to accessible and adequate development coupled with reasonable standards of sanitation. These developments include access to decent affordable housing where it is generally defined as housing that consumes less than 30 percent of a family's income and often enables families to enjoy stability, good health, employment, education, and recreation. Affordable housing programmes in turn contribute to the physical, economic, environmental, and social wellbeing and sustainability of communities (Millennial Housing Commission, 2002). According to the World Bank, 2017 report on Kenya economic update on unavailable and unaffordable housing, there is an estimated accumulated housing deficit of over 2 million units. This is as a result of the increased population, rapid urbanization and current production of less than 50,000 units annually. This is due to the rapid population growth of 2.6 per cent per annum, compared to the global average of 1.2 per cent, and an urbanization rate of 4.4 per cent against the global average of 2.1 percent. This means that urbanized areas such as Nairobi City County welcomes 0.5 million new city dwellers annually. According to World Bank (2011), the city was estimated to have 3.2 million residents, 1 million of which lived in slums with only 3 per cent living in houses with permanent walls, electricity and water.

The prevailing trending situation has seen the implementation of various efforts and strategies to improve the housing situation in Nairobi and the country at large in order to meet the rising demand. Reference is made to the 'Big Four (4) Agenda' by the government whose goal (among three others) is to provide affordable housing for all Kenyans. The housing programme aims at providing approximately 500,000 housing units to lower income households and other underserved populations in all forty-seven (47) counties by 2022; 30,000 of them will be constructed in the first phase to account for at least 30 percent of the current city housing market. (Parliamentary Service Commission, 2018)

It is in this light that the developer, C. Maranga Kenya Holdings Limited, proposes to develop one hundred and twenty (120) residential bedsitter units on land parcel plot LR No. 26806located within South C area, Lang'ata constituency of Nairobi County so as to meet the increasing demand for standard, habitable and affordable houses while adhering to environmental and social best practices, Nairobi City County Zoning Regulations as well as other relevant laws and regulations.

1.2. Justification of the Project

Kenya's Affordable Housing Programme is one of the national government's four pillars of growth, in the President's Big Four Plan. The government recently unveiled its plan to ensure that all Kenyans enjoy their right to decent housing through an initiative dubbed 'The National Affordable Housing Programme' in the Big Four Agenda. Its aim is to enable the low to middle income citizens of Kenya acquire homes at subsidized prices. The government intends to construct 500,000 housing units distributed all over the 47 counties by 2022 and this involves a number of incentives and support to enable the delivery of affordable housing by various stakeholders and investors in Kenya.

The proposed project aims at addressing housing facilities shortage in the city as manifested by overcrowding and spread of slums and squatter settlements in many parts of Nairobi where the low and middle-income urban population is forced to live in dilapidated conditions, with no security of tenure, limited access to water, sewerage and power systems, and a myriad of social issues.

The proponent is aware that an Environmental Impact Assessment (EIA) is a statutory requirement under Environmental Management and Coordination Act No. 8 of 2015, and the Integrated Environmental Impact Assessment Regulations, 2018. The expert undertook the study with the objective of identifying both positive and negative impacts of the proposed project; provide counter measures for the negative impacts and optimize the positive ones and come up with an Environmental Management Plan (EMP) as per the terms of reference (TOR).

The EMP will be useful in managing the activities at the site so that potential and actual impacts to the environment are addressed.

The report has also provided guidelines on how to mitigate the negative environmental impacts and is confident that they will be implemented by the proponent. The EMP will also be an excellent reference tool for compliance audits in future. This is in line with the statutory requirements and the guidelines issued by NEMA.

1.3. Scope, Objective and Criteria of the Environmental and Social Impact Assessment (ESIA)

1.3.1. Scope

The Kenya Government policy on all new projects, programmes or activities requires that an environmental impact assessment is carried out at the planning stages of the proposed undertaking is to ensure that significant impacts on the environment are taken into consideration during the project design, site clearance including construction, operation and decommissioning of the facility. The scope of this ESIA, therefore, covered:

i). The baseline environmental conditions of the area,
ii). Description of the proposed project,
iii). Provisions of the relevant environmental laws,
iv). Identification and discuss of any adverse impacts to the environment and social lives anticipated from the proposed project,
v). Appropriate mitigation measures,
vi). Provision of an environmental social monitoring and management plan outline.

1.3.2. Objective of the Environmental and Social Impact Assessment

The purpose of the ESIA was to ensure that the development options under considerations are environmentally sound and sustainable, and that any environmental and social consequences shall be recognized early in the projects cycle and taken into account during projects design. It also identifies ways of improving the projects environmentally, and minimizing, mitigating, or compensating for the adverse impacts. By alerting the projects designers and implementing agency to issues early, ESIA: -

a. Shall enable them to address environmental and social issues in a timely and practical fashion,

b. Reduce the need for projects conditionality, because appropriate steps shall be taken in advance or incorporated into projects design, and
c. Help avoid costs and delays in implementation due to unanticipated environmental and social problems.

The ESIA shall also provide a formal mechanism for inter-agency coordination and for addressing the concerns of the affected groups and local non-governmental organizations. In addition, they shall play a major role in building environmental capability in the country, like economic, financial, institutional, and engineering analyses, the ESIA is part of the project's preparation hence close integration with the other aspects of project preparation ensures that;

i. Environmental and social considerations are given due weight in projects selection, sitting, and design decisions, and
ii. Carrying out ESIA's does not unduly delay projects processing.

1.3.3. Objective of the Project

The objectives of the proposed project include:

i. To meet the economic desires of the proponent.
ii. To add more adequate, affordable and modern designed housing facilities within the area.
iii. To increase revenue base
iv. To create jobs and provide employment opportunities to the local people especially the youths
v. To improve the living standards of the locals
vi. To provide ready market for construction goods and services within and outside the project area.
vii. To boost both local and national economy.

1.3.4. Terms of Reference (TOR) for the ESIA Process

C. Maranga Kenya Holdings Limited, who is in here referred to as the proponent, contracted Inter Architects (Firm of Experts) as consultants to conduct an environmental and social impact assessment for the proposed development on plot Lr. No. 26806/12 in South C Area, Nairobi County. The scope of the assessment covered implementation works of the proposed development which included ground preparation, masonry works and development of associated utilities required by the project. The output of this work was a comprehensive Environmental and social impact full study project report for the purposes of applying for an EIA license and providing necessary mitigation measures that need to be put in place in order to protect the environment and neighboring residents.

It was recognized that any form of development such as the proposed project is likely to impact the site and the surrounding environment hence, before any commencement of any work, there was an urgent need to carry out an Environmental and Social Impact Assessment in compliance with the Environmental Management and Coordination Act (EMCA) of 1999 and Environmental Impact Assessment and Audit Regulations, 2003.

The ESIA included the necessary specialist studies to determine the environmental and social impacts relating to the biophysical, health and safety and socio-economic aspects and to determine the issues or concerns from the relevant authorities and interested and/or affected

parties. The appropriate measures to ensure co-existence of the proposed development with other social and economic activities in the area will be provided as part of an Environmental Management Action Plan.

The main objective of the assignment was to assist the project proponent to prepare a project report after carrying out an ESIA of the proposed project, so it takes into consideration appropriate measures to mitigate any adverse impacts to the environment. The study identified existing and potential environmental and social impacts and possible concerns that interested and/or affected parties have with the development, as well as the associated mitigation measures for the negative impacts as stipulated in the Environmental Social Monitoring and Management Plan (ESMMP).

The consultant on behalf of the project proponent conducted the study by incorporating but not limited to the following terms of reference: -

i. Location of the proposed project.
ii. A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
iii. The objectives of the project.
iv. The technology, procedures and processes to be used, in the implementation of the project.
v. The materials to be used in the construction and implementation of the project.
vi. The products, by-products and waste to be generated by the project.
vii. A description of the potentially affected environment.
viii. The environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
ix. Provide alternative technologies and processes available and reasons for preferring the chosen technology and processes.
x. Analysis of alternatives including project site, design and technologies.
xi. An environmental management plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
xii. Provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out development activities.
xiii. Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management in case of emergencies.
xiv. An identification of gaps in knowledge and uncertainties which were encountered in compiling the information.
xv. An economic and social analysis of the project.
xvi. Such other matters as the Authority may require.

1.3.5. Methodology Outline

Since the proposed project site is located within an area that has no natural resources whose total effect to the surroundings could not be adverse and noting that the intended development and use will be in line with what is currently existing, an environmental and social full study project

report would be adequate for licensing. The general steps followed during the assessment were as follows:

1. Environment screening, in which the project was identified as among those requiring environmental impact assessment under schedule 2 of EMCA, 1999
2. Environmental scoping that provided the key environmental and social issues
3. Desktop studies, evaluation checklist and interviews
4. Physical inspection of site and surrounding areas
5. EIA Consultations, public forum and Public Participations (CPP) by the use of administered questionnaires
6. Reporting.

1.3.5.1. Environmental Screening

This step was applied to determine whether an environmental impact assessment was required and what level of assessment was necessary. This was done in reference to requirements of the EMCA, 1999, and specifically the second schedule. Issues considered included the physical location, sensitive issues and nature of anticipated impacts.

1.3.5.2. Environmental Scoping

The Scoping process helped narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, natural/ecological, social, economic and cultural aspects.

1.3.5.3. Desktop Study

This included documentary review on the nature of the proposed project activities, project documents, plans, designs, policy and legislative framework as well as the environmental setting of the area among others. It also included discussions with the project affected/interested persons, stakeholders and design engineers as well as interviews with random neighbors.

1.3.5.4. Site Reconnaissance Survey and Assessment

Field visits were meant for physical inspections of the site characteristics and environmental and socio-economic status of the surrounding areas to determine the anticipated impacts. It also included observations, taking of photos and interviews with random members of the surrounding.

1.3.5.5. Consultation and Public Participation

To ensure adequate consultations and public participation in the ESIA process, questionnaires were prepared and administered to the project interested/affected person's, residents and businesses/enterprises within the project site surrounding more specifically the immediate neighbors to the proposed site and the information gathered was subsequently synthesized, analysed and incorporated into the ESIA full study project report.

1.3.5.6. ESIA Organization and Structure

The ESIA was carried out to full completion under the guidance of the lead expert assisted by an associate expert, environmental assistant and a sociologist where they coordinated the day-to-day functions and any related institutional support matters. Otherwise, all requirements by NEMA with regard to the assessment were formally communicated to the project proponent.

1.3.5.7. Responsibilities and Undertaking

The Consultant (Firm of Experts) undertook to meet all logistical costs relating to the assignment, including those of production of the report and any other relevant material. The consultant arranged for own transport and travels during the exercise. The proponent provided site plan showing roads, service lines, buildings layout and the actual sizes of the sites, details of raw materials, proposed process outline and anticipated by-products, future development plans, operation permits and conditions, land-ownership documents and site history, and estimated investment costs.

1.3.5.8. Reporting and Documentation

The Environmental and Social Impacts Assessment Project Report from the findings was compiled in accordance with the guidelines issued by NEMA for such works and was prepared and submitted by the project proponent for consideration, approval and licensing. The Consultant ensured constant briefing of the client during the exercise. Description designs, plans and sketches showing various activities are part of the appendices.

The output from the consultants includes the following:

1. An Environmental Impact Assessment report comprising of an executive summary, study approach, baseline conditions, anticipated impacts and proposed mitigation measures,
2. A Social Impact Assessment report comprising of an executive summary, introduction, study methodology, results, conclusion and recommendations.
3. An Environmental and Social Monitoring and Management Plan outlines which also forms part of the report recommendations

PROJECT DESIGN, DESCRIPTIONS AND IMPLEMENTATION

2.1. Nature of the Proposed Project

The proposed housing development project shall comprise of one block with ten floors. Each floor will consist of twelve (12) bedsitter units. The project will entail a total of one hundred and twenty (120) units, a high-speed lift, a borehole, parking space and other salient and auxiliary facilities. The development aims at providing quality, affordable, decent and modern housing units for residents within south C and Nairobi County at large and increase the utility of land in the area. Currently, the site is occupied by an existing built up single residential dwelling which will be decommissioned to pave way for the proposed project development.

2.2. Project Site Location and Size

The project site located in South C area, Lang'ata constituency in Nairobi County. The project land parcel is plot lr. no. 26806/12 and it lies on coordinates latitude: $1^0$19'00.8" south and longitude: $36^0$49'29.5" east. The site is at distance of approximately measure of 0.26Km from Kenya Water Institute or from Oleshapara avenue road. The project site approximately measures to 0.0428 hectares.

Figure 1: Google Earth Image on Project Site and its Surrounding.

2.3. Land Tenure, Use, Ownership and Management

The parcel of land on which the subject development project is proposed belongs to C. Maranga Kenya Holdings Limited, proponent to the development project. The certificate of ownership land title is drawn under the Registration of Titles (Chapter 281) as Plot L.R. No. 26806/12.
Current, management of the property is under the care of C. Maranga Kenya Holdings Limited.

2.4. Project's Neighboring and Surrounding

The neighboring area is occupied mainly by residential estates and apartments (such as Akiba court phase III, Belco apartments, Vivienda Oleshapara, 5 Star apartment, Aljazeera residency and among others), learning institutions (such as Kenya Water Institute), Restaurants and hotels, commercial premises, health facilities, worship centers and parastatal offices which are located within the project area.

Figure 2: Presence of residential developments surrounding the site

Figure 3: Developments Within Project Site Area.

2.5. Designs and Plans of the Proposed Project

In general, the design of the project will tend to essentially optimise the use of best available technology to prevent or minimize potential environmental and social impacts associated with the project and to incorporate efficient operational controls together with trained staff, to ensure high level business and environmental performances. The project development plans and design will constitute of one (1) block with ten (10) floors. Other components that will make up the development includes;

1. Ground floor level will be used as parking space for vehicles by residents. The whole parking space is designed in such a way that it can accommodate a total of sixteen (16) cars. Other components to be included in this level are:

i. Common gate
ii. Generator room
iii. Underground water tank
iv. Pedestrian walkway and passage
v. Lift lobby

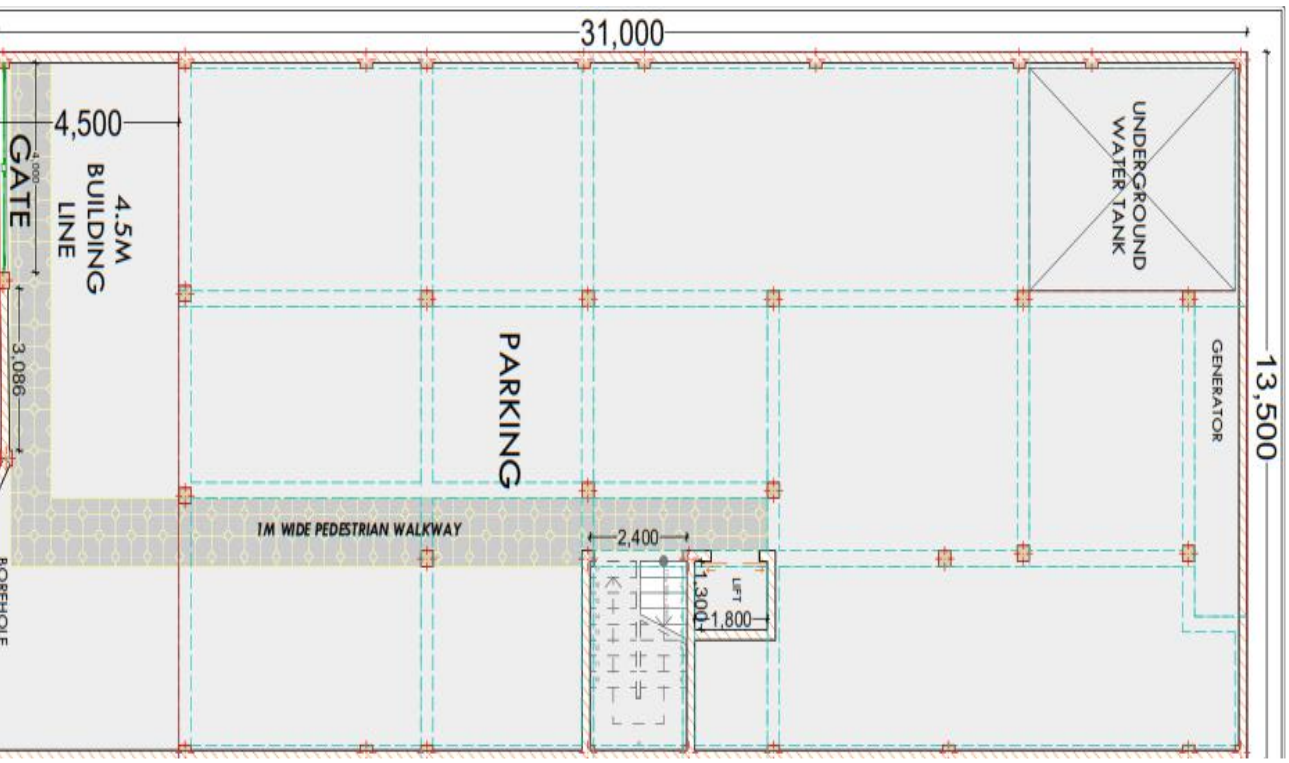

Figure 4: Architectural Ground Floor Plan

2. Typical 1st -10th floor levels will comprise of twelve (12) bedsitter units on each floor and of which will also consist of the following;

i. Fitted kitchen
ii. Bathrooms and washrooms
iii. A balcony
iv. Passage

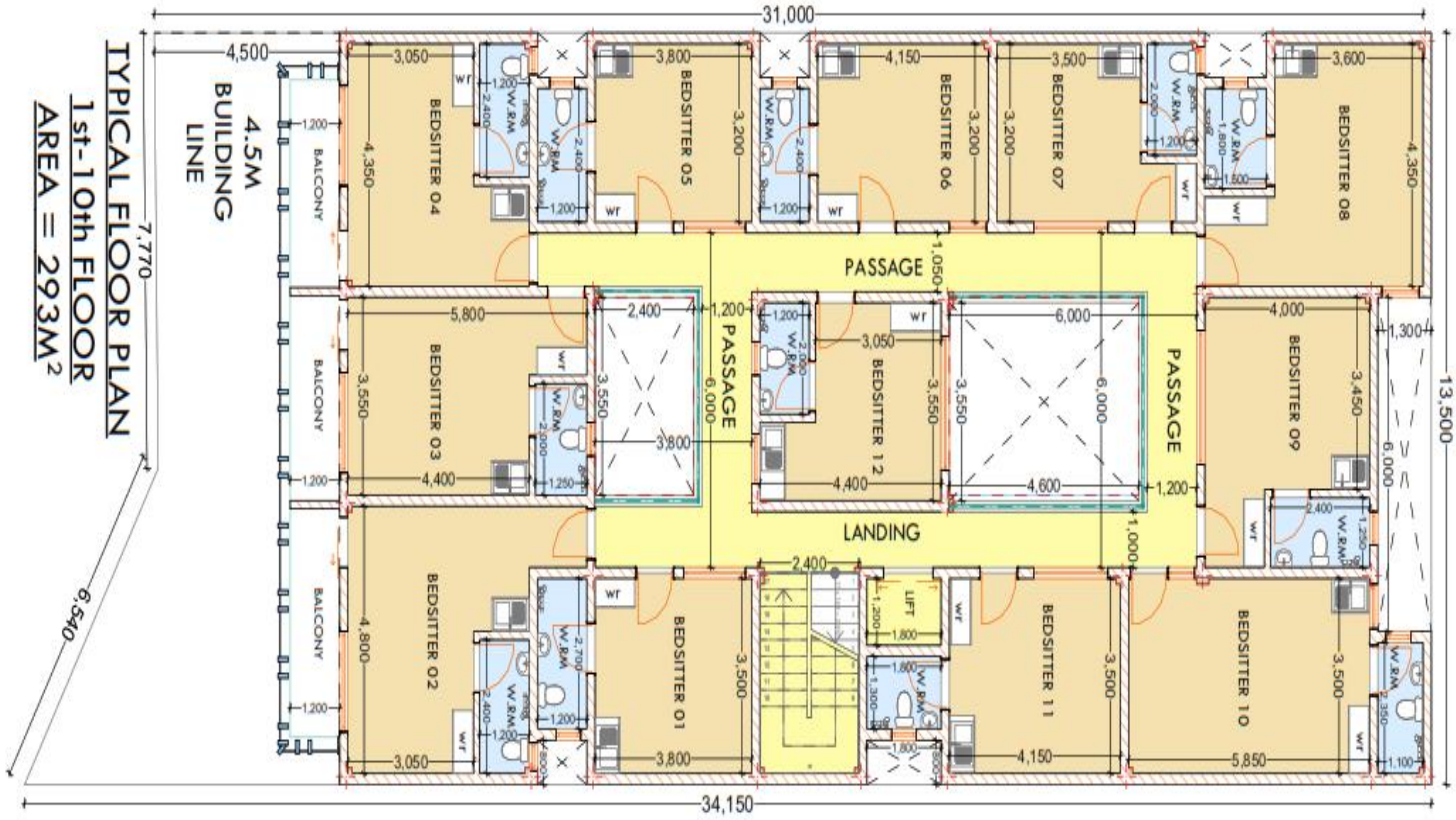

Figure 5: 1st -10th Floor Architectural Plan.

3. Roof top level will constitute of;

i. A water tank room.

ii. Kitchen

iii. Store
iv. Cafeteria
v. Laundry
vi. Machine room
vii. Passage and roof top terrace

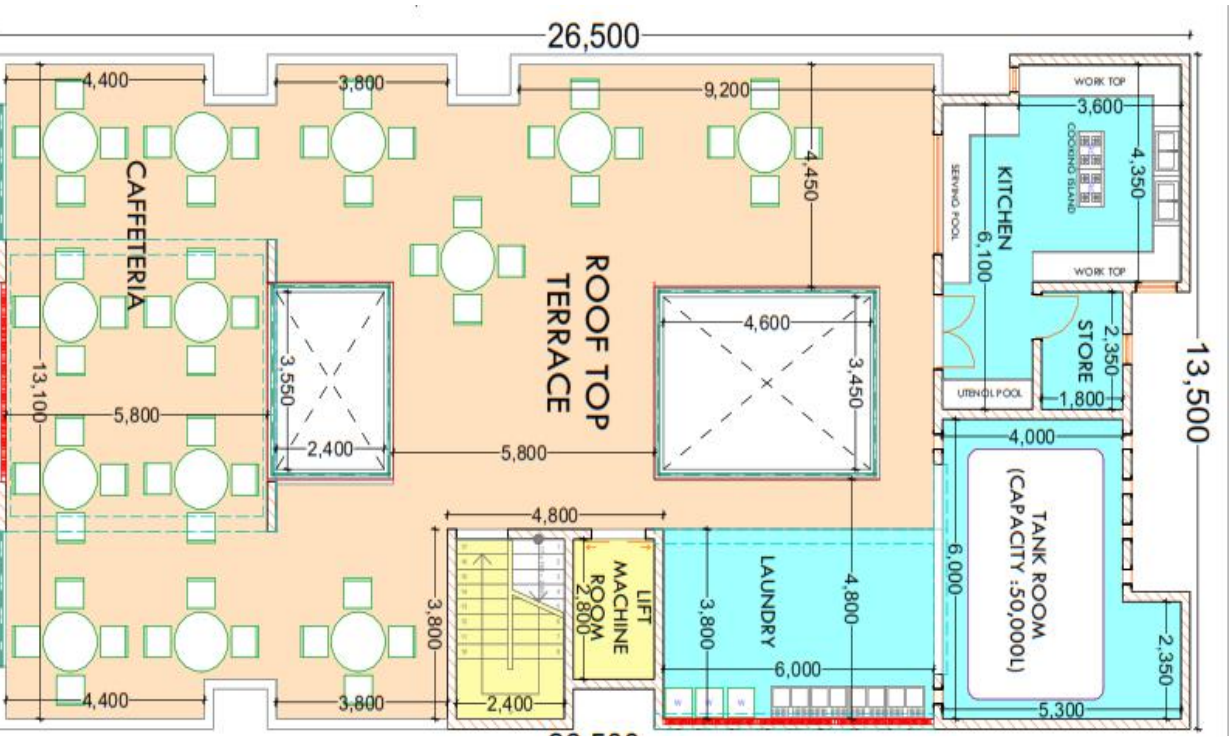

Figure 6: Architectural Roof Top Plan

4. Other salient and auxiliary features for the proposed development will include;

i. Borehole
ii. High speed lift
iii. A power backup generator
iv. Generator room
v. Staircases and verandas
vi. Carbo fitted pathways
vii. Solar water heater
viii. Firefighting and safety equipments
ix. A gate house and a common gate
x. Storm water drainages
xi. 24 hrs. CCTV surveillance cameras
xii. Security lights
xiii. Solid waste disposal and collection facilities
xiv. Underground water tanks
xv. Boundary wall
xvi. Security guards

(*Find copies of approved architectural plans and designs drawings attached as appendices*)

The proposed development will also be fitted, connected and served with the existing infrastructural facilities such as water provision services system, sewer waste disposal channel system, power and electricity connectivity service from the power grid, solid waste management and disposal collection point, etc. The proposed project is in line with the zoning of the area that permits developments as such housing units' facilities.
The following services, infrastructures and facilities were considered and integrated during the plans, designs and implementation process of the project development as discussed below;

2.5.1. Solid Waste Management

Solid waste management will consist of color-coded bins for each type of waste in the building block and along the corridors at designated points. A NEMA registered garbage Collection Company will be contracted for collection and disposal of waste at a designated dumpsite.

2.5.2. Water Use and Waste Water Management

The proposed site will be connected to Nairobi City Water and Sewerage Company that serves the area. The proponent has also proposed to sink a borehole on site, so as to address city waters shortage and supply. Underground water storage tanks will be installed to supplement NCWSC water. All wastewater from the development will be channeled to the existing NCWSC serving the area while storm water will be channeled by gravity to the drainage facility channels serving the area.

2.5.3. Transport Network Infrastructure

The proposed site will have access roads that will connect the various functions within the area. There will be common passage and verandas within the development building.

2.5.4. Electricity Power and Energy

Kenya Power and Lighting Company (KPLC) will serve the facility for provision of electricity services. Power distributions will be done in a sustainable manner by employing the use of energy saving gadgets such as bulbs within the facility. Solar panels and generators will be installed within the facility to supplement the national grid supply.

Figure 7: Presence of KPLC Power Connectivity and Availability.

2.5.5. Lighting Systems

All functions within the facility will be fitted using the latest energy saving lighting equipment. Lighting will be dimmable and be under daylight and occupancy controls. To save on energy, provision is made for lighting controls with; daylight linked dimming, occupancy controls in spaces that are not continuously occupied including the car park. Solar panels will also be installed to provide renewable energy for lighting where necessary.

2.5.6. Safety and Security Systems

A 24-hour CCTV surveillance system will be installed with fixed cameras monitoring the main access points and final escape exits and additional key internal areas. An electric fence will be erected around the facility. Street lighting will also be put in place to increase security. A security firm will be contracted on full time basis by the facility management to provide security services. The facility will have common gate and contracted security personnel on guard.

2.5.7. Communication Infrastructure

A structured cabling network will provide a resilient, high bandwidth system for facility user services. Fibre internet will be connected to all residential areas and other facilities.

The proponent has also proposed the use of the existing service infrastructure such as water supply, electricity, sewer system, solid waste management and road network within the area.

2.5.8. Fire Outbreak Risks Occurrence, Response and Safety

Fire outbreak occurrence is likely to occur during the project development construction and operation phase. The outbreak occurrence is highly contributed by poor electricity connections, individual's ignorance and the don't know how. The developer to the proposed development has

proposed provision of firefighting and safety facilities and equipments e.g., fire extinguishers, water hose pipes, fire blankets, fire exists outlets among others at easily accessible designated areas within the premises. A firefighting response and safety registered company will be contracted to provide effective and efficient firefighting equipments at strategic easily accessible points within the building and also, they will be mandated with responsibility of regular inspection and maintenances of these equipments to ensure they are effective in responding to fire outbreak occurrence risks. Trained personnel will be present at site at all times throughout the development phases, where he will be responsible at addressing fire risks emergency when they occur and also in conducting fire drills.

2.6. Construction Inputs

The project proposed inputs will include the following:

1. The materials that shall be used will include stones, cement, sand, crushed rock (gravel/ballast), ceramic fixtures, reinforcement bars, wood/timber, glass, painting materials, plastic, electrical and mechanical fixtures. All these materials shall be obtained from licensed dealers who have complied with the environmental management guidelines and policies and approved by Kenya Bureau of Standards (KEBS).
2. Several machines shall be used which will include earth moving equipment (excavators, loaders, wheel loading shovels and backhoe), material handling equipment (cranes and hoists), construction equipment (concrete mixers and vibrators) and engineering vehicles (trailers, tippers and dumpers).
3. The project will also require labor forces of both skilled and non-skilled workers. The skilled personnel will include the project consultants (architects, engineers, quantity surveyors and environmental experts) and a contractor with a team of foreman, masons, plasterers, carpenters, plumbers, welders, electricians, glaziers, painters and casual laborers.
4. Other construction inputs will include wastewater and sewer disposal, water services provided by Nairobi County Sewer and Water Company (NCSWC), power and electricity connectivity and supply from the KPLC main power grid or provided by generators or solar panels.

2.7. Description of the Project's Pre-Construction and Construction Activities

2.7.1. Pre-Construction Phase

This stage shall involve:

i. Preliminary surveys and cost-benefit analysis to establish the need for an additional development
ii. Identification of any existing legal and regulatory requirements that may affect the project at any stage of its implementation
iii. Conducting a preliminary geotechnical exploration investigation for the project.
iv. Conducting a preliminary geotechnical exploration investigation for the project.
v. Preparation of the preliminary architectural designs for the proposed project and submission to the County Government for approval.
vi. Seeking of the appropriate approvals from the relevant authorities

vii. Appraisal of baseline conditions to determine supply and demand for required infrastructural services.
viii. Conducting an ESIA and submission of the study report to NEMA for licensing.

2.7.2. Construction Phase

2.7.2.1. Mobilization of Building Materials

The proponent plans to source several building materials locally and expressed the confidence that the materials can be procured locally. The great emphasis laid on procurement of building materials from within the local area makes both economic and environmental senses since it reduces negative impacts of transportation of the materials to the project site through reduced distance of travel by the materials transport vehicles. Building materials are transported to the project site from their extraction, manufacture, or storage sites using transport trucks. There is adequate and well-maintained tarmac road linkage for the purpose of smooth transportation of building materials into the project site.

2.7.2.2. Storage Materials

Building materials will be stored on site according to their need. Bulky materials such as rough stones, ballast, sand and steel will be carefully piled and covered on site. Materials such as cement, paints and glasses among others are to be stored in temporary storage rooms conveniently within the project site for this purpose

2.7.2.3. Masonry, Concrete Work and Related Activities

The construction of the proposed development will involve a lot of masonry work and related activities. General masonry and related activities will include stone shaping, concrete mixing, plastering, slab construction, construction of foundations, and erection of building walls and curing of fresh concrete surfaces. These activities are known to be labor intensive and will be supplemented by machinery such as concrete mixers.

2.7.2.4. Structural Steel Works

All the beams and floors shall be reinforced with steel metals to enhance the stability of the proposed building. Structural steel works will involve steel cutting, welding and erection.

2.7.2.5. Roofing and Sheet Metal Works

Roofing activities will include iron sheet cutting, raising the roofing materials such as structural timber to the roof and fastening the roofing materials to the roof. Proper planning and measuring must be done before procurement of the sheets to ensure not much solid waste is generated after roofing is completed.

2.7.2.6. Electrical Work

Electrical work during construction of the premises will include installation of electrical gadgets and appliances including electrical cables, lighting apparatus, sockets among others. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.

2.7.2.7. Plumbing

Installation of pipe work for water supply and distribution will be carried out from the existing supply and then to associated facilities. In addition, pipes will be installed to connect sanitary facilities with the existing Nairobi County sewerage system serving the area, and for drainage of storm water from the rooftop into the peripheral drainage system. Plumbing activities will include metal and plastic cutting, the use of adhesives, metal grinding and wall drilling among others.

2.7.2.8. Installation of Equipment

Several equipment will be installed within the buildings and other facilities. Equipment to be installed include air conditioning equipment and refrigeration equipment, firefighting equipment, alarms, lighting systems, sanitary equipment and waste handling facilities, railings and others as needs be.

2.7.2.9. Landscaping

To improve the aesthetic value or visual quality of the site once construction is complete, the proponent will carry out extensive landscaping especially at the front and rear parts of the developed building that shall involve establishment of small and attractive flower gardens. It is noteworthy that the proponent will use plant species that are available locally and fast growing for the landscaping.

2.8. Description of the Project's Operational Activities

2.8.1. Solid Waste and Waste Water Management

The developer has proposed to contract a licensed and authorized company responsible for solid waste handling throughout the development operational phase. Solid waste generated within the premises during its operation phase, where it will be occupied by residents who generate lots of household wastes in their day-to-day activities. These household wastes will be disposed off to a designated area within the development, from where licensed contracted company will be responsible for collecting and disposing off these wastes to a designated dumpsite approved by the relevant authority.

2.8.2. Cleaning

Once the proposed development is complete the proponent will be responsible for regular washing and cleaning of the common passage and way leaves, however, the residential tenants/owners will be responsible for cleaning their own units. Cleaning operations will involve the use of substantial amounts of water, disinfectants and detergents.

2.8.3. General Repairs and Maintenance

Throughout the operational phase of the development project, general repairs will be carried out to ensure normal functioning of the building infrastructures, components and avoid any hazard, injury or accident to the occupants. Such activities will include repair of floors, repairs and maintenance of electrical gadgets and equipment, repairs of leaking water pipes, painting, maintenance of flower garden and replacement of worn-out materials among others.

2.9. Description of the Project's Decommissioning Activities

2.9.1. Demolition Works

Upon decommissioning, the project components including buildings, drainage systems, verandas and the boundary wall will be demolished. This will produce a lot of solid waste that shall require a proper mechanism in its handling, disposal and management.

2.9.2. Dismantling of Equipment and Fixtures

All equipments' including electrical installations, finishing fixtures partitions, pipe-work among others will be dismantled and removed from the site on decommissioning of the project. Priority will be given to reduce, recycle and reuse of these equipment in for other projects. This will be achieved through resale of the equipment to other building owners or contractors or donation of this equipment's to schools, churches and charitable institutions.

2.9.3. Site Restoration

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the topsoil and re-vegetation using indigenous vegetation species.

2.10. Project Budget

The total cost of the proposed project is estimated to approximately Kshs. 190,450,000. This amount will be distributed to various project activities that include; builders work, electrical services installations, mechanical service installations, external works, water reticulation and drainage services, site installations, preliminaries and contingencies.
(*Attached as Appendices, Find a Copy of Summarised Bill of Quantities)*

BASELINE INFORMATION OF THE STUDY AREA

3.1. Background Information

Nairobi County is one of the 47 counties in the Republic of Kenya. It borders Kiambu County to the North and West, Kajiado to the South and Machakos to the East. Among the three neighboring counties, Kiambu County shares the longest boundary with Nairobi County. The County has a total area of 696.1 Km^2 and is located between longitudes 36° 45' East and latitudes 1° 18' South. It lies at an altitude of 1,798 meters above sea level.

The project proposed site is located in South C area, Lang'ata constituency in Nairobi County in land parcel plot lr. no. 26806/12. The site lies on coordinates latitude: $1^0$19'00.8" south and longitude: $36^0$49'29.5" east. The site is connected and can be accessed by use of Oleshapara road or by Uchumi road.

3.2. Administrative Units

Nairobi County is divided into seventeen constituencies/ sub-counties namely; Starehe, Kamukunji, Kasarani, Roysambu, Ruaraka, Makadara, Embakasi South, Embakasi North, Embakasi Central, Embakasi East, Embakasi West, Dagoretti North, Dagoretti South, Lang'ata, Westlands, Kibra, Mathare and 85 wards with Lang'ata being the largest with a total area of 196.80 Km^2 and Mathare being the smallest.

The proposed project site being within south C area is in Lang'ata sub-county, Nairobi County.

3.3. Bio-Physical Environment

3.3.1. Physical and Topographic Features

The terrain in the eastern side of the County is gently rolling but 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 (NNP) 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. These rivers are highly polluted as open sewers and industrial waste is directed towards them. 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.

3.4 Ecological Conditions

The 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.

3.4.1 Water Resources and Sanitation

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. There are areas in Nairobi with significant problem of lack of space for household toilets, and lack of land for public toilets. These include: Kiambiu, Kinyago, Kibera, Korogocho, Mathare, Sinai, Mukuru kwa Njenga and Reuben, Kangemi and Githunguri. There is need for setting aside some land for the construction of public toilets and for slum upgrading.

3.4.2 Climate, Rainfall and Temperature Profile

The County has a fairly cool climate resulting from its high altitude. Temperature ranges from a low of 10^0C to a high of 29^0C. It has a bi-modal rainfall pattern. The long rains season fall between March to May with a mean rainfall of 899 millimeters (mm) while the short rains season falls between October to December with a mean rainfall of 638 mm. The mean annual rainfall is 786.5 mm.

3.5 Biological Environment

3.5.1 Flora

The county has both indigenous and exotic forests which have a wide variety of trees, plants, herbs and other floral species.

The proposed site area is characterised by some local indigenous and exotic floral species which play a significant role in the ecology.

3.5.2 Fauna

Nairobi County is rich in biodiversity despite the accelerated pace of urbanization and development. The County is home to about 100 mammal species, 527 bird species and a variety of plant species. Nairobi hosts a variety of wildlife such as lions, leopards, cheetahs, hyenas' monkeys, buffaloes and birds among others. Tourists both local and international come to see these animals. Therefore, wildlife is a source of tourist attraction thus main source of county income. During the site visit there was evidence of small animals such as insects and bird species.

3.5.3 Forests

Nairobi County is home to three gazetted forests managed by Kenya Forest Service namely Karura, Ngong forest and Nairobi Arboretum. Karura forest is the largest of the three with 1,041

hectares and one of the largest urban gazetted forests in the world. About 632 hectares contain exotic tree plantations while indigenous trees cover 260 hectares. The rest of the forest is shrubs and other plants. Ngong forest covers 538 hectares with 80 per cent being indigenous trees and 20 per cent exotic eucalyptus plantations. Nairobi Arboretum is 30 hectares of wooded landscape and situated about 3Kms from the city centre. The forests are rich in different species of trees, plants and insects.

To achieve the national forest cover target of 10% of land area, the major afforestation effort will have to be in community and private lands. According to a study by Kenya Forest Service (2013) the national tree cover is about 7.2% while for Nairobi City County the cover is 7.6%. The challenge facing the tree cover in the County is the growing demand for land for real estate development, which more often result in the cutting of trees. The current road expansion programme, currently being undertaken by the National Government, although good for the city, has also resulted in the reduction of tree cover, especially along the road corridors.

3.6 Socio-Economic Profile

3.6.1 Population Size and Composition

In 2009, the County population was projected to be 3,138,369 and is expected to rise to 4,941708 in 2018, 5,433,002 in 2020 and 5,958,338 in 2022 respectively. The female population projections from age cohorts 0-4, 5-9, 10- 14, 15-19 and 20-24 remain slightly higher than that of male except for under 5 where the number of boys is higher than that of girls. From the age bracket 35-39 the population of males overtakes that of females and remains higher up to the age bracket 75-79. This is attributed to influx of men from rural areas to Nairobi in search of white color jobs. Above 80+ years the female population remains higher than the male counterparts. This is a result of life expectancy where men's life expectancy is shorter than women.

3.6.2 Agriculture, Livestock, Apiculture and Fisheries

Most of the crop production is to a large extent small-scale, market oriented and subsistence farming where farmers have small portions of land. Horticulture farming takes lead in crop production in the county. The main vegetables grown include tomatoes, kales, spinach, cabbage, local vegetables, onions, capsicum and carrots. Fruits grown include passion fruits, mangoes, bananas and avocado. Several varieties of herbs and spices are also grown. Cut flowers are also grown, especially in Lang'ata Sub County. The main food crops grown are maize, beans and Irish potatoes on small scale basis especially in peri-urban sub counties of Dagoretti South, Lang'ata, Westlands, Kasarani and Roysambu. The crops are grown for both household consumption and for commercial purposes.

Nairobi is the major market for livestock and livestock products from other counties where large supplies originate. Livestock products and by-products in the county include milk, eggs, both red and white meat as the major animal-based source foods, hides, skins, honey and bees-wax. The county produces considerable livestock products though the quantities are insufficient to meet the consumption needs of the resident population, with deficits being offset by supplies from other counties and other countries.

The main fisheries activities carried out in Nairobi County include aquaculture development (Fish farming), fish quality assurance, fish value addition and marketing, promotion of

recreational fisheries, implementation of fisheries management measures and compilation of fisheries statistics. The main fish species produced through fish farming are Oreochromisniloticus (Nile tilapia) and Clariasgariepinus (African cat fish). The urban fish farming technologies in the county include fish ponds, fish tanks, aquaponics systems and aquariums for production of fish for food and ornamental fish. The main fish markets where fish is landed in large quantities are City market and Gikomba fish market. Nairobi City County is also a host of two fish processing factories dealing in fish for export purposes mainly Nile perch fish products and fish maws. The fish industry in Nairobi employs an estimated 3,000 people working as fish traders, fish farmers, fish processors and provision of fisheries auxiliary services.

3.6.3 Education Institutions

The County has 211 public ECD centres. Among these 21 are stand-alone ECDs while us 190 are in main primary schools. The private ECDs are 344 in number. The County has 205 public primary schools with total enrolment of 193,058 and 2000 private primary schools with a total enrolment of 254,476. There are twelve vocational centres in the county with total enrolment of 477 students. Nairobi County has 95 public secondary schools and 57 private secondary schools.
Nairobi County hosts two public universities, that is, University of Nairobi and Technical University of Kenya. There are ten private universities and 16 campuses operated by both public and private universities in the County. Most of the campuses are located within the Central Business District (CBD). In addition, the County has 237 science and technology institutes.

3.6.4 Urban Centres and Markets

Nairobi County is a major trading centre. It provides a conducive environment for doing businesses by both locals and international communities. Majority of Nairobians especially middle earners get their income from businesses. There are various types of markets namely; open air markets; self-constructed markets, development tenant purchase markets, rental markets, hawkers' markets and wholesale markets.
The Gikomba market is Kenya largest market. It offers affordable second-hand clothing, furniture, accessories, fresh produce and processed materials. Another open-air market is Maasai market situated on Taifa road and it a place to shop for all sorts of jewellery, fashion, ornaments and paintings. Other markets are Toi markets, city market, Muthurwa market, Githurai market among others.

3.6.5 Tourism and Wildlife

Nairobi County has major parks and museum which serves as main tourist attraction and activities centres. The main national parks are Nairobi national park (NNP), Nairobi safari walk and Nairobi mini orphanage. The Nairobi Safari Walk is a major attraction to tourists as it offers a rare foot experience for wildlife viewing. The County boasts of the Nairobi National Museum which houses a large collection of artifacts portraying Kenya's rich heritage through history, nature, culture and contemporary art. Other important museums include Nairobi Gallery and the Nairobi snake park.

3.6.6 Employment

Nairobi commands the largest share of formal sector wage employment in Kenya with a total of 453,000 people. The manufacturing industry accounts for the highest wage employment followed by trade, restaurants and hotels. The construction, transport and communications industry also play key role in generation of wage employment. Other important sectors include finance, real estate and business services. The main formal employment zones in Nairobi are the Central Business District (CBD), Industrial area, along Mombasa Road, along Thika Road and Dandora

A large segment of the labor force in Nairobi is self-employed largely in the informal sector with 1,548,100 being employed in this sector. This is about 3.5 times those in wage employment. The informal sector covers small scale activities that are semi-organized, unregulated and uses low and simple technologies while employing few people per establishment. Nairobi County Integrated Development Plan, 2018 Page 18 The ease of entry and exit into the informal sector, coupled with the use of low level of technology at all makes it easy avenue for employment creation especially for the youth. The level of unemployment in Nairobi stands at 14.70 per cent with the female unemployment rate standing at 18.99 per cent while that of males is 11.55 per cent.

3.6.7 Health

Kenyatta National Hospital (KNH) is the major referral hospital in the County. There are 45 hospitals with a bed capacity of 6,990. There are 141 health, 200 dispensaries and 551 Clinic. The public health workforce in the county is 3695 comprising mainly of nurses, clinical officers and public health officers. The doctor patient ratio stands at 1:17,000.

3.6.8 Infrastructure

3.6.8.1 Road, Railway Network and Airports

The current road network in the County is inadequate in terms of coverage to meet current and future demands as envisaged in the Vision 2030. There is heavy congestion on most of the City roads especially during the morning and evening peak hours. The total road network covers 3602km out of which 1735km are tarmac road while 1867km are earth roads. The current poor state of road network is a great impediment to socio-economic growth leading to high production costs and low productivity. The completion of Thika Super highway, by-passes and missing links within the County will help in reducing traffic congestion.

Nairobi County hosts 3 airports; Jomo Kenyatta International Airport, Wilson Airport and East Leigh Airport. Jomo Kenyatta International Airport (JKIA) is the biggest Airport in East and Central Africa, and is the focal point for major aviation activity in the region.

The County has a railway network of 75km and a total of 15 functional railway stations with the current main one being the Standard Gauge Railway (SGR). These railway networks are found with the locality areas of: Embakasi, Makadara, and Nairobi main terminal, Dandora, Githurai, Kahawa, Kibera, Dagoretti, JKIA and Syokimau. The establishment of Makadara and Imara Daima railway stations and expansion of Nairobi platform will help to improve public transportation in Nairobi for socio-economic development.

3.6.8.2 Information, Communication and Technology (ICT)

Posts and telecommunication sub-sector has experienced mixed growth in the recent past. While the County has 38 post office branches, the growth of postal services has rather been declining due to increase in mobile telephony. Mobile telephony has the highest coverage in Nairobi compared to other parts of the country with over 95 per cent of the inhabitants having access to mobile communication. The players engaged in mobile telecommunication include: Safaricom, Orange, Airtel and YU while those in mailing services include Kenya Postal Corporation, Group 4 Securities (G4S), Direct Handling Limited (DHL), Wells Fargo among others.

3.6.8.3 Energy Supply

The main sources of energy in Nairobi County are electricity, solar, wind energy, LPG, biogas paraffin, charcoal and firewood. Lack of access to clean sources of energy is a major impediment to development through health related complications such as increased respiratory infections and air pollution. 63.2 per cent of the population use paraffin as cooking fuel. Other sources of energy for cooking include LPG gas (20.2per cent), charcoal (10.5 per cent) and firewood (1.8 per cent). About 68.2 per cent of households use electricity as a means of lighting 28.8 per cent use paraffin while 2.9 per cent and 1.7 per cent use grass and dry cells respectively.

The main providers and connectivity on services for power and electricity accessibility and suppliers are the Kenya Power and Lighting Company (KPLC). The project proponent intends to connect the development with the KPLC main grid.

3.6.8.4 Housing

Although the county targeted to undertake slum upgrading e.g., in Kasarani, slum upgrading was undertaken in Embakasi West and Embakasi East in KCC and Kayole Soweto informal settlements where a total of 8.4 Km of roads and drainage were developed, 9 flood lights installed and 5.4 Km of sewer developed. Another twelve settlements were also planned and are awaiting provision of infrastructure. The county had also targeted to renovate all county rental houses (17,000). However due to limited funding it managed to renovate 150 housing units and also carried out repair works of about 1,000 units. Routine maintenance was undertaken in the estates. The County Executive Committee also approved apportionment of 10% of annual rental income equivalent to Kshs. 60 million in 2016/2017 for maintenance.

3.6.9 Land Use and Zoning

Industrial and commercial land has dwindled in the last decade and most industries have been looking for land in Athi river part of Machakos County. The projected housing land requirement is estimated to be 250 Km^2. Land meant for urban agriculture has been on the decline as more of it is turned to residential use with the city relying on other counties for supply of food items. The industrial areas are largely concentrated in Industrial Area, Kariobangi South and Baba-Dogo.

3.6.10 Solid Waste Management

Major challenges facing Nairobi County with respect to Integrated Solid Waste Management (ISWM) include management of waste collection and disposal. Identification and maintenance of

final disposal sites will be a critical concern in the immediate term. There is need for private organizations to take up critical functions like recycling, transportation and Solid Waste Management. Nairobi County generates over 2000 tons of garbage per day and most of this garbage finds its way to the final destination at the Dandora dumpsite in an environmentally unsustainable manner. There is need for the County government to sensitize residents on garbage management.

RELEVANT LEGISLATIVE, POLICIES AND INSTITUTIONAL FRAMEWORK

4.1 Introduction

EIA is an instrument tool or activity for environmental management and development control. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is a condition that all developers conduct EIAs on the development projects.

EIAs are carried out in order to identify potential positive and negative impacts associated with the proposed development with a view of taking advantage of the positive impacts and developing mitigation measures for the negative ones. The guidelines on EIAs are contained in section 58 to 67 of the Act. According to section 68 of the EMCA CAP 387, the authority shall be responsible for carrying out environmental audits on all activities that are likely to have a significant effect on the environment.

The protection, conservation and exploitation of the natural resources is governed by a number of policies, laws and regulations coupled with the provisions for the environmental management. Some of the key national policies, laws and regulations that have a direct bearing on the optimal operation of the proposed project are discussed in this chapter.

4.2 National Legislative Frameworks

4.2.1 The Constitution of Kenya, 2010

The Constitution of Kenya Article 42, on the environment provides 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 the present and future generations. Article 69, of the Constitution provides for the establishment of systems of environmental impact assessment, environmental audit and environmental monitoring. The Constitution also states that the State shall eliminate processes and activities that are likely to endanger the environment and the State shall utilize the environment for the benefit of the people of Kenya. The Constitution of Kenya clearly 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.

These environmental rights are enforceable in a court of law (Article 70). Land must be used in a sustainable manner, and in accordance with the principles of sound conservation and protection of ecologically sensitive areas. The State may regulate the use of any land or right over any land in the interest of land use planning (Article 66). The Constitution thus gives recognition to public, community and private land. Land use regulation goes beyond exploitation merely for economic purposes, and lays emphasis on conservation.

Article 174 of the Constitution sets out the objects of devolution of government, which include:

i). Giving powers of self-governance to the people and enhancing their participation in the exercise of the powers of the State and in making decisions affecting them;

ii). Recognizing the right of communities to manage their own affairs and to further their development;

iii). Protecting and promoting the interests and rights of minorities and marginalized communities;

iv). Promoting social and economic development and the provision of proximate, easily accessible services throughout Kenya;
v). Ensuring equitable sharing of national and local resources throughout Kenya;
vi). Facilitating the decentralization of State organs, their functions and services, from the capital of Kenya.

The Fourth Schedule of the Constitution sets out the functions devolved to the county governments, including agriculture; county health services; control of air and noise pollution; cultural activities; county transport; animal control and welfare; county planning and development; pre-primary education; implementation of specific national government policies on natural resources and environmental conservation; county public works and services and firefighting services and disaster management.

4.2.2 Environmental (Impact Assessment and Audit) Regulations, 2003

These regulations stipulate how an EIA study report should be prepared and specifies all the requirements that must be complied with. It highlights the stages to be followed, information to be made available, role of every stakeholder and rules to be observed during the EIA study report making process.

Section 4 (1) states that no proponent shall implement a project likely to have a negative environmental impact or for which an EIA is required under the Act or these Regulations unless an EIA has been concluded and approved in accordance with these Regulations.

Section 11 (1) states that an EIA study shall be conducted in accordance with terms of reference developed during the scoping exercise by the proponent and approved by the Authority. Section 13 (1) and (2) further states that proponent shall, on the approval of the terms of reference under regulation 11, submit to the Authority the names and qualifications of the impact assessment experts appointed to undertake the EIA study and authorized so to do in accordance with section 58 (5) of the Act and that every EIA study shall be carried out by a lead expert qualified in accordance with the criteria of listing of experts specified in the Fourth Schedule to these Regulations.

Section 17 (l) stipulates that during the process of conducting an EIA study under these Regulations, the proponent shall in consultation with the Authority; seek the views of persons who may be affected by the project. Part IV of the regulations states how an EIA Study Report is conducted, contents and information required, submission, timelines and review process.

The proponent and consultant have undertaken this EIA study report in line with all the provisions set out in these regulations. A meeting, administration of questionnaires and interview were conducted to seek views of persons who may be affected by the project in line with these regulations.

4.2.3 Environmental Management and Coordination Act (EMCA), 1999 and Amendment 2015

The Act states in section 3 (1) and (2) that every person is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment and that the entitlement to a clean and healthy environment under subsection (1) includes the access by any person in Kenya to the various public elements or segments of the environment for recreational, educational, health, spiritual and cultural purposes.

Part VI Section 58 (2) of the Act states the proponent of any project specified in the Second Schedule shall undertake a full environmental impact assessment study and submit an EIA study report to the Authority prior to being issued with any license by the Authority: provided that the Authority may direct that the proponent forego the submission of the EIA Study report in certain cases.

Section 58 (5) states that EIA studies and reports required under the Act shall be conducted or prepared respectively by individual experts or a firm of experts authorized in that behalf by the Authority. The Authority shall maintain a register of all individual experts or firms of all experts duly authorized by it to conduct or prepare environmental impact assessment studies and reports respectively. The register shall be a public document and may be inspected at reasonable hours by any person on the payment of a prescribed fee. Subsection (7) further states that EIA shall be conducted in accordance with the EIA regulations, guidelines and procedures issued under this Act.

Section 59 (1) states that upon receipt of an EIA study report from any proponent under section 58(2), the Authority shall cause to be published in the Gazette, in at least two newspapers circulating in the area or proposed area of the project and over radio stating:

a. A summary description of the project;
b. The place where the project is to be carried out;
c. The place where the environmental impact assessment study, evaluation or review report may be inspected;
d. A time limit of not exceeding ninety days for the submission of oral or written comments by any member of the public on the environmental impact assessment study, evaluation or review report.

Subsection (2) and (3) of 59 states that the Authority may, on application by any person extend the period stipulated in sub-paragraph (d) so as to afford reasonable opportunity for such person to submit oral or written comments on the EIA report and the Authority shall ensure that its website contains a summary of the report referred to in subsection (1).

4.2.4 Environmental Management and Coordination Act (Water Quality) Regulations, 2006

Water Quality Regulations apply to water used for domestic, industrial, agricultural, and recreational purposes; water used for fisheries and wildlife purposes, and water used for any other purposes. Different standards apply to different modes of usage. These regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources.

Part II Section 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. Subsection (2) further states that "No person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit"

Part IV Section 24 states that "No person shall discharge or apply any poison, toxic, noxious or obstructing matter, radioactive wastes, or other pollutants or permit any person to dump any such matter into water meant for fisheries, wildlife, recreational purposes or any other uses".

According to these regulations, "Every person shall refrain from any action which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act".

4.2.5 Environmental Management & Coordination Act (Waste Management) Regulations, 2006

The regulations are contained in the Kenya Gazette No. 69, Legal Notice No. 121. Section 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 waste receptacle."
Section 4 (2) states that "Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed of such waste in the manner provided for under these Regulations."
Section 6 (1) stipulates that "Any person who owns or controls a facility or premises which generates waste shall minimize the waste generated by adopting the following cleaner production principles:

a. Improvement of production process through conserving raw materials and energy, eliminating the use of toxic raw materials within such time as may be prescribed by the Authority and reducing toxic emissions and wastes,
b. Monitoring the product cycle from beginning to end by identifying and eliminating potential negative impacts of the product, enabling the recovery and re-use of the product where possible and reclamation and recycling,
c. Incorporating environmental concerns in the design, process and disposal of a product.

Section 9 states that "Any person licensed to transport waste shall collect waste from the designated area of operations or storage areas and shall deliver such waste to the designated storage site, disposal site or plant"

4.2.6 Environmental Management & Coordination Act (Noise and Excessive Vibration Pollution Control) Regulations, 2009

Section 3 (1) and (2) of the regulations states that no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment except as otherwise provided in the Regulations. In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered, whether the noise can be controlled without much effort or expense to the person making the noise:

i. Time of the day;
ii. Proximity to residential area;
iii. Whether the noise is recurrent, intermittent or constant;
iv. The level and intensity of the noise;
v. Whether the noise has been enhanced in level or range by any type of electronic or mechanical means;

These regulations also relate noise to its vibration effects and seek to ensure no harmful vibrations are caused by controlling the level of noise.
Part II Section 4 states that: except as otherwise provided in these Regulations, no person shall:

1. Make or cause to be made excessive vibrations annoys, disturbs, injures or endangers the comfort, response, health or safety of others and the environment; or
2. Cause to be made excessive vibrations which exceed 0.5 centimeters per second beyond any source property boundary or 30 meters from any moving source.

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

Section 14 relates to noise, excessive vibrations from construction, demolition, mining or quarrying site, and state that: where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority may impose on how the work is to be carried out including but not limited to requirements regarding;

- Machinery that may be used, or
- The permitted levels of noise as stipulated in the Second and Third Schedules to these Regulations.

4.2.7 Environmental Management & Coordination Act (Air Quality) Regulations, 2014

The objective of the Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such as mobile sources (e.g., motor vehicles) and stationary sources (e.g., industries) as outlined in the Environmental Management and Coordination Act, 1999.

Section 5 states that no person shall act in a way that directly or indirectly causes, or is likely to cause immediate or subsequent air pollution; or emit any liquid, solid or gaseous substance or deposit any such substance in levels exceeding those set out in the first Schedule.

Further, clause 6 stipulates that no person shall cause or allow emission of the priority air pollutants prescribed in the second schedule to cause the ambient air quality limits prescribed in the first schedule to be exceeded. Clause 25 (1) states that no person shall cause or allow the emission of visible air pollutants from a stationary or mobile vehicle in excess of the limits set out under the prescribed Standard.

Clause 33 states that no person operating construction equipment or handling construction material shall allow emission of particulate matter so as to adversely affect the limits set out in the First schedule. Clause 35 states that no person shall cause or allow stockpiling or other storage of material in a manner likely to cause ambient air quality levels set out under the First Schedule to be exceeded. Clause 38 stipulates that no person shall cause or allow emissions of priority air pollutants set out under the Second Schedule from disposal of medical waste, domestic waste, plastics, tires, industrial waste or other waste by open burning.

4.2.8 The National Poverty Eradication Plan (NPEP), 1999

The National Poverty Eradication Plan provides a national policy and institutional framework for action against poverty. The vision is to halt the current increase in the incidence of poverty through implementation of well-planned poverty alleviation programmes. This approach is resorted to after failing to combat poverty through national development plans and other

specially designated programmes. Based on this realization the plan intends to bridge the gap between national development plans and address the needs of the poor; come up with a charter for social integration setting out pro-poor policies and planning; improve access to essential services by low income households that currently lack basic health, education and safe drinking water; develop a strategy for broad based economic growth; increase access to education for children of low income groups; eliminate shortfalls in the poor household's access to mother and child health care services; and enhance the assets and income streams of the poor to build and maintain group corporation.

The specific goals and targets for the NPEP are:

i. Reduce the number of the poor in the total population by 20 percent by 2004; and by a further 30 percent by 2010.
ii. Increase enrolment rates by fifteen percent over the first six years of the plan.
iii. Increase completion rates by 19 percent, especially for girls in the six-year period.
iv. Universal Primary Education (UPE) to be achieved by 2015.
v. Universal access to Primary Health Care to within 5 km of all rural households or within one hour of local transport by 2010.
vi. Increase by 8 percent each year until 2004, access to safe drinking water by poor households and create universal access to safe water by 2001. Reduce time spent by women on fuel (wood) and water collection.

4.2.9 The Physical Planning Act of 1996, Rev. 2012

The Local Authorities are empowered under section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section, therefore allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderly development of an area.

Section 30 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 local authority.

Finally, section 36 states that if connection with a development application, local authority is of the opinion that the proposed development activity will have injurious impact on the environment, the application shall be required to submit together with the application an environment impact assessment EIA report to NEMA for review.

4.2.10 Land Registration Act, 2012

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

and sealed with the Seal of the Registrar, shall be received in evidence in the same manner as the original.

4.2.11 The National Land Commission Act, 2012

Pursuant to Article 67 (2) of the constitution, the functions of the commission are outlined in section 5 of the act as follows;

i. To manage public land on behalf of the national and county governments;
ii. To recommend a national land policy to the national government;
iii. To advise the national government on a comprehensive programme for the registration of title in land throughout Kenya;
iv. To conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities;
v. To initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress
vi. To encourage the application of traditional dispute resolution mechanisms in land conflicts;
vii. To assess tax on land and premiums on immovable property in any area designated by law;
viii. To monitor and have oversight responsibilities over land use planning throughout the country.

4.2.12 National Construction Authority Act, 2011

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

4.2.13 Building Code, 2000

This gives general guidelines for the construction of buildings and attendant safety measures such as installation of firefighting appliances, fire escapes etc. It equally recognizes local authorities (county governments) as lead planning agencies and thus requires every developer to submit building plans to the relevant local authority for approval. The local authorities are in turn empowered to disapprove any plan submitted if it is not correctly drawn or does not provide sufficient information that complies with the relevant by-laws. Any developer who intends to erect a building, such as a residential block, must also give the concerned local authority a notice of inspection before the erection of the proposed structure. After erecting the building, a notice of completion shall be issued to the local authority to facilitate final inspection/approval. No person shall therefore occupy a building whose certificate of completion has not been issued by

the local authority. As a precaution against fire breakout, the by-law states that the walls of any premise shall be non-combustible throughout. Similarly, in every building which comprises more than one story, other than a small house, shall have fire resistance. Section 214 indicates that, in any public building whose floor is more than 20 feet above the ground level, the council may recommend the provision of firefighting equipment that may include one or more of the following: hydrants, hose reels and fire appliances, external conations, portable fire appliances, water storage tanks, dry risers, sprinkler, drencher and water spray spring protector system.

4.2.14 The Water Act, 2002

This Act of Parliament provides for the regulation, management and development of water resources, water and sewerage services. Part II section 9 of this Act states that every person has a right to access water resources, whose administration is the function of the national government. Part III section 11 states the establishment of the Water Resources Authority (WRA) whose functions is stipulated in section 12 and include but not limited to receiving water permits applications for water abstraction, collection of water permit fees and water use charges. Section 63 of the act states that every person in Kenya has the right to clean and safe water in adequate quantities and to reasonable standards of sanitation as stipulated in Article 43 of the Constitution. Section 143 states that a person shall not, without authority conferred under this Act;

a) Willfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction;

b) Throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.

Section 147 states that a person who commits an offence under this Act, or under any Regulations or made under this Act, shall, if no other penalty is prescribed in respect of the offence, be liable to a fine not exceeding one million shillings or to imprisonment for a term not exceeding two years, or to both such fine and imprisonment.

4.2.15 The Work Injury Benefit Act (WIBA), 2007

The WIBA Act provides for compensation to employees for work related injuries and diseases contracted in the course of their employment and for connected purposes; Section 7(a) of the Act, on the obligations of the employer, requires an employer to obtain and maintain an insurance policy with an insurer approved by the State in respect of any liability that the employer may incur under this Act to any of his employees. Section 10(1) States that an employee who is involved in an accident resulting in the employee's disablement or death is subject to the provisions of this Act, and entitled to the benefits provided for under this Act. It also states expressly that an employer is liable to pay compensation in accordance with the provisions of this Act to an employee injured while at work. On First Aid covered in section 45(1), an employer is supposed to provide and maintain such appliances and services for the rendering of first aid to his employees in case of any accident as may be prescribed in any other written law in respect of the trade or business in which the employer is engaged.

4.2.16 Energy Act, 2006

The Act establishes an Energy Regulatory Commission (ERC) mandated to perform all functions that pertain to energy production, transmission, setting and enforcing of energy policies, public education and enforcing energy conservation strategies, prescribing the energy licensing process and issuing of licenses that pertain to energy sector in Kenya. Section 30 of the Act provides the factors that shall be taken into consideration prior to issuance of license. It states the need and expression of an entity to conserve and protect the environment and natural resources in accordance to the EMCA Cap 387. Moreover, the Act gives provisions for the need to protect health and safety of users of energy by providing an enabling environment of operation that protects the health and safety of users of the service for which the license or permit is required and other members of the public affected by the undertaking.

4.2.17 Energy (Energy Management) Regulations, 2012

These Regulations shall apply to the owner or occupier of industrial, commercial and institutional facilities using any form of energy.

Section 5 (1), (2), (3) and (4) stipulates that "The owner or occupier shall develop an energy management policy for the facility which shall have the minimum requirements as provided in the First Schedule." (2) "The owner or occupier shall within one year of classification file the energy management policy for every designated facility with the Commission for approval before implementation." (3) "The owner or occupier of a facility shall designate an energy officer for every designated facility, who shall be responsible for the development and implementation of energy efficiency and conservation." (4) "The owner or occupier of a facility shall maintain records of information for every designated facility for a minimum period of five years from the date of occupation of the facility, which shall include

a. Monthly and annual electricity, fuel and water consumption;
b. Monthly production data or occupancy levels; and up to date building plans, infrastructure plans and floor area drawings.

Section 6 states that "(1) the owner or occupier shall cause an energy audit of the facility to be undertaken by a licensed energy auditor at least once every three years. (2) The report of the audit undertaken under paragraph (1) shall be in the form set out in the Second Schedule. (3) The owner or occupier shall submit the report of the audit to the Commission in a manner approved by the Commission, within six months from the end of the financial year in which the audit is undertaken. (4) The Commission shall examine the report submitted hereunder and if dissatisfied therewith, may require the concerned owner or occupier of a facility, at his own cost, to engage an independent energy auditor from a list of names provided by the Commission to undertake an energy audit. (5) An energy auditor shall upon completion of an audit execute a quality assurance declaration in the form set out in the Third Schedule. (6) The Commission or its agent may subject the energy audit report to verification after giving not less than fourteen days' notice to the facility owner or occupier."

4.2.18 Energy (Solar Water Heating) Regulations, 2012

The regulations in section 3 stipulate that "All premises within the jurisdiction of a local authority with hot water requirements of a capacity exceeding one hundred litres per day shall install and use solar heating systems."
Section 6 (3) states "An owner or occupier of premises that has a solar water heating system shall use and carry out the necessary operational maintenance and repairs required to keep the installation in good and efficient working condition."

4.2.19 The Traffic Act (Cap 403)

The Traffic Act gives provisions and guidelines that govern the Kenya roads transport sector. These guidelines are essential to private, public and commercial service vehicles in ensuring safety and sanity on the roads hence ensuring the environment; the human being a component, is safeguarded.

4.2.20 Radiation Protection Act, Cap 243

The Radiation Protection Act, Chapter 243, aims to control the import, export, possession and use of radioactive substances and irradiating apparatus. Under this Act in section 9, a license is required to handle any radioactive substances or irradiating apparatus from the National Radiation Protection Board. Handling here includes the method of disposing of radioactive waste products, transportation of radioactive materials, storage, use and maximum working hours that employees are expected to work with radioactive materials. Under this Act also, institutions generating this category of waste shall be expected to apply for a license from the same board. The provisions of this act will guide the proponent on the use of radiation and its control, if there will be use of any radiation apparatus.

4.2.21 The Public Health Act CAP 242

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

4.2.22 Food, Drugs and Chemical Substances (Cap 254)

This Act provides for the prevention of adulteration of food, drugs and chemical substances and for matters incidental thereto and connected therewith. The Act prohibits against sale of

unwholesome, poisonous or adulterated food; labelling, packaging, treating, processing, selling or advertising any drug in contravention of any regulations made under this Act, or in a manner that is false, misleading or deceptive as regards its character, constitution, value, potency, quality, composition, merit or safety; selling any device that, when used according to directions on the label or contained in a separate document delivered with the device or under such conditions as are customary or usual, may cause injury to the health of the purchaser or user thereof.
A person who contravenes this Act shall be guilty of an offence.

4.2.23 The Penal Code CAP 63

Chapter XVII on "Nuisances and offences against health and convenience" contained in the penal code strictly prohibits the release of foul air into the environment which affects the health of the persons. It states that any person who voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render it less fit for the purpose for which it is ordinarily used and who voluntarily vitiates the atmosphere in any place, so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighborhood or passing along a public way, is guilty of a misdemeanor.

4.2.24 The Standards Act CAP 496

This Act promotes the standardization of the specification of commodities, and provides for the standardization of commodities and codes of practice to ensure public health and safety. It establishes the Kenya Bureau of Standards (KEBS) and defines its functions as related to:

a) Making arrangements or provision of facilities for the testing and calibration of precision instruments, gauges and scientific apparatus, for the determination of their degree of accuracy by comparison with standards approved by the Minister on the recommendation of the Council, and for the issue of certificates in regard thereto.
b) Promotion of standardization in industry and commerce

This means the Proponent has to ensure all materials and equipment in use during construction as well as operation of the facility adheres to the highest standards and do not pose any human health and safety risk.

4.2.25 The County Governments Act 2012

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

and the County government may also issue directives and authorizations on various aspects e.g., waste management and fire emergency preparedness among others.

4.2.26 Occupier Liability Act (Cap 34)

Section 3 states that, an occupier of premises owes the same duty, the common duty of care, to all his visitors, except in so far as he is free to and does extend, restrict, modify or exclude his duty to any visitor or visitors by agreement or otherwise.

According to section 6, persons who enter premises for any purpose in the exercise of a right conferred by law are to be treated as permitted by the occupier to be there for that purpose, whether they in fact have his permission or not.

4.2.27 Landlord and Tenants Act

This is an Act of Parliament mandated to make provision with respect to certain premises for the protection of tenants of such premises from eviction or from exploitation and for matters connected therewith and incidental thereto.

4.2.28 Rent Restriction Act, 2012

This Act was mandated to make provision for restricting the increase of rent, the right to possession and the exaction of premiums, and for fixing standard rents, in relation to dwelling-houses, and for other purposes incidental to or connected with the relationship of landlord and tenant of a dwelling house.

4.2.29 Occupational Safety and Health Act, (OSHA) 2007

The purpose of the enactment of this Act was to provide for the Safety, Health and Welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes.

The Act requires employers to provide personal protective clothing and appliances where employees are employed in any process involving exposure to wet or to any injurious or offensive substance, including, where necessary, suitable gloves, footwear, goggles and head coverings.

4.2.30 The Environment and Land Court Act, 2011

This Act 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

4.2.31 Urban and Cities Act No. 13 of 2011

Part V (d) of the Act states that every city and municipality established under this Act shall operate within the framework of integrated development planning which shall be the basis for the preparation of Environmental Management Plans, Disaster Preparedness and Response, overall delivery of service including provision of water, electricity, health, telecommunications and solid waste management among others.

4.3 Relevant Legal Policies

4.3.1 The National Environmental Action Plan (NEAP)

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

4.3.2 National Policy on Water Resources Management and Development (1999)

While the National Policy on Water Resources Management and Development (1999) enhances a systematic development of water facilities in all sectors for promotion of the country's socio-economic progress, it also recognizes the by-products of this process as wastewater. It, therefore, calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution.

In addition, the policy provides for charging levies on wastewater on the basis of quantity and quality. The "polluter-pays-principle" applies in which case parties contaminating water are required to meet the appropriate cost of remediation. The policy provides for establishment of standards to protect water bodies receiving wastewater, a process that is ongoing.

4.3.3 Policy Paper on Environment and Development (Sessional Paper No. 6 of 1999)

The overall goal is to integrate environmental concerns into the national planning and management processes and provide guidelines for environmentally sustainable development. The paper provides comprehensive guidelines and strategies for government action regarding environment and development.

4.3.4 The Land Policy (Sessional Paper No. 3 of 2009)

The overall objective of the National Land Policy is to secure land rights and provide for sustainable growth, investment and the reduction of poverty in line with the Government's overall development objectives. Specifically, it seeks to develop a framework of policies and laws designed to ensure the maintenance of a system of land administration and management that will provide all citizens with the opportunity to access and beneficially occupy and use land; economically, socially, equitably, and environmentally sustainable allocation and use of land; effective and economical operation of the land market; efficient use of land and land-based resources; and efficient and transparent land dispute resolution mechanisms. The previously existing land laws have been repealed and the law consolidated into three statutes, namely the Land Act 2012, the Land Registration Act 2012 and the National Land Commission (NLC) Act 2012.

4.3.5 Public Health Policy

The policy calls upon the project proponent to ensure that buildings are adequately provided with utilities so that they are fit for human habitation. The proposed development will have all amenities/utilities that are essential for safeguarding public health for all people using the facilities during the construction, operational and decommissioning phases of the project.

4.3.6 The National Environmental Sanitation and Hygiene Policy, (2007)

The Environmental Sanitation and Hygiene (ESH) Policy is intended to improve people's health and quality of life. It aims at clarifying the various roles in order to enhance the existing legal and constitutional framework and to encourage the private sector, civil society and community participation in the planning, implementation and ownership of ESH services; protect the environment from pollution and its negative effects on human health; and reduce poverty.

4.3.7 Environmental Impact Assessment Guidelines Policy, 2002

The EIA guidelines require that an EIA be conducted in accordance with the issues and general guidelines spelt out in the second and third schedules of the regulations. These include coverage of the issues on schedule 2 (ecological, social, landscape, land use and water considerations) and general guidelines on schedule 3 (impacts and their sources, project details, national legislation, mitigation measures, a management plan and environmental auditing schedules and procedures. This assessment has been conducted according to the EIA guidelines. (NEMA, 2002)

4.3.8 National Housing Policy

The goal of this Housing Policy is to facilitate the provision of adequate shelter and a healthy living environment at an affordable cost to all socio-economic groups in Kenya in order to foster sustainable human settlements. This will minimize the number of citizens living in shelters that are below the habitable living conditions. It will also curtail the mushrooming of slums and informal settlements especially in the major towns.

4.3.9 Physical Planning Policy

The physical planning policy governs the development and approval of all building plans as provided for in the Physical Planning Act (Cap 286). The proposed project will be subjected to the provisions of this policy and legislation.

4.3.10 National Climate Change Response Strategy

The purpose of the NCCRS is to put in place robust measures needed to address most, if not all, of the challenges posed by climate variability and change. It is divided into ten chapters. Chapter one looks at the history of climate change, challenges and international efforts to combat climate change. The remaining chapters give details on evidence and impacts of climate change; strategic focus of the national climate change response strategy (NCCRS); adaptation and mitigation interventions; communication, education and awareness programmes; vulnerability assessment; research, technology development and transfer; policy, legislation and institutional framework; as well as action plan, implementation framework and resource mobilization plan, respectively.

4.3.11 Sustainable Development Goals (SDG's)

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

a) Goal 3: Good Health & Well Being

The project will contribute to improved health and productivity through the provision of a safe and clean environment for living.

b) Goal 6: Clean Water and Sanitation

The connection of the liquid waste to the septic tank and provision of adequate sanitary facilities shall improve water quality and sanitation by ensuring zero proportion of untreated wastewater is not discharged to the environment.

c) Goal 7: Affordable and Clean Energy

The implementation of an energy management system through good orientation, solar shading, natural ventilation, natural lighting, energy efficient fitting and appliances shall contribute to increased energy efficiency.

d) Goal 8: Decent Work and Economic Growth

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

4.3.12 Kenya Vision 2030

Kenya Vision 2030 is the country's new development blue print covering the period 2008 to 2030. The blue print aims at transforming Kenya into a newly industrializing "middle-income country providing a high-quality life to all its citizens by the year 2030". The Vision is based on three "pillars"; the economic, the social and the political. The adoption of Vision 2030 came after the successful implementation of the Economic Recovery Strategy (ERS) for Wealth and Employment Creation which has seen the country's economy back on the path to rapid growth since 2002 when Gross Domestic Product (GDP) grew from a low of 0.6% and rising gradually to 6.1% in 2006, one of the foundations for Vision 2030 is infrastructure. The Vision aspires for a country firmly interconnected through a network of roads, railways, ports, airports, water and sanitation facilities, and telecommunications. In this Vision to ensure that the main projects under the economic pillar are implemented, investment in the nation's energy sector is given the highest priority. The proposed development project will promote the economic growth of the locality and transport sector during construction and operation phases and help propel Kenya to a middle-income country as envisioned in the Vision 2030 development plan by developing the housing sector, one of the key target sectors in the plan.

4.4 National Institution Frameworks

4.4.1 National Environmental Management Authority (NEMA)

The National Environment Management Authority (NEMA), was established under the Environmental Management and Co-ordination Act No. 8 of 1999 (EMCA) as the principal instrument of Government for the implementation of all policies relating to environment.

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

4.4.2 National Environment Tribunal (NET)

The tribunal is formed under section 125 of the EMCA, Cap 387 and handles all cases related to environmental offences in the Republic of Kenya. If there will be any disputes to the proposed project, they will be presented to the tribunal for hearing and determination. Any person aggrieved by the decision or order of the tribunal may appeal against such decision or order to the High Court.

4.4.3 National Environment Council (NEC)

The National Environment Council (NEC) is established by Section 4(1) of the Environmental Management and Coordination Act no. 8 of 1999. NEC is the highest policy body under EMCA. The committees are chaired by is chaired by the Cabinet Secretary responsible for of Environment matters. Other members of the Council are:

1. The Permanent Secretaries responsible for matters in the First Schedule of the Act, namely: agriculture economic planning and development, education, energy, environment, finance, fisheries, foreign affairs, health, industry, law or law enforcement, local government, natural resources, public administration, public works, research and technology, tourism and water resources
2. Representatives of public universities; specialized research institutions; the business community and non-governmental organizations
3. The Director General NEMA who is the Secretary.

Key Functions of NEC:

i. Policy formulation and direction for the purposes of this act
ii. Set national goals and objectives and determine policies and priorities for the protection of the environment;

iii. Promote cooperation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes
iv. Perform such other functions as are assigned under the Act.

4.4.4 County Environment Committee

County Environment Committee is established under section 29 (1) of Environmental Management and Coordination Act no. 8 of 1999. The committees are chaired by the member of the county executive committee in charge of environmental matters who shall be appointed by the Governor.

Its duties and responsibilities are;

i. Responsible for the proper management of the environment within the county for which it is appointed
ii. Develop a county strategic environmental action plan every five years
iii. Perform such additional functions as are prescribed by this Act or as may, from to time, be assigned by the Governor by notice in the Gazette.

4.4.5 Public Complaints Committee

The committee was established under section 31 of Environmental Management and Coordination Act no. 8 of 1999 and later amended in 2015 to National Environmental Complaints Committee.

The functions of the Complaints Committee shall be

1. To investigate –
a. any allegations or complaints against any person or against the Authority in relation to the condition of the environment in Kenya;
b. on its own motion, any suspected case of environmental degradation, and to make a report of its findings together with its recommendation thereon to the Council;
2. To prepare and submit to the Council, periodic reports of its activities which report shall form part of the annual report on the state of the environment under section 9 (3); and
3. To perform such other functions and exercise such powers as may be assigned to it by the Council.

4.4.6 National Environment Action Plan Committee

Established under section 37 of Environmental Management and Coordination Act no. 8 of 1999.) The National Environment Action Plan Committee shall, after every five years, prepare a national environment action plan for consideration and adoption by the National Assembly.

The purpose of the Environmental Action plans is to co-ordinate and harmonise the environmental policies, plans, programmes and decisions of the national and county governments, as the case may be, in order to:

i. Minimize the duplication of procedures and functions; and promote consistency in the exercise of functions that may affect the environment
ii. Secure the protection of the environment across the country

iii. Prevent unreasonable actions by any person, state organ or public entity in respect of the environment that are prejudicial to the economic or health interests of other counties or the country.

4.5 International Conventions, Treaties and Agreements

4.5.1 The Rio Declaration and Agenda 21

The Rio Declaration and Agenda 21, the action plan for the 21st century are two non-legally binding instruments adopted by the 1992 United Nations Conference on the Environment and Development (UNCED). While the Rio Declaration contains general principles and objectives, Agenda 21 contains detailed guidance on their practical implementation. Principle 4 of the Rio Declaration provides that in order to achieve sustainable development environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. Principle 25 accentuates this by stating that peace, development and environmental protection are interdependent and indivisible.

4.5.2 The World Commission on Environment and Development (The Brundtland Commission of 1987)

The Commission in its 1987 report dubbed "Our Common Future" focused on the environmental aspects of development, in particular the emphasis on sustainable development that produces no lasting damage to the biosphere and to particular ecosystems. In addition to environmental sustainability is economic and social sustainability. Economic sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resources. While social sustainable development is development that maintains the cohesion of a society and its ability to help its members work together to achieve common goals, while at the same time meeting individual needs for health and well-being, adequate nutrition, and shelter, cultural expression and political involvement. The key aspect of sustainability is the interdependence of generations.

4.5.3 United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC) is an international environmental treaty adopted on 9 May. The UNFCCC objective is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner. (United Nations, 1992)

4.5.4 The United Nations Convention on Biological Diversity

United Nations Convention on Biological Diversity (UNCBD), is a multilateral treaty. It entered into force on 29 December 1993. The Convention has three main goals including: the conservation of biological diversity (or biodiversity); the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources. (United Nations, 1993)

4.5.5 Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."
During the construction and operational phase of the proposed project a lot of emissions are expected these include; emissions from the trucks and machinery on site.

4.5.6 Paris Agreement

The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise.

4.5.7 Occupational Safety and Health Convection, 1981

It is an International Labor Organization (ILO) convention which provides for the adoption of a coherent national occupational safety and health policy, as well as action to be taken by governments and within enterprises to promote occupational safety and health and to improve working conditions. This policy shall be developed by taking into consideration national conditions and practice. The Protocol calls for the establishment and the periodic review of requirements and procedures for the recording and notification of occupational accidents and diseases. (ILO, 1981)

4.5.8 Safety Provisions (Building) Convection, 1937

Part IV, Article 16 requires that all necessary personal safety equipment be kept available for the use of the persons employed on the site and be maintained in a condition suitable for immediate use. It further requires workers to use the equipment thus provided and the employer to take adequate steps to ensure proper use of the equipment by those concerned.
Article 18 requires that adequate provision be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work. (ILO, 1937).

4.5.9 Working Environment (Air Pollution, Noise and Vibration) Convection, 1977

It is an ILO Convention concerning the protection of workers against Occupational hazards in the working environment due to air pollution, noise and vibration. The convention provides that, as far as possible, the working environment shall be kept free from any hazards due to air pollution, noise or vibration. To achieve this, technical measures shall be applied to enterprises or processes, and where this is not possible, supplementary measures regarding the organization of work shall be taken instead. (ILO,1977).

CONSULTATION AND PUBLIC PARTICIPATION

5.1 Introduction

The successful planning and implementation of projects is basically determined by effective Consultations and Public Participation (CPP) during the ESIA process. It is a policy requirement by the Government of Kenya which is enshrined in the constitution and a mandatory procedure as stipulated by EMCA Cap 387 for the purpose of achieving the fundamental principles of sustainable development. It is an important process through which stakeholders including beneficiaries, interested, affected and members of public living in the surrounding project areas (both public and private), are given an opportunity to contribute to the overall project design by making recommendations and raising concerns on projects before they are implemented. In addition, the process creates a sense of responsibility, commitment and local ownership for smooth implementation.

This chapter describes the process undertaken during the CPP in order to identify the key issues and impacts of the proposed project. Views and concerns from the local residents, local leaders, surrounding institutions and development partners for the proposed residential development, who in one way or another would be affected or have interest in the proposed development were sought through interviews, administration of questionnaires and public meetings as stipulated in the Environmental Management and Coordination Act Cap 387.

5.2 Objectives of Consultation and Public Participation

This involves consultation and knowledge sharing of the proposed residential project's developmental attributes to the project area and socio-economic development. It aids in the proper implementation, operation and maintenance of the proposed project as well as presenting the local communities with the opportunity to own the project themselves hence creating a sense of belonging and ownership.

The key objectives of the public participation are to:

i. Provide an opportunity for the public to influence project activities in a positive manner
ii. Ensure that important impacts are overlooked and benefits are maximized
iii. Facilitate consideration of project alternatives, mitigation measures and trade-offs;
iv. Improve transparency and accountability of decision-making; and increase public confidence in the Environmental and Social Impact Assessment process and the proposed project's undertaking.
v. Reduce conflict through early identification of contentious issues.

5.3 Sources of Information

Predictions, evaluation and analysis of possible positive and negative impacts of construction, operation and decommissioning of the proposed project were discussed. Prediction of impacts technically characterizes the causes and effects of impacts, and their secondary and synergistic consequences to the environment and the local community. During the environmental and social impact assessment, public participation was a key component in getting information to be incorporated in writing this study report. Both positive and negative views of the perceived affected neighbors were sought. The exercise was conducted by a team of experienced registered environmental and social impact assessment experts via administration of pre-designed

questionnaires, conducting a public forum, interviews with the residents surrounding the proposed project site and discussion with proponent's technical team, review of the facility specifications etc.
(Attached as Appendices, Find Samples of Public Appraisal Questionnaires)

5.4 Methodology

Consultations and public participation were mainly achieved through site reconnaissance and survey, meetings, discussions, direct interviews, and administering of pre-designed questionnaires.

5.4.1 Site Reconnaissance and Survey

Site reconnaissance and survey for the proposed development project was conducted on the proposed project site situated within south C area, Nairobi County. It mainly involved observations, taking photos, site familiarization and collection of primary data on biophysical, socio-economic and environmental and social characteristics of the site and the surrounding area.

5.4.3 Direct Interviews

This method was employed by use of an interview guide to parties involved in the project (e.g., the architect, hydrogeologist, contractor, engineers, etc.). The method was also used during the process of collecting data to random individuals residing and those carrying out business in the area.

5.4.4 Administration of Questionnaires

Properly pre-designed questionnaires were administered to the project area residents and businesses that were likely to be affected by the proposed project activities.
(Attached as Appendices, Find Copies of Filled Questionnaires.)

5.5 Consultation and Public Participation Findings, Sampling, Analysis and Results

5.5.1 Findings

The proposed project site borders mainly residential apartments and small business enterprises. The neighboring developed properties to the proposed project site are at a safe distance from the project site hence negligible impacts expected to affect them. Views, concerns and issues raised by different project interested/affected persons, in relation to the development project were summarised as below.

5.5.1.1 Positive

Different project interested/affected persons felt that the proposed development will lead to the following positive impacts within their area;

i). Increase in provision of housing units in the area.
ii). Creation of jobs and employment opportunities.
iii). Provision of affordable, well modern designed housing units
iv). Business and economy boost and growth

v). Contribution towards improved and growth of infrastructure facilities and services in the area.
vi). Provision of water and other social amenities.
vii). Improvement in security
viii). Increase in population thus increase of customers for the existing businesses.
ix). Contribute towards increase in land/property value
x). New business/venture opportunities in the area.

5.5.1.2 Negative

The public participants also felt that the proposed development project will lead to the following negative impacts within their area;

i). Environmental degradation and pollution
ii). Choking of the existing sewer systems and blockage
iii). Emission of dust and particles.
iv). Air pollution
v). Excessive vibrations and increased Noise pollution
vi). Contributions towards traffic and road congestion
vii). Insecurity
viii). Contribute towards competition and exert pressure in the locally available resources and utilities.
ix). Contribute towards blockage of the storm drainage channels thus resulting to increased flooding in the area.
x). Contribute towards increased waste generation.
xi). It will attract criminal mischief persons.
xii). Contribute towards tribalism, favorism and gender discrimination during employment
xiii). Contribute to degradation of well-maintained and in good condition infrastructures and utilities within the area.

5.5.2 Data Sampling and Analysis

Data collected from the questionnaires were compiled for sampling and analysis. Secondary data were analyzed descriptively using frequencies and percentages. Qualitative data in form of field notes were retyped and analyzed through search of key themes. Quantitative data were analyzed through descriptive statistics with the aid of SPSS computer program.

IDENTIFICATION OF THE PROJECT ANTICIPATED IMPACTS AND MITIGATION MEASURES

6.1 Introduction

This chapter will discuss the prediction, identification and analysis of the anticipated project impacts throughout the project cycle, that is, pre-construction, construction, operation and decommissioning phases. The identified anticipated impacts emanating from the proposed project will result to effects which may be positive or negative on the environmental and social elements thus influencing to analysis and categorizing them into four major parameters, which are;

1. Magnitude - described as being major or minor positive/negative.
2. Duration – refers to period/time and is described as short-term or long term
3. Extent – refers to coverage and it is evaluated in terms of being specific (localized) or widespread
4. Reversibility – described as in terms of being reversible or irreversible.

6.2 Anticipated Potential Impacts

On the basis of information gathered during both desktop and field study, the potential social and environmental impacts were identified and determined through discussions with the project consultant, stakeholder participation, a review of EIA guidelines and professional judgment. The impacts were summarised as shown in the table below based on their magnitude, duration, extent and reversibility;

Table 2: Table of Anticipated Impacts Throughout the Project Cycle

Anticipated Impact	Impact Analysis Throughout Project Cycle		
	Construction Phase	***Operation Phase***	***Decommissioning Phase***
Employment opportunities	Major positive Short term Widespread Reversible	Major positive Long term Widespread Irreversible	Major positive Short term Localised Reversible
Provision and increase in housing facilities		Major positive Long term Specific Irreversible	
Locals living standards upgrade	Major positive Short term Specific Reversible	Major positive Long term Widespread Irreversible	Major positive Short term Specific Reversible
Optimal land utilisation as a resource	Major positive Short term Specific Reversible	Major positive Long term Specific Irreversible	Minor positive Short term Specific Reversible
Increase in land/property value	Major positive Short term	Major positive Long term	Major positive Short term

Anticipated Impact	Impact Analysis Throughout Project Cycle		
	Construction Phase	***Operation Phase***	***Decommissioning Phase***
	Specific Irreversible	Specific Irreversible	Specific Irreversible
Economic boost and upgrades	Major positive Short term Widespread Reversible	Major positive Long term Widespread Reversible	Minor positive Short term Widespread Reversible
Increase in revenue base	Major positive Short term Widespread Reversible	Major positive Long term Widespread Reversible	Minor positive Short term Widespread Reversible
Business/venture opportunities	Major positive Short term Widespread Reversible	Major positive Long term Widespread Reversible	Minor positive Short term Specific Reversible
Outlook change of the area	Major positive Long term Specific Irreversible	Major positive Long term Specific Reversible	Major positive Long term Specific Irreversible
Fulfilment of the proponent's desire	Major positive Short term Widespread Irreversible	Major positive Long term Widespread Irreversible	Minor positive Short term Widespread Irreversible
Solid waste generation	Major negative Short term Specific Irreversible	Major negative Long term Specific Irreversible	Major negative Short term Specific Irreversible
Increase generation of effluent/liquid waste	Major negative Short term Specific Irreversible	Major negative Long term Specific Irreversible	Major negative Short term Specific Irreversible
Air pollution and dust particles emission	Major negative Short term Specific Reversible	Minor negative Short term Specific Reversible	Major negative Short term Specific Irreversible
Noise pollution and excessive vibrations	Major negative Short term Specific Reversible	Minor negative Short term Specific Reversible	Major negative Short term Specific Reversible
Water demand and increased usage	Major negative Short term Widespread Irreversible	Major negative Long term Widespread Irreversible	Major negative Short term Widespread Irreversible
Energy demand and increased usage	Major negative Short term	Major negative Long term	Major negative Short term

Anticipated Impact	Impact Analysis Throughout Project Cycle		
	Construction Phase	*Operation Phase*	*Decommissioning Phase*
	Widespread Irreversible	Widespread Irreversible	Widespread Irreversible
Surface run-off and storm water drainage	Major negative Short term Widespread Irreversible	Major negative Long term Widespread Irreversible	Minor negative Short term Widespread Irreversible
Oil leakage and spills	Minor negative Short term Specific Irreversible	Minor negative Long term Specific Irreversible	Minor negative Short term Specific Irreversible
Occupational health and safety	Minor negative Short term Specific Reversible	Minor negative Long term Specific Reversible	Minor negative Short term Specific Reversible
Impacts on workers' and community health and safety	Major negative Short term Specific Reversible	Minor negative Long term Specific Reversible	Major negative Short term Specific Reversible
Fire outbreak and safety	Major negative Short term Specific Reversible	Major negative Long term Specific Reversible	Major negative Short term Specific Reversible
Increase in social vices	Minor negative Short term Specific Reversible	Major negative Long term Specific Reversible	Minor negative Short term Specific Reversible

6.2.1 Positive Impacts

6.2.1.1 Employment Opportunities

One of the major positive impacts associated with the proposed development project is creation of new and additional job opportunities to the local youths in the area especially casual workers, masons, carpenters, joiners, electricians and plumbers. This shall therefore contribute positively towards the betterment of their living standards as well as meet their daily basic needs.

6.2.1.2 Provision and Increase in Housing

High demand of affordable housing is an issue of concern in urban areas due to high population increase and its evident because also the national government is currently trying to address this issue through its goals in agenda four, where one of the goals ids to provide modern affordable housing facilities to the public residents in urban areas.

The proposed development is in line with helping to address the issue on housing since once it is implemented and seen through its completion it will provide modern designed and affordable houses to the general public.

6.2.1.3 Living Standards Upgrade

Standards of living for the individual local people will be improved as the proposed project will employ the unemployed local youths during the construction and operation phases. Employment will enable the jobless youths earn a source of income from the project and thus enabling them to improve and upgrade their standards of living.

6.2.1.4 Optimal Utilisation of Land and Use as a Resource

This is evident since the project area is under utilised thus currently not adding much value as expected to the developer, but once the project is implemented and the project carried out to completion, the current parcel of land will be in full utilisation in providing housing facilities to the county residents and boost proponents income gains.

6.2.1.6 Economic Boost and Upgrade

Through the use of locally available raw materials during the construction phase of the project including cement, concrete and ceramic tiles, timber, sand, ballast and electrical cables among others the project will contribute positively towards growth of the economy by contributing to the Gross Domestic Product (GDP). 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.

6.2.1.7 Increase in Revenue Base

There will be positive gain for the revenue system through payment of relevant taxes and rates thus the proposed project will contribute towards the national and local revenue earnings.

6.2.1.8 Provision of Ready Market for Construction Goods and Services

The proposed project will provision a ready market for suppliers of construction and building materials and services. The project will require large quantities with good quality of building materials most of which will be sourced locally. This shall provide ready market for building material local suppliers such as quarrying companies, hardware shops and individuals with such other materials required for effective completion of the project.

There will also be a ready market for services required during construction phase of the proposed development and this includes but not limited to; casual worker's services, masons, carpenters, joiners, mechanics, electricians and plumber's services. All the required services and goods required for the proposed project will be sourced locally.

6.2.1.9 Businesses/Venture Opportunities

The proposed development project will create a conducive environment for new businesses. This will result to mushrooming of businesses such as food kiosks, where the owners will be responsible for preparing food for the site workers. The project will also influence small scale traders e.g., hawkers who will be attracted to sell their products to the site workers.

6.2.1.10 Outlook Change of the Area

The proposed development project area will completely change in its outlook once the apartment building has been erected and this will lead to improvement in the aesthetic value in the area.

6.2.1.11 Fulfillment of the Proponents' Desire

Once the proposed development project has been approved and given a go ahead by the relevant authorities such as NEMA, NCA, Physical County Planners, County Public Health, etc. and has seen its development phases to completion, it will enable the proponent to fulfil their desires, which are but not limited to:

a) To improve their economic gains.
b) Maximize utilization of the available land.
c) To provide additional adequate, affordable and modern designed housing units.
d) To increase their revenue base.

6.2.1.12 Increased in Improved Security

Security will be ensured around the proposed development through installation of CCTV surveillance cameras, distribution of suitable security lights and presence of 24-hour security guards from a contracted security company. This will lead to improvement in the general security within the surrounding area.

6.2.1.13 Increase of Infrastructure Services and Facilities.

This being a project that will serve to provide housing units to willing people from within and outside Nairobi County, there is need to provide and improve on services and utilities that will serve the people conveniently without degrading nor depleting the existing ones. The roads, sewer system and water delivery systems will be improved and expanded to cater for the demand.

6.2.2 Negative Impacts and Potential Mitigation Measures

6.2.2.1 Solid Waste Generation

Solid waste will be a major negative impact during the project cycle. The waste will consist of construction debris, cement bags, wood, broken glasses, containers, metal, sharp objects such as nails, organic waste, paper, and plastic among others during the development construction phase. The waste may result to blockage of drainage systems, choking of water bodies and have a negative impact to the human health. During operation phase, wastes may be organic emanating from the kitchen, paper, plastic and containers. Unfit disposal of construction waste could have medium or long-term environmental and public health impact. Extent of this impact will be local to areas where waste is dumped or their immediate neighborhood.

Potential Mitigation Measures

i). Segregation of waste at the source during the project cycle.
ii). Use of an Integrated Solid Waste Management System (ISWMS); through a hierarchy of options: source reduction, recycling, composting and reuse, will facilitate waste handling during operation/occupation phase.

iii). Engage the services of registered waste handlers to collect and transport waste to designated disposal sites.
iv). Provision for waste management rooms at strategic places within the development facility.
v). Efficient use of building material to reduce waste and recycling/reuse where feasible.
vi). To manage waste in line with the Waste Management Regulations, 2006.

6.2.2.2 Increase Generation of Effluent

There will be increased generation in liquid waste as a result of increased population inflow within the project site both during construction and operation phases of the development. Inadequate provision of sanitary facilities during the construction period may result to defecation of secluded areas within the site creating unsanitary conditions and source for fly infestation. Improper liquid waste disposal may be a threat to human health for both workers and the neighboring community and also result to contamination of water resources, land and air. All liquid waste shall be properly managed through connection to the existing sewerage system that serves the area.

Potential Mitigation Measures

i). Connecting and channeling all liquid/effluent wastes to the existing city county sewerage system.
ii). Provision of adequate and appropriate sanitary facilities for the workers during construction phase and tenants during the operation phase of the facility.
iii). Proper decommissioning of the sanitary facilities shall be carried out once construction is complete.
iv). Sanitary facilities shall be kept clean always through regular cleaning.
v). Ensure regular maintenance of foul water drainage works at the premises to prevent clogging and fore-stall breakdowns.
vi). The design of the internal sewerage system shall consider the estimate discharges from individual sources and the cumulative discharge of the entire project, that is, it will have the capacity to consistently handle the loads even during peak volumes.
vii). All drain pipes passing under building should be of heavy duty PVC pipe tube encased in concrete surround.
viii). All manholes should have heavy-duty covers set and double sealed airtight as approved by specialists.

6.2.2.3 Air Pollution, Particles and Dust Emission

Air pollution will be a major negative impact during the construction phase as a result of increase in levels of fugitive dust emanating from the demolition, excavation, construction activities and stockpiled earth materials. This may be a public health hazard resulting to nuisance to the workers and the public. Air pollution may also be as a result of emission of fumes and particles or combustion of fossil fuels from the construction machinery. This is expected as a short term and reversible impact after the end of construction.

Potential Mitigation Measures

i). Regular sprinkling of water on work areas to prevent fugitive dust violations.
ii). Use of dust nets/screens around the construction site to contain and arrest dust.

iii). Use environmentally friendly fuels such as low sulphur diesel.
iv). Minimize the period for idling of machinery and construction vehicles.
v). Minimize exposed areas through the schedule of construction activities to enable dust control.
vi). Regular and prompt maintenance of construction machinery and equipment to minimize generation of hazardous gases.
vii). Ensure no burning of waste such as paper and plastic containers on sites/non-designated areas.
viii). Onsite dirt piles or other stockpiled material should be covered, wind breaks installed, water and/or soil stabilizers employed to reduce wind-blown dust emissions.
ix). Restricting heights from which materials are to be dropped, as far as practicable to minimize the fugitive dust arising from unloading/loading.
x). Where a vehicle leaving a construction site is carrying a load of dusty materials, the load shall be covered entirely by clean impervious sheeting to ensure that the dusty materials will not leak from the vehicle.
xi). Provide PPEs to the workers in dusty areas on the site.
xii). Monitor the air pollution levels regularly as per the Air Quality regulations.

6.2.2.4 Noise and Excessive Vibrations

Noise pollution will be a negative impact and short term limited to the construction period. The noise will be caused by the construction activities, use of heavy machineries and vehicles during transportation of materials to and from the site. Vibrations will be experienced during the concrete vibration during concreting of the structural elements and hacking of the walls and building elements during plastering of the structure. On occupation and operation of the facility, there will be minimal noise and vibrations from the units.

Potential Mitigation Measures

i). Construction works shall be carried out only during the day from 0800hrs to 1800 hrs.
ii). Noise shields shall be used on noisy equipment, such as corrugated iron sheet structures, to minimize the exposure to the neighbors and other workers within the site
iii). The construction vehicles and machinery shall be switched off when not in use to reduce idling time.
iv). All noisy activities shall be scheduled concurrently during the construction period to reduce the exposure period to the PAPs.
v). Equipment installed with noise abatement devices shall be used as much as practicable.
vi). All machines and equipment shall be maintained regularly to reduce frictional noise.
vii). All workers shall be trained and provided with PPEs such as helmets, earmuffs, dust mask, etc. which will be used at all times when operating within the site area.
viii). Drivers delivering materials shall avoid unnecessary horning of the trucks/vehicles.
ix). Bill board shall be erected at the construction site entrance to notify of the construction activities and timings.
x). Regular monitoring of noise levels at the site as per the regulations.

6.2.2.5 Water Demand and Usage

The demand and usage for water will increase during the project cycle. During construction, water will be required for activities such as cement mixing, curing of concrete, sprinkling of water on dusty areas to suppress dust and drinking water for workers. During operation phase, water will be needed for bathing, washing, cleaning, drinking and cooking. This will place strain on the existing water supply by Nairobi County Sewerage and Water Company (NCSWC).

Potential Mitigation Measures

i). Drill a borehole to supplement the county supply.
ii). The contractor shall use water bowers and tankers to bring in water for construction activities i.e. during periods of high water demand (i.e. during slab formation). Water fetching shall however be subject to authorization by the relevant authority.
iii). Provision of adequate underground and roof tanks for water storage that covers two days' water demand.
iv). Use water efficient appliances and fixtures for conservation of water during the project cycle.
v). Provide notices and information signs to sensitize on means and needs to conserve water resource i.e., "Keep/Leave the Tap Closed", etc. This will awaken the civic consciousness of the workers and residents with regard to water usage and management.
vi). Prompt detect and repair of all the water fixtures and fittings to reduce water wastage

6.2.2.6 Energy Demand and Usage

There shall be increased demand and use of energy during the construction stage (fuel for running machinery and other equipment) and during operation phase (electricity used by the occupants of the units). Energy conservation is thus fundamental and shall involve optimum use of petroleum products (diesel and gasoline), electrical appliances (equipment), lighting systems and other electric machinery as used for different purposes. It also includes use of renewable energy sources.

Potential Mitigation Measures

i). Turn off machinery and equipment when not in use.
ii). Use of solar energy as an alternative source of energy.
iii). Monitor energy use during construction and set reasonable limit.
iv). Put off all lights immediately when not in use or are not needed.
v). Install and routine maintenance of energy efficient appliances e.g., LED bulbs etc.
vi). Exterior lights shall be controlled by a programmable timer.
vii). The water booster set will contain inverter pumps for energy saving and precise control of flow and pressure rate.
viii). Generator should be provided as a full backup energy source throughout the development.

6.2.2.7 Surface Run-off and Storm Water Drainage

The proposed project construction phase will lead to increased release of sediments into the drainage systems. The building roofs and pavements may lead to increased volume and velocity of storm water or run-off flowing across the area covered by the building. This can lead to

increased amounts of storm water entering the drainage systems, resulting in overflow and damage to such systems.

Potential Mitigation Measures

i). Semi permeable materials will be used for construction of pavements.
ii). After completion of construction, the proponent shall embark on comprehensive landscaping.
iii). Drainage channels shall be covered; say with gratings, to avoid occurrence of accidents and entry of dirt.
iv). Construct gently sloping drains to convey water at non-erosive speed.

6.2.2.8 Fire Outbreak Risks Occurrence, Response and Safety

The operations that lead to fire outbreaks include poor handling of electricity systems, faulty electrical equipment, carelessness etc. These should be avoided both during construction and operation phases of the project through provision of firefighting facilities, proper training and sensitizations.

Potential Mitigation Measures

i). Post "No smoking signs" where flammable materials are stored.
ii). Hire competent and properly authorized electrical contractor to do the electrical works.
iii). Train staff on the use of the available firefighting equipment. At least one person trained on handling firefighting equipment should be available through-out the construction phase of the project.
iv). Conduct regular firefighting drills within the site.
v). Develop and post at the site fire emergency and evacuation procedures.
vi). Provide adequate number of appropriate firefighting equipment at accessible strategic places within the property.
vii). Organize for inspection and maintenance of fire equipment at least once in a period of six months.
viii). Maintain on site telephone contacts for fire brigade, G4S, fire brigade and St. Johns ambulance service provider.

6.2.2.9 Oil Leakages and Spills on the Environment

Though this may not be common at the site, it is wise to control and observe the little that could occur especially during maintenance of the involved machinery. During operational phase, oil spills might occur at the parking lots.

Potential Mitigation Measures

i). All machinery shall be keenly inspected not to leak oils on the ground. This can be ensured through regular maintenance.
ii). Install oil trapping equipment in areas where there is a likelihood of oil spillage
iii). Maintenance will be carried out in a well-designed and protected area and where oils/grease is completely restrained from reaching the ground. Such areas should be covered to avoid storm from carrying away spilled oils into the soil/water systems.
iv). All oils/grease and materials will be stored in a site's store, in the contractor's yard.
v). Proper disposal of oil handling materials such as drums, oily clothes/papers/materials and cans.

vi). All drainage facilities shall be fitted with adequate functional oil-water separators and silt traps.
vii). Collect the used oils and re-use, re-sell, or dispose of appropriately using expertise from contracted licensed waste handlers;

6.2.2.10 Emergence and Spread of Social Vices

The proposed development will lead to potential for employment opportunities and access to new services which will draw people to the area more specifically the project site. This factor will further lead to a temporary increase in economic activities and employment of skills for the development. This will lead to population influx which might lead to changes in or unwanted behaviors in the area. This unwanted or change in behavior may be in the form of loose morality, an increase in school drop-out due to cheap labor, child labor, drug use and abuse, theft/robbery and increased incidences of HIV/AIDS and related infections/diseases and other communicable diseases.

Potential Mitigation Measures

i). To minimize project effects on local social set up, the proponent will;
ii). The contractor shall ensure that there is adequate street lighting and a security guard within the site to help curb with issues that may arise from theft. Also installing 24hr operating CCTV surveillance, which will be monitored regularly.
iii). It is recommended that the contractor employs workers from the immediate area where possible to avoid social conflict
iv). Conduct periodic sensitization forums for employees on ethics, morals, general good behavior and the need for the project to co-exist with the neighbors.
v). Offer awareness, guidance and counselling on HIV/AIDS and other STDs to employees;
vi). Provide safety tools such as condoms to employees
vii). Ensure enforcement of relevant legal policy on sexual harassment and abuse of office.

6.2.2.11 Occupational Health and Safety

During construction phase, there will be increased air and noise pollution which are considered harmful to human health. The neighbors and workforce involved shall be subjected to these environmental hazards putting them at high risk.

Waste material such as pieces of glass and nails left lying on the ground may cause injuries/accidents to the workers on site. Food for the construction workforce is usually provided by mobile individuals most of which operates without licenses. This can compromise health of the workers especially if such foodstuffs are prepared in unhygienic conditions.

Potential Mitigation Measures

i). Provide adequate and functional sanitary facilities for the workers.
ii). All workers shall use properly fitting PPEs to avoid injuries and illness which include working boots, overalls, helmets, goggles, earmuffs, masks, gloves etc.
iii). Provide appropriate signage and warnings in work areas to avoid injuries to the workers and occupants.
iv). The contractor shall adapt a suitable emergence response plan to manage occurrence of anticipated hazards during construction phase.

v). Safety awareness may be gained through regular safety meetings, safety training or personal interest in safety and health.
vi). Provide first aid facilities and ensure that workers are trained on emergency response such as first aid skills.
vii). Local individuals preparing food for the workers at the site shall be controlled, monitored and evaluated to ensure that food is hygienically prepared.
viii). Workers shall always be sensitized on social issues such as drugs, alcohol, diseases such as HIV/AIDS and STIs etc.
ix). Comply with OSHA 2007 and all other relevant regulations governing health and safety of workplaces.

6.2.2.12 Impacts on Workers' and Community Health and Safety

Workers and local community members in the project area may be exposed to various risks and hazards including falling from height during construction which may lead to fatality, falling objects, collapsing of excavations, road accidents, slips and trips, flammable and explosive substance, electrical shocks, dust, noise and vibrations, poor hygiene, fire exposures, bruises and cuts, etc.

Potential Mitigation Measures

The proponent and project contractor will implement all necessary measures to ensure health and safety of the workers and the general public during construction, operation and decommissioning of the proposed development as stipulated in the Occupational Safety and Health Act, 2007

OCCUPATIONAL HEALTH AND SAFETY

7.1 Introduction

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

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

a) Risks of slips, trips and falls
b) Risks related to instability
c) Risks related to traffic
d) Risks related to construction machinery
e) Risks related to electricity
f) Risks related to gas
g) Fire and explosion risks

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

7.2 Principles of Occupation Health and Safety (OHS)

These principles involve the following three main actions:

1. Risk Identification and Assessment: - This shall involve identifying the various hazards and risk at the site that have the potential to occur, all the people who may be at risk such as employees, cleaners, visitors, contractors, the public, etc. as well as determine whether a control program is required for a particular hazard.
2. Risk Communication: - Refers to the exchange of real-time information, advice and opinions between workers and people facing threats to their health, economic or social well-being. The ultimate purpose of risk communication is to enable people at risk to take informed decisions to protect themselves and their loved ones. Risk communication uses many communications techniques ranging from media and social media communications, mass communications and community engagement. It requires a sound understanding of people's perceptions, concerns and beliefs as well as their knowledge and practices.
3. Risk Management: - This involves actions implementing risk evaluation decisions, monitoring, re-evaluation and prioritizing, and compliance with legal requirements that safeguard health and safety at construction sites The OHS personnel shall be required to determine if existing control measures are adequate or if more should be done.

7.3 Construction Safety, Emergency Procedures and Action Plan

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

1. Create a culture of safety within construction by planning, creating and supporting ongoing OHS awareness campaigns that promote the importance of workplace occupational health and safety with industry stakeholders as well as consumers.
2. Increase safety knowledge in the construction site by promoting awareness of the top construction sector hazards (trips and falls from heights, motor vehicle incidents, struck by objects, machinery) and how to control these hazards through new and improved information channels
3. Support the role of the supervisor in creating and maintaining a culture that fosters worker participation in identifying and mitigating workplace hazards.
4. Create a strategy for continuous health and safety learning for the construction workers e.g., by conducting regular training sessions and drills on how to handle emergencies and accidents at site.
5. Identify, review and enhance health and safety content of apprenticeship training standards to keep abreast with any new methods that are effective in promoting site safety.
6. Provide suitable and well maintained Personal Protective Equipment (PPEs) to all the workers and visitors and ensure they are utilized at all times and in the right manner. These include safety boots, helmets, gas masks, gloves and googles.
7. Place visible and readable signs to control the movement of vehicles and notify motorists and pedestrians around the, and workers in the site.
8. Enclose or isolate hazardous parts of machines or sites within the construction site to minimize exposure
9. Prepare and maintain emergency response equipment such as fire extinguishers and first aid kits in readiness for use when need be.
10. Encourage reporting of safety incidents as soon as they occur at the site, so as to enable a quick action to alleviate the extent of the damage.
11. Comply with the provision of the Occupational Safety and Health Act, (OSHA), 2007

ANALYSIS OF PROJECT ALTERNATIVES

8.1 Introduction

The various project alternatives were analysed for the proposed housing development. The options included the Relocation Project Alternative, Zero/No Project Alternative", The Proposed Project Alternative, Alternative Construction Materials and Technologies and Technology Scale and Waste Management Options. With such information, the reviewers will have a basis for decision making.

8.2 Relocation Option

Relocation option to a different site is an option available for the proposed project. At present the proponent does not have an alternative site where this can be relocated to, meaning he/she has to look for the land elsewhere. Looking for the land to accommodate the scale and size of the proposed project and completing all the required official transactions may take up to more than one year although there is no guarantee that the land would be available. The developer will spend another one year on design and approvals since design and planning has to be according to site conditions. Project design and planning before the stage of implementation will cost the developer millions of shillings. Whatever has been done and paid to date will be counted as losses to the developer.

8.3 Zero/No Project Alternative

This alternative implies that the status quo is maintained with no development of the proposed development facilities. This would avoid the realization of the impacts associated with the proposed development of housing units. However, with the increasing demand for affordable, modern designed housing facilities especially in Nairobi County, a lack of development of the proposed facility will mean that the existing shortfall in urban housing sector will continue to prevail unabated. The resources in the area would continue to be underutilized and the numerous benefits to be gained associated with the proposed development would not be realized. Therefore, the "Zero/No Option alternative" is the least preferred and is deemed inappropriate on the basis that supply of housing unit facilities is a necessity in the county and the country at large.

8.4 The Proposed Project Alternative

The proposed housing development project shall comprise of one block with ten floors. Each floor will consist of twelve (12) bedsitter units. The project will entail a total of one hundred and twenty (120) units, a high-speed lift, a borehole, parking space and other salient and auxiliary facilities. The project is in line with the planning of the area as the region allows such project developments and also this is evident from the existing and ongoing developments in the area and approval of architectural design drawing by the relevant authority. The government through the Big 4 Agenda on affordable Housing encourages developers to construct more housing units to alleviate the increased demand for housing especially in the urban areas. The proposed project will provide more habitable units, increase in government revenue through taxes, provide ready market for construction goods and services and maximum optimal utilisation of land, among

other benefits. Thus, the project is a timely venture and this is the best option for the proposed development project.

8.5. Alternative Land Use Activities

The project proposed site area is in a residential zone i.e., used for residence. Alternative land use activities such as farming and car repairs will conflict with surrounding land use activities. For uniformity purposes, the proponent is interested in construction of residential apartment similar both in form and character to what is existing in the neighborhood.

8.6. Alternative Construction Materials and Technologies

The proposed project will be constructed using reinforced concrete, natural stones for the walling, cement for mortar and plaster works, structural steel, metal scaffolds and formwork. The concrete structure will be built using locally sourced sand, cement, metal bars and fittings that meet the Kenya Bureau of Standards (KEBS) requirements. The metal scaffolds will be advantageous than timber because it will reduce the wasting of precious trees, has a longer lifetime, provides a steady and firm standing, easily assembled and dismantled and it increases the work efficiency. The equipment that saves on water and energy will be given priority during the construction of the proposed project. The technologies available include the conventional brick and mortar style, concrete frame construction, prefabricated concrete panels, timber construction, steel and aluminium frame and Expanded Polystyrene Technology (EPT). The developer has preferred the use of reinforced concrete frame construction as the technology is durable, offers outstanding resistance to explosion and/or impact and performs well during both natural and manmade disaster. Reinforced concrete can also endure very high temperatures from fire for a long time without loss of structural integrity.

8.7. Waste Water Management Alternatives

Four locally available technologies are discussed below: -

8.7.1 Alternative One: Waste Water Treatment Plant

This involves the construction of a plant that will enable the recycling of the waste water from the project activities to reusable standards and utilised within the site in activities such as irrigating the flower gardens and flashing of the toilets. It is usually expensive to construct and maintain, but it is the most reliable, efficient and cost-effective in the long term.

8.7.2 Alternative Two: Use of Stabilization Ponds/Lagoons

This refers to the use of a series of ponds/lagoons that allow several biological processes to take place, before the water is released back to the river. The lagoons can be used for aquaculture purposes and irrigation. However, they occupy a lot of space but are less costly. No chemicals are used/heavy metals sink and decomposition processes take place. They are usually a nuisance to the public because of smell from the lagoons/ponds. This option is not preferable in the area because the required space is not only available, and the local community are not likely to accept the option.

8.7.3 Alternative Three: Use of Constructed/Artificial Wetland

This is one of the powerful tools/methods used in raising the quality of life and health standards of local communities in developing countries. Constructed wetland plants act as filters for toxins. The advantages of the system are the simple technology, low capital and maintenance costs required. However, they require space and a longer time to function. Long term studies on plant species on the site will also be required to avoid weed biological behavioral problems. Hence it is not the best alternative for this kind of project

8.7.4 Alternative Four: Use of Septic Tank

This involves the construction of underground concrete-made tanks to store the sludge with soak pits. This option is viable in instances where the project is not served with a sewer system or is far from a sewer line.

8.7.5 Alternative Five: Use of Existing Sewer Line Systems

This involves seeking approvals from the county council's and connecting the proposed project development with the county council sewer system that exists and offers services within the area. This is the most viable alternative since the proposed development surrounding site area is connected and served by the county council sewer system in addressing waste water issues. The developer has opted in using the county council sewer systems existing and connected in the area for the disposal and management of waste water generated throughout the project cycle.

8.8. Solid Waste Management Alternatives

Throughout construction, the project will produce wastes such as soil, wood chips, metal scraps and paper wrappings among other. Wastes to be generated during operation phase are mainly domestic in nature. The Proponent is expected to observe EMCA (Waste Management Regulations, 2006).

An Integrated Solid Waste Management System (ISWMS) is recommended for management of all solid wastes generated throughout the projects phases. The following shall be given preference in its descending order:

i). The developer shall give priority to waste reduction at source of the materials. This option will demand a solid waste management awareness programme in the management and the residents.

ii). Secondly, Reducing, Recycling, Reuse and composting of the waste. This calls for a source separation programme to be put in place. The recyclables will be sold to waste buyers within South C area and Nairobi County or donated.

iii). The third priority in the hierarchy of options is combustion of the wastes that are not recyclable.

iv). Finally, sanitary land filling will be the last option for the developer to consider.

ENVIRONMENTAL AND SOCIAL MONITORING AND MANAGEMENT PLAN

9.1 Introduction

The Environmental, Social Monitoring and Management Plan is an important process of ensuring project sustainability and environmental and social protection. The process and plan involve measurement of relevant parameters, at a level of details accurate enough, to distinguish the anticipated changes. It is therefore important to integrate in the environmental and social impact assessment process, an environment monitoring and management plan that includes the monitoring of the progress of mitigation measures being implemented while also monitoring the project for any new negative impacts that were not earlier considered or anticipated. Monitoring aims at determining the effectiveness of actions to improve environmental quality. The ESMMP outlined in the tables below addresses the identified issues of concern (potential negative impacts) and mitigation measures as well as roles, costs and monitorable time-frame that can help to determine the effectiveness of actions to upgrade the quality of environment; as regards the proposed project.

The ESMMP have considered for all phases; construction, operational and decommissioning phases.

9.2 Construction Phase

Table 3: ESMMP for the Development Project During Construction Phase

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
Site Disturbance and Degradation	➢ Dumping of excess excavated materials to sites designated by NEMA and Council ➢ Restoration of sites Excavated	Contractor	Throughout the construction period	200,000
Emission of Dust, Particles and Air Pollution	➢ Regular sprinkling of water on work areas and access road to prevent fugitive dust violations. ➢ Careful screening of construction site to contain and arrest construction related dust. ➢ Enclosing, covering and watering of exposed stockpiles e.g., sand. ➢ Regular and prompt	Proponent, Contractor, Workers & Drivers	Daily inspection and Routine maintenance	350, 000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	maintenance of construction machinery and equipment to minimize generation of hazardous gases. ➢ Ensure training of all personnel working on the project site on air quality management during the construction phase. ➢ All drivers shall be under strict instructions to minimize unnecessary trips. and idling of engines. ➢ Use environmentally friendly fuels such as low sulphur diesel. ➢ Restricting heights from which materials are to be dropped, as far as practicable to minimize the fugitive dust arising from unloading/loading. ➢ Provide personal protective equipment (PPE) such as nose masks, goggles etc. to the workers in dusty areas within the site. ➢ Monitor the air pollution levels regularly as per the Air Quality regulations			
Noise Pollution	➢ Ensure construction works are carried out only during the daytime i.e., from 0800hrs to 1800 hrs. ➢ Ensure that all site workers are provided with and wear PPE at all times	Proponent, Contractor, Workers & Drivers	Weekly inspection Routine maintenance	250,000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	➢ Ensure use of suppressors or noise shields on noisy equipment ➢ Ensure regular and prompt maintenance of the machineries and equipment to suppress frictional noise ➢ Reduce idling time on trucks and other noisy equipment. ➢ Operate noisy machinery only when necessary and switch them off when not in use. ➢ Trucks used at construction site shall be routed away from noise sensitive areas where feasible and that the drivers avoid unnecessary horning of the trucks/vehicles ➢ Comply with EMCA (Noise and Excessive Vibration pollution control) Regulations 2009			
Generation of Effluent and Solid Wastes	➢ Direct all liquid waste to the sewer system serving the site area ➢ Engage services of a registered NEMA waste handler to collect and dispose the solid waste regularly at approved disposal points ➢ Ensure covering of the trucks during transportation of the building materials and waste. ➢ Segregate waste at the site, recyclable/reusable materials	Proponent, Contractor, Workers & Drivers	Weekly inspections	350,000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	and hazardous waste for appropriate disposal ➢ Sensitize workers on the reuse of materials where feasible ➢ Ensure sanitary facilities are provided at the site and proper decommissioning after the construction phase			
Increase in Water Demand and Usage	➢ Drill a borehole to supplement the existing county water supply ➢ Employ services of waters vendors to supplement water supply ➢ Use of water efficient appliances, fittings and fixtures at the site ➢ Sensitize workers to reduce water wastage or reuse water where feasible ➢ Connect to the NCSWC water supply after acquisition of relevant permits	Proponent, Contractor & Workers	Daily inspection	350,000
Surface Run-off and Storm Water Drainage	➢ Routine maintenance of storm drains along the access road ➢ Ensure efficiency of drainage structures through proper design and maintenance. ➢ Proper installation of cascades to break the impact of water flowing in the drains	Proponent & Contractor	Routine maintenance	250,000
Oil leakage,	➢ Proper storage, handling and	Proponent &	Routine	200,000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
Spills and Pollutions	disposal of new/used oil and related wastes ➢ Maintain construction machinery and equipment to avoid leaks ➢ Maintenance of construction vehicles and equipment to be carried out in the contractors' yard (off the site)	Contractor	maintenance & Weekly inspection	
Insecurity	➢ Employ security guards to monitor movement of people in and out of the property and keep records of movement of people and vehicles in and out of the construction site ➢ Construct temporary barrier (iron sheet) around the site ➢ Install security lights around the property. ➢ Installation of a CCTV within the site area	Proponent, Management & Contractor	Daily Inspection	250,000
Fire Occurrence Incidence and Emergencies	➢ Provide firefighting equipment at strategic points within the site ➢ Ensure regular maintenance of firefighting equipment ➢ Sensitize the workers on fire risks and train them on first aid skills ➢ Prepare effective emergency response plan ➢ Provide emergency numbers at strategic points within the site ➢ Use of signage at strategic places within the site such as	Contractor, Proponent & Workers	Monthly inspection & Routine maintenance	200,000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	"No smoking" signs where flammable materials are stored			
Increase in Social Vices	➢ Periodic sensitization forums for employees on ethics, morals; general good behavior and the need for the project to co-exist with the neighbors ➢ Guidance and counselling on HIV/AIDS and other STDs to employees ➢ Provision of condoms ➢ Contractor to have a strong policy on sexual harassment and abuse of office guided by proponent's policy on the same	Contractor & Proponent	Throughout the construction phase	70,000
Health and Safety of Workers	➢ Ensure construction works are limited to daytime only ➢ Workers to be adequately insured against accidents ➢ All workers shall be sensitized before construction begins on how to control accidents related to construction. ➢ Keep record of the public emergency service telephone numbers including Police, Fire brigade and Ambulance at strategic points ➢ Provide first aid kits facilities at strategic places in the site ➢ Provide PPEs to the workers	Proponent, Contractor & Workers	Daily inspection	300,000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	and ensure that they wear at all times ➢ Ensure that the workers are registered with NHIF / NSSF and remits appropriate fees ➢ Prepare a comprehensive contingency plan before construction begins on accident response			

9.3 Operational Phase

Table 4: ESMMP for the Development Project During the Operational Phase

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
Increased Generation in Solid Waste.	➢ Designate a temporary waste storage area within the development and provide waste collection containers ➢ The proponent shall ensure regular collection of wastes to avoid accumulation of waste. ➢ The proponent shall contract a NEMA licensed waste handler for collection of wastes and disposal at licensed disposal sites. ➢ The proponent shall ensure all wastes are handled in compliance with the provisions of EMCA, Waste Management Regulations, 2006	Proponent, management & tenants	Periodic inspections	250,000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
Liquid Waste	➢ Ensure sanitary facilities are kept clean always through regular cleaning ➢ Ensure regular maintenance of foul water drainage works at the premises to prevent clogging and fore-stall breakdowns ➢ Frequent monitoring of the internal drainage system	Proponent, Management & Tenants	Periodic inspection Routine maintenance	150,000
Air Pollution	➢ Ensure regular collection and disposal of solid waste to avoid air pollution ➢ Periodic maintenance of generator and water pumps ➢ Comply with Air Quality regulations	Proponent, Management & Tenants	Routine inspection and maintenance	100,000
Increased Water Demand and Usage	➢ Use water efficient appliances and fixtures for plumbing products and white goods ➢ Prompt detect and repair of all the plumbing products and white goods ➢ Provision of rain water harvesting facilities to supplement other sources of water supply ➢ Provision of roof/underground tanks for water storage ➢ Regular maintenance of all the water components ➢ Encourage water reuse/recycling where	Proponent, Management & Residents	Routine maintenance & Periodic inspection	250,000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	feasible ➢ Provide notices and information signs to sensitize on means and needs to conserve water resource i.e., "Keep/Leave the Tap Closed", etc. This will awaken the civic consciousness of the residents with regard to water usage and management.			
Excessive Vibrations and Noise Pollution	➢ Installation of silencers on the generators and transformer rooms ➢ Do annual noise measurements ➢ Sensitize residents on minimal permissible noise levels ➢ Comply with EMCA (Noise and excessive vibration pollution ➢ control) Regulations 2009	Proponent, Management & Residents	Routine inspection	150,000
Storm Water Drainage	➢ Proper maintenance of drainage structures ➢ Inspection and maintenance of water harvesting gutters and storage tanks	Proponent, Management & Residents	Routine inspection and maintenance	100,000
Increased Energy Demand and Use	➢ Use solar energy as an alternative source of energy ➢ Use energy efficient appliances such as LED bulbs for lighting ➢ Switch off electrical	Proponent, Management & Residents	Periodic inspection & Routine maintenance	300,000

Anticipated Environmental and Social Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	appliances when not in use ➢ Regular maintenance of all the electrical components ➢ Regular inspection and maintenance of the solar panels			
Insecurity	➢ Engage services of security guards ➢ Install and regular maintenance of the CCTV cameras ➢ Place hotline numbers on strategic places ➢ Sensitize residents on security precautions ➢ Sensitize the residents on ―Nyumba Kumi Initiative"	Proponent, Management & Residents	Routine inspection and maintenance	150,000
Fire Outbreak Occurrence	➢ Install firefighting equipment at strategic points within the building ➢ Sensitize the residents on fire risks ➢ Conduct regular fire drills and prepare effective emergency response plan ➢ Ensure regular maintenance of firefighting equipment ➢ Provide emergency numbers at strategic points within the buildings	Proponent, Management & Residents	Routine Inspection and maintenance	150,000

9.4 Decommissioning Phase

In addition to the mitigation measures provided in above two tables in this chapter, it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the residential apartment development have ceased. The necessary

objectives, mitigation measures, allocation of responsibilities, time frames and costs pertaining to prevention, minimization and monitoring of all potential impacts associated with the decommissioning and closure phase of the proposed project, are outlined in the table below:

Table 5: ESMMP for the Development Project During Decommissioning and Closure Phase

Anticipated Environmental Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
Demolition of Development Structure	➢ Apply for demolition permit from relevant authorities before commencing the demolition exercise ➢ Engage a registered private contractor to carry out the demolition ➢ Provide workers with PPEs and train them before the demolition begins ➢ Ensure that demolition exercise is carried out during the day time only ➢ Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	Proponent, Management & Contractor	Daily Inspection during the demolition period	500,000
Generation of Demolition Wastes.	➢ The contractor shall ensure that waste is segregated at source and separated in a suitable manner into general, hazardous waste and material which can be recycled/ reused. ➢ Wherever possible recycling shall be carried out.	Contractor & NEMA Licensed Waste Handler	Throughout the Decommissioning Phase	200,000

Anticipated Environmental Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	➢ The contractor shall designate a waste collection area within the site and provide an adequate number of waste receptacles for waste collection ➢ The contractor shall engage a NEMA licensed waste handler for collection and disposal of waste ➢ Particular care shall be taken in handling of materials that could be wind-borne or waterborne to ensure that the release of these materials is minimized ➢ The contractor shall ensure that no dumping of waste within the surrounding			
Noise Pollution	➢ Demolition activities to be restricted to daytime (8am to 5pm) ➢ Use of Suppressors /noise shields on noisy equipment ➢ Ensure that all workers wear respective safety & protective gear (PPEs) ➢ Comply with EMCA (Noise and excessive vibration pollution control)	Proponent, Contractor & Workers	Routine Inspection	200,000

Anticipated Environmental Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	Regulations 2009			
Solid and Liquid Waste	➢ Ensure that all solid waste is disposed at designated areas by NEMA waste handler ➢ Reuse of construction debris where feasible ➢ Ensure refuse collection vehicles are covered to prevent scattering of wastes by wind during transportation ➢ Ensure all persons involved in refuse collection are in full protective attire (PPEs) ➢ Proper decommissioning of all the sanitary facilities	Contractor & Proponent	Daily Inspection	250,000
Air Pollution	➢ Sprinkling of water regularly on dusty areas to suppress dust ➢ Careful screening of the site to contain and arrest demolition related dust ➢ Ensure demolition machinery and equipment are well maintained to reduce exhaust gas emission	Proponent & Contractor	Daily Inspection Routine Maintenance	200,000
Health and Safety of Workers	➢ All workers to wear PPEs e.g., helmets. ➢ All workers shall be	Contractor, Workers, Proponent &	Daily Inspection	250,000

Anticipated Environmental Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	sensitized before demolition begins, on how to control accidents related to demolition ➢ Adherence to safety procedures shall be enforced ➢ All workers shall be adequately insured against accidents	NEMA inspectors		
Displacement of Residents.	➢ Give notice to the residents on the intention to decommission the project early enough to enable them look for alternative accommodation.	Proponent & Management	Prior to commencement of decommissioning activities	No extra cost
Re-Vegetation and Comprehensive Landscaping	➢ Implement an appropriate re-vegetation programme to restore the site to its original status ➢ Ensure appropriate storm water runoff controls are implemented to prevent surface erosion ➢ Monitoring and inspection of the area for indications of erosion shall be conducted and appropriate measures taken to correct any occurrences ➢ Fencing and signs restricting access shall be posted to minimize	Contractor & Proponent	Random Inspection	350,000

Anticipated Environmental Impacts	Proposed Mitigation Measures	Responsible Individual/Party	Time Frame	Estimated Cost (Kshs).
	disturbance to newly-vegetated areas			

DECOMMISSIONING PLAN OF THE EXISTING BUILDING STRUCTURE

10.1. Introduction

Decommissioning is the demolition and final disposal of the project and associated materials at the expiry of the project. It mainly involves the contractor and proponent removing all materials resulting from demolition from the site paving way for new developments and/or restoring the site to the near original state before construction.

10.2 Removal of the Existing Building Structure

Decommissioning phase of the existing building will include the following;

1. Preparation of a decommissioning plan report for submission to NEMA, a relevant environmental authority body.
2. Contaminated metal must be steam-cleaned prior to disposal.
3. Routing of effluent dependent on contaminants.
4. If any metal, including piping, have future value it may be moved, after cleaning, to a storage area for redundant materials.
5. The area to be excavated must be cordoned off with red/yellow danger tape and "NO SMOKING" signs displayed around the site.
6. All other electrical, storm water or water pipelines must be located prior to excavation to ensure they are not damaged in the excavation process. All pipes, vents and hose reels connected to the building and water tanks respectively, must be disconnected and sealed before the tanks are removed.

10.3 Description of the Existing Building Decommissioning Activities

10.3.1 Acquisition of the Relevant and Required Permits.

The proponent and contractor will apply for demolition and noise/excessive vibration emission permits from Nairobi Metropolitan County Council and NEMA before proceeding with demolition process.

10.3.2 Demolition Works

Upon receiving permits for demolition and noise/excessive vibration emission, demolition works will proceed through decommissioning the existing building structure components including structures, paved areas, drainage systems, and hoarding structure. Demolition works activities will result to increased generation of solid waste. The wastes generated should be recycled/reused and if not recyclable/reusable, they will be disposed of appropriately by a licensed waste disposal company.

10.3.3 Dismantling of Equipment's' and Fixtures

All equipment's' including electrical installations, finishing fixtures partitions, among others will be dismantled and removed from the site on decommissioning of the existing building. Priority will be to reuse these equipment's' in the proposed serviced apartments development project. This will help cut costs of purchasing for the same materials during construction phase of the upcoming development.

10.3.4 Site Restoration

Once all the waste resulting from demolition and dismantling works is removed from the site, the site will be restored through replenishment of the topsoil.

10.4 Anticipated Impacts, Recommendation of Possible Mitigation Measures and Decommissioning Activities Process Plan

It is with no doubt that during decommissioning process, activities such as demolition of the existing building structure on site will lead to positive and negative impacts both environmentally and socially. The following are anticipated positive impacts expected during decommissioning process of the existing building structures at site:

10.4.1 Positive Impacts

i). Creation of employment opportunities
ii). Effective use of 3R's in waste management
iii). Source of revenue and economic gain
iv). Satisfaction of the proponent's desire
v). Pave way for a modern designed serviced apartments development
vi). Improvements and increase in aesthetic values of site area and its surrounding environment after decommissioning process
vii). Optimal utilisation of available land as a resource

10.4.2 Negative Impacts

Anticipated impacts likely to affect the environment and social lives of people within and around the site are discussed; recommendation for mitigation measures of negative impacts is also given together with the involved party responsibility, estimated frequency for monitoring and management and estimated decommissioning activities costs are summarised in the table below;

Table 6: Anticipated Negative Impacts and Recommended Monitoring and Mitigation Measures

Anticipated Environmental/ Social Impact	Proposed Mitigation Measures	Party Responsible	Frequency of Monitoring and Management	Estimated Cost (Kshs)
Eviction of Current Occupants from the existing structure	➢ Prepare an eviction notice and letters stating reasons/needs for eviction from the existing building structure. ➢ Issuing out eviction notice and letters to the occupants/tenants early enough before demolition starts. ➢ Allow occupants/tenants ample time for search of vacant rental units/spaces elsewhere.	Project proponent & Management	Twice	1,000/=

Anticipated Environmental/ Social Impact	Proposed Mitigation Measures	Party Responsible	Frequency of Monitoring and Management	Estimated Cost (Kshs)
Demolition of Existing Building Structures	➢ Apply for demolition permit from relevant authorities before commencing the demolition ➢ Engage a registered private contractor to carry out the demolition works. ➢ Provide workers with PPE equipment's' ➢ Provide appropriate signage markings at site. ➢ The demolition exercise to be limited to day time only. ➢ Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	Project Proponent, Contractor & NEMA Inspector	Daily Routine	To be estimated by the demolishing contractor
Air Pollution	➢ Dust suppression with water sprays on dusty areas ➢ Careful screening of construction site to contain and arrest demolition related dust ➢ Ensure demolition machinery and equipment are well maintained to reduce exhaust gas emission	Project Proponent, Contractor & NEMA Inspector	Daily Routine	
Noise Pollution and Excessive Vibration	➢ Demolition activities to be restricted to daytime (8am to 5pm) ➢ Use of Suppressors on noisy equipment or use of noise shields for instance corrugated iron sheet structures ➢ Workers in the vicinity or involved in high level noise to wear respective safety & protective gear. ➢ Comply with EMCA (Noise and excessive vibration pollution control) Regulations 2009	Project Proponent, Contractor & NEMA Inspector	Daily Routine	To be estimated on site

Anticipated Environmental/ Social Impact	Proposed Mitigation Measures	Party Responsible	Frequency of Monitoring and Management	Estimated Cost (Kshs)
Health and Safety of Workers	➢ All workers to wear PPEs e.g., helmets, gloves, googles etc. ➢ All workers will be sensitized before demolition begins, on how to control accidents related to demolition. ➢ Accordingly, adherence to safety procedures will be enforced. ➢ All workers will be adequately insured against accidents ➢ Employ the use of clear signage posters alerting of possible danger situations. ➢ Develop an effective Emergency Response Plan (ERP) and enlighten the staff on safety measures and procedures through training	Project Proponent, Contractor, EHS officer & NEMA Inspector	Daily Routine	To be estimated on site
Solid and Liquid Waste	➢ Ensure proper solid waste disposal and collection facilities ➢ Refuse collection vehicles will be covered to prevent scatter of wastes by wind. Demolition wastes to be collected by a licensed operator to avoid illegal final dumping at unauthorized sites. ➢ All persons involved in refuse collection shall be in full protective attire	Project Proponent, Contractor & NEMA Inspector	Daily Routine	To be estimated on site
Traffic Increase	➢ Deploy traffic marshal and flagmen for controlling traffic ➢ Provide trucks and other vehicles used during demolition with a designated parking areas and zones ➢ Employ the use of speed limit signage and hazard demarcations along the access road	Project Proponent, Traffic marshal & Contractor	Daily Routine	To be estimated on site

Anticipated Environmental/ Social Impact	Proposed Mitigation Measures	Party Responsible	Frequency of Monitoring and Management	Estimated Cost (Kshs)
	➢ Compel drivers to comply with recommended speeds. and monitor in collaboration with the County Traffic Units			

10.5 Decommissioning Activities Process Plan

Decommissioning activities before and during the demolition process of the existing building, recommendation of mitigation measures, involved party responsibility for carried out actions on site, expected estimate time-frame and the estimated decommissioning activities costs are summaries in the table below.

Table 7: Decommissioning Activities Process Plan

Decommissioning Activity	Proposed Mitigation Measures	Party Responsible	Time Frame	Estimated Cost (Kshs)
Acquisition of the requisite demolition and noise/excessive vibration emission permits from the Nairobi Metropolitan County Council and NEMA before the start of the demolition process.	➢ Strict adherence to the respective legislations and regulations like the EMCA (Noise and Excessive Vibrations Pollution (Control), Regulations of 2009.	Project proponent, Contractor & EHS officer	Throughout the decommissioning process	10,000/=
Removal of all fixed water pumps, water pipes (domestic/firefighting), site generator (if any).	➢ Provision of personal protective equipment like the earmuffs, goggles, inspiratory, mouth and nose muffs, gloves, safety boots, aprons.	Project Engineer & Contractor	Throughout decommissioning phase	5,000/=
Removal of permanent structures like the site office, washrooms, parking slots, shops, and water tanks (if any), unless required for an agreed future use.	➢ Contracting of a NEMA licensed solid waste handler and hazardous waste handler to collect, transport, dispose and generally manage all the demolition waste	Project Engineer & Contractor	Throughout the decommissioning phase	10,000/=

Decommissioning Activity	Proposed Mitigation Measures	Party Responsible	Time Frame	Estimated Cost (Kshs)
	materials produced at the site on behalf of the project management.			
Demolition of the main site office, rental shops, store, and the washrooms.	➢ Employing the 3R's of waste management (Recycling, Reusing and Reducing).	Project Engineer & Contractor	Throughout the decommissioning phase	15,000/=
Disconnection of electrical connections and wiring within the site.	➢ Contracting of fire safety and qualified electricians/experts to carry out the wiring disconnection exercise professionally.	Project Engineer & Contractor	Throughout the decommissioning phase	5,000/=
Reusing, selling, renewing or recycling the non-functional equipment and machineries, vehicles, trucks, tractors, engines, and pump, and used grease and oil lubricants containers in the store (if any).	➢ Provision of adequate color-coded waste bins for demolition waste segregation and sorting at the source for easier disposal	Project Engineer & Contractor	Throughout the decommissioning phase	50,000/=
Selling, reusing or recycling the unused water dispensers, the unused grease and oil lubricants, the water storage tanks, firefighting pipes, extinguishers, fire hose reels (if any).	➢ Identification of NEMA licensed waste oil/grease/fuel dealers (hazardous waste handlers) to manage on behalf of the proponent hazardous waste materials.	Project Engineer & Contractor	Throughout the decommissioning phase	20,000/=
All building materials, machinery, vehicles, and equipment not being used for other purposes must be removed to the contractor's yard, recycled, reused, or	➢ Employing proper signage during the demolition process.	Project proponent	Throughout the decommissioning phase	50,000/=

Decommissioning Activity	Proposed Mitigation Measures	Party Responsible	Time Frame	Estimated Cost (Kshs)
renewed as much as possible.				
Disposal of demolition wastes should be to an approved dumping site and methods applicable.	➢ Awareness creation on workers' safety and why it matters the most (prioritized).	Project proponent, contractor & EHS officer	Immediately	40,000/=
Provision of solid waste collection bins of different colors to ensure for solid waste sorting and segregation at the source before disposal.	➢ Conduction of trainings and drills on fire and general safety to all the site occupants to ensure that their safety is taken care of at all times.	Project proponent, contractor & EHS officer	Throughout the decommissioning phase	25,000/=
Contracting a NEMA licensed/registered solid waste and hazardous waste handler to collect, transport and dispose solid wastes/hazardous wastes on a regular timely basis.	➢ Drafting a waste management plan and design for a sustainable and long-term waste management within the project area.	Project Contractor & EHS Officer	Throughout the decommissioning phase	60,000/=
Testing of hazardous waste materials like grease and oil from the site to ensure that they don't pollute the environment as a result of spillage, infiltration or leakage.	➢ Display of the various ways and methods of managing ➢ hazardous waste materials to prevent pollution from ➢ occurrence.	Project Contractor & EHS officer	Throughout the decommissioning phase	100,000/=
Initiate a landscape maintenance program that will revitalize the site better than was before.	➢ Inclusion of all the site occupants for team work building and wise decision making.	Project proponent & contractor	Continuous	70,000/=
Levelling and grading the resultant project site landscape in conformity	➢ As the EMCA Act CAP 387, general requirements.	contractor & EHS officer.	Continuous.	50,000/=

Decommissioning Activity	Proposed Mitigation Measures	Party Responsible	Time Frame	Estimated Cost (Kshs)
with the surrounding natural environment landscape.				
Returning the removed overburden soil from the resultant project site from where it was taken.	➢ Strict adherence to the stipulations of the Occupational Health and Safety Act of 2007, and its subsidiary legislations	Contractor & EHS officer.	Throughout the Decommission phase.	25,000/=
Conduction of routine inspections, patrols and / or monitoring of the decommissioning process to ensure for environmental and social safety	➢ Strict adherence to OSHA regulations and the EMCA Act, CAP 387, stipulations.	Project EHS Officer.	Throughout the Decommissioning Phase	20,000/=

Decommissioning of the existing building structure is considered important and beneficial to both the proponent and general public. The negative impacts expected to arise during the phase can be managed to satisfactory levels that do not warrant significant environmental degradation. Additionally, the foreseen environmental and social impacts are all mitigatable, through the proposed measures, to levels of low significance environmental damage and socially tolerable impacts.

CONCLUSION AND RECOMMENDATIONS

11.1. Conclusions.

An ESIA has been carried out for the proposed residential apartment development identifying, evaluating and outlining the potential positive and negative impacts of the project activities based on interactions between the project activities in different phases and the environmental and social status and sensitivities of the various ecological components of the project, namely the biophysical, social, and health components.

Potential mitigation measures for the identified adverse impacts were proposed and incorporated into the Environmental, Social Monitoring and Management Plan (ESMMP), which would ensure the potential adverse impacts and associated impacts of the project on the environment and social lives implemented throughout the life of the project.

The ESIA has demonstrated that the overall impacts associated with the proposed development project can be managed within reasonable and acceptable limits by applying all proposed mitigation measures contained in the ESMMP.

In consideration of the above therefore, there is no major environmental and social issue to impede the development of the proposed project. All the identified potential adverse impacts of the proposed project shall be eliminated or reduced through the implementation of the recommended potential mitigation measures. The benefits that will be derived from the proposed development project are therefore much greater than the short-term environmental and social effects.

It is concluded that the proposed project will not cause serious damage to the environment and social lives if the ESMMP is implemented to the latter by the proponent.

11.2. Recommendations.

Based on findings of the ESIA, the proposed project is considered to have an overall low negative environmental and social impacts and an overall moderate positive socio-economic impact, with the implementation of respective mitigation measures. Taking into consideration the findings of the ESIA process, it is the opinion of the team of experts that the project benefits outweigh the impacts and that the project will make a positive contribution to the local area and country at large, therefore it is recommended for this project be approved and issued with a license by NEMA provided the developer effectively follows and adheres to the proposed mitigation measures as outlined in the ESMMP. It is also recommended that the developer to seek consultation services of a NEMA registered firm/lead expert in carrying out an Environmental Audit and Monitoring for the proposed development project once it is complete and in its operational phase after every twelve (12) months as stipulated in EMCA under the Second Schedule and as may be required by the relevant authority, NEMA.

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APPENDICES

Appendix I: Additional photographs
Appendix II: Additional documents
Appendix III: EIA firm and team of experts NEMA licenses.
Appendix IV: Copy of the proposed project development site legal document of ownership
Appendix V: Copies of approved architectural drawings plans and designs.
Appendix VI: Copies of consultations and public participation appraisal questionnaires.

Appendix I: Additional photographs

Figure 8: Proposed Borehole Site

Figure 9: Developments Neighboring Project Site

Figure 10: Kenya Power and Lighting Availability

Figure 11: Existing Building Structures on Site

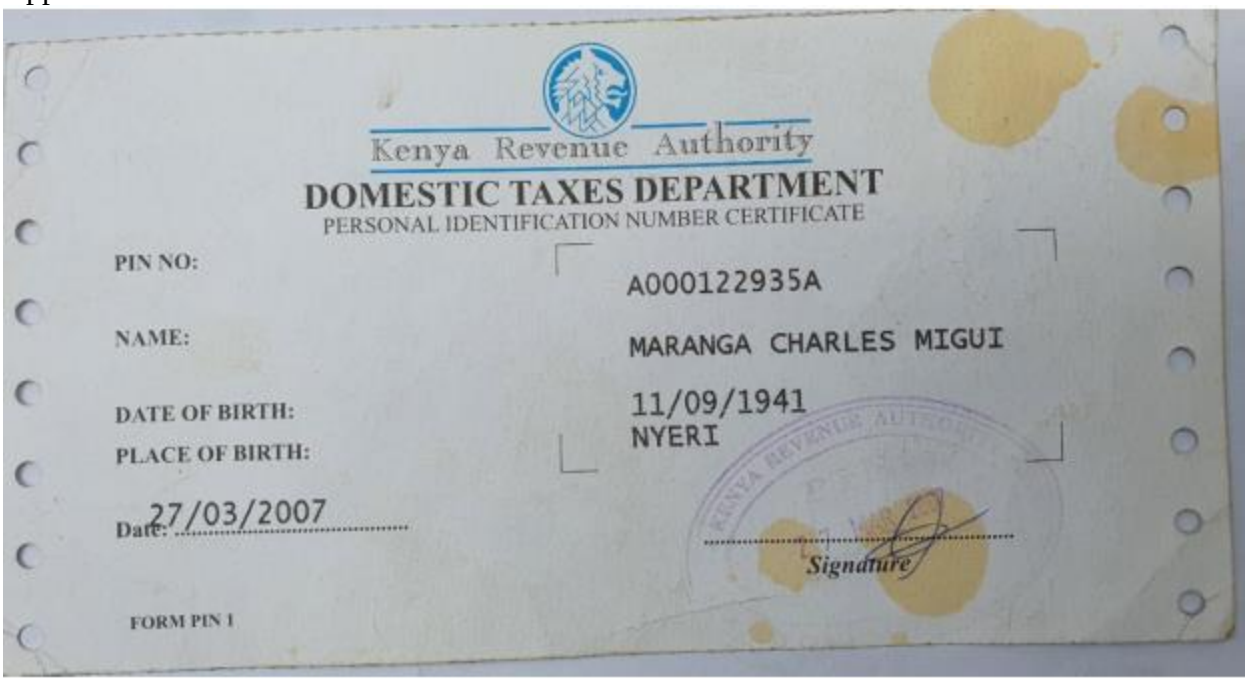
Figure 12: Neighboring Developments to Site

Figure 13: Developments Within Site Area

Figure 14: Road Network Serving the Area

Figure 15: Google Earth Image

Appendix II: Additional documents



Kenya Revenue Authority

DOMESTIC TAXES DEPARTMENT

PERSONAL IDENTIFICATION NUMBER CERTIFICATE

PIN NO: A000122935A

NAME: MARANGA CHARLES MIGUI

DATE OF BIRTH: 11/09/1941

PLACE OF BIRTH: NYERI

Date: 27/03/2007

Signature

FORM PIN 1

No. **PVT-V7UEY52**

CERTIFICATE OF INCORPORATION

I hereby **CERTIFY** that,

C. MARANGA KENYA HOLDINGS LIMITED

is on this date 15 May 2019 Incorporated under the Companies Act, 2015 and that the Company is a **PRIVATE LIMITED COMPANY.**

Registrar Of Companies

This is a system generated certificate. To validate this document send the word **BRS** to **21546**

INTER ARCHITECTS

Invoice Number: INV-CU-AAE431

PRN: PPA-CU-AAE431

FORM P.P.A. 2

THE PHYSICAL PLANNING ACT (NO. 6 OF 1996)

NOTIFICATION OF APPROVAL OF DEVELOPMENT PERMISSION

To David Zinny Weyusia,

P.O. 24797-00100 Nairobi.

Your application, **PPA-CU-AAE431** , submitted on 20 May 2021

Seeking permission for **Change of use (New)** from **Single dwelling unit** to **Multi dwelling units (Apartments)** on L.R/Plot no **P.O BOX 40238 NAIROBI**

Situated in **SOUTH C** ,Road **ALONG UCHUMI ROAD**

Was approved by the County Planning Committee held on **2021-06-24** .

Under **Item 76** Subject to the following/appended conditions:

i.) Submission of satisfactory building plans within three years otherwise the approval lapses

ii) Payment of revised ground rent as will be determined by the Director of Valuation,Ministry of Lands and Physical Planning

iii) Payment of revised rates as will be determined by the Director Valuation & Property Management - Nairobi City County

iv) Subject to the plot not constituting part of the disputed public/private utility land/allocations

v) Subject to compliance with Sections 36, 41 and 52 of the Physical Planning Act

vi) Subject to compliance with the approved zoning policy

vii) Subject to provision of appropriate setback(s) as per the rezoning plan

viii) Subject to provision of adequate and functional on site parking to the satisfaction of Director of Roads, Public Works & Transport

xv) Subject to the proposed development maintaining the requisite of 3m, 6m, 9m building line as per the statutes

xxvi) Subject to the development maintaining the residential character and densities of the area

Date of Issue 06 July 2021	Signed
	Name
	For: Chief Officer - Urban Planning
cc:	*The Chairman National Land Commission , Nairobi*
	The Director of Physical Planning, Nairobi
	The Director of Surveys, Nairobi
	The Secretary, State Department of Lands, Ministry of Lands & Physical Planning

NAIROBI METROPOLITAN SERVICES
CITY PLANNING DEPARTMENT
Development Application - Policy
Plan Approval
Signature:
Date:
Director,
POLICY IMPLEMENTATION SECTION

8.8.2021

Appendix III: EIA firm and team of experts NEMA licenses.

Appendix IV: Copy of site ownership and legal documents

REPUBLIC OF KENYA

THE REGISTRATION OF TITLES ACT

(CHAPTER 281)

CERTIFICATE OF TITLE: NO. I.R. 27394

ANNUAL RENT: SHS.350/- (Revisable)

TERM: 99 YEARS FROM 1.1.1973

7714

I HEREBY CERTIFY that CHARLES MIGUI MARANGA of Post Office Box Number 40238 Nairobi in the Republic of Kenya pursuant to a Transfer registered as Number IR. 26806/12 is now the registered proprietor as lessee from the Government of the Republic of Kenya for the term of Ninety-nine years from the First day of January One thousand Nine hundred and seventy-three of ALL THAT piece of land situate in the City of Nairobi in the Nairobi Area containing by measurement nought decimal nought four two eight (0.0428) of a hectare or thereabouts and being Land Reference Number 209/8292/17 as delineated on Land Survey Plan Number 95261 annexed to the said Transfer SUBJECT however to revisable annual rent of Shillings Three hundred and fifty (Shs.350/-) and to the Act Special Conditions and Encumbrances specified in the Memorandum hereunder written

IN WITNESS WHEREOF I have hereunto set my hand and seal this twentieth day of August One thousand Nine hundred and Seventy-four

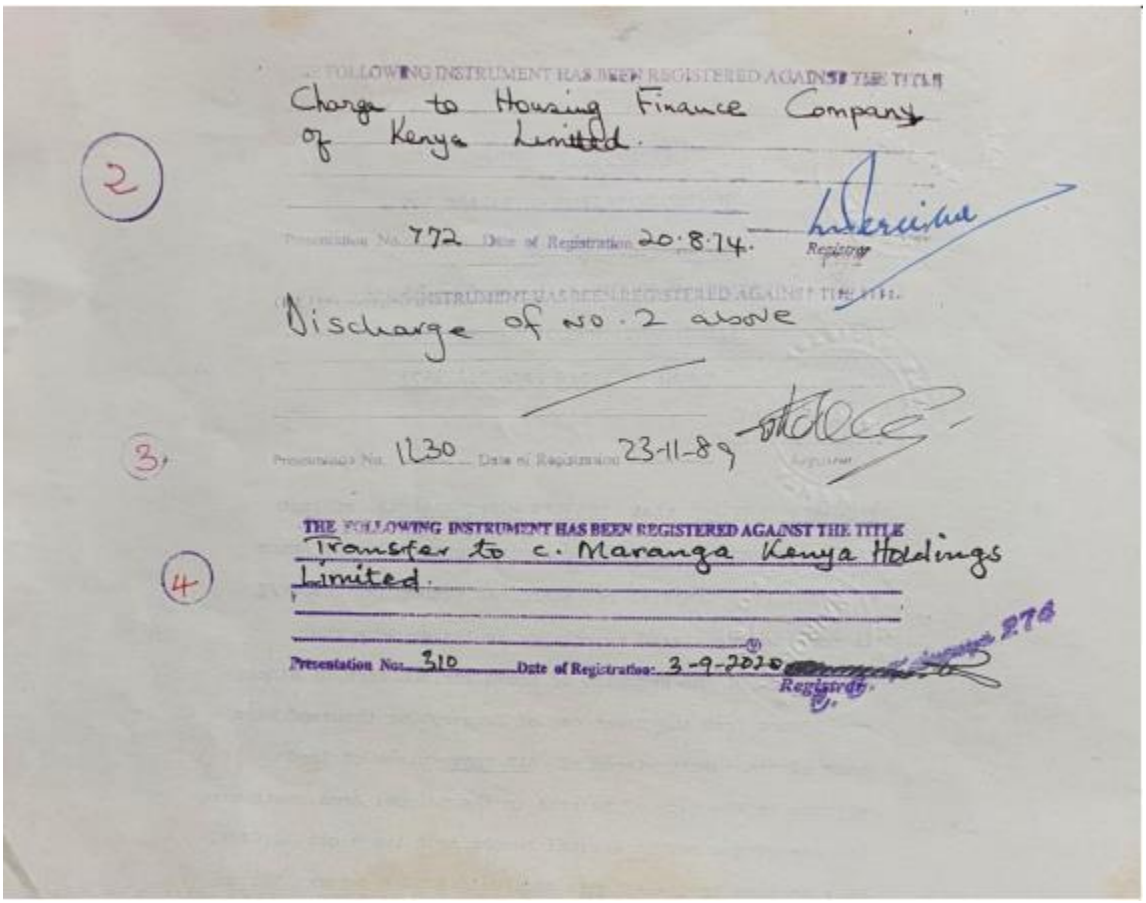
REGISTRAR OF TITLES

M E M O R A N D U M

1. The Government Lands Act (Chapter 280)

2. The Special Conditions contained in a Grant registered as Number IR.26806/1

LAND TITLES REGISTRY—NAIROBI, KENYA
REGISTRATION OF TITLES ACT
REGISTERED AS No. I.R. 27394/1
Presented 20.8. 1974
This 12.25Pm.
Registrar of Titles



2

THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THE TITLE

Charge to Housing Finance Company of Kenya Limited.

Presentation No. 772 Date of Registration 20.8.74. Registrar

THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THE TITLE.

Discharge of no. 2 above

3. Presentation No. 1230 Date of Registration 23-11-89 Registrar

4 THE FOLLOWING INSTRUMENT HAS BEEN REGISTERED AGAINST THE TITLE

Transfer to c. Maranga Kenya Holdings Limited.

Presentation No. 310 Date of Registration: 3-9-2020 Registrar

INTER ARCHITECTS

E MUNYORO GATHUTHI

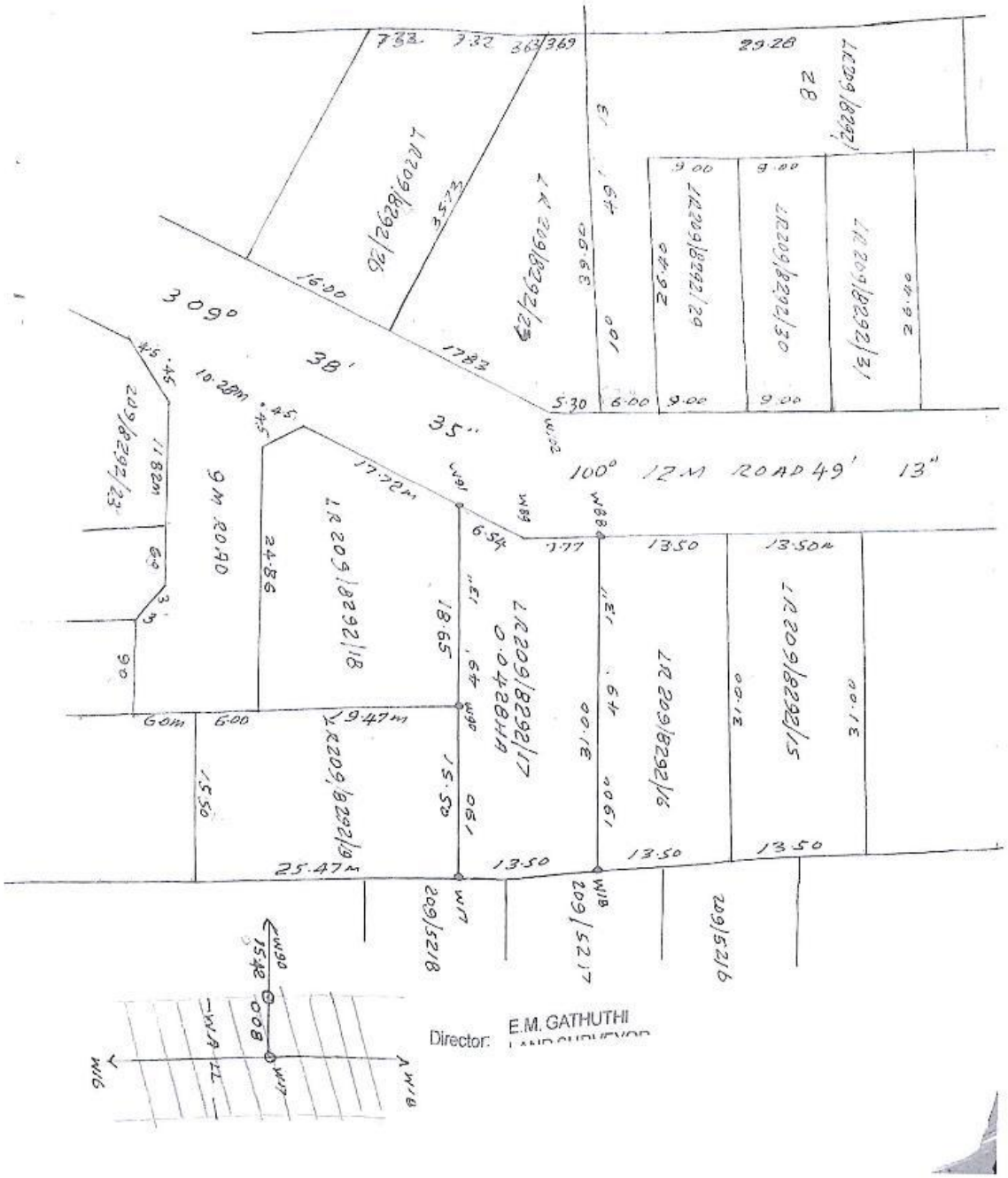
Site Surveyors for • Planners • Engineers • Land Surveyors

Hurlingham
PanAfrica Insurance House
1st Floor, Room 10
P.O. Box 62092
Telephone: 715465
Nairobi - Kenya

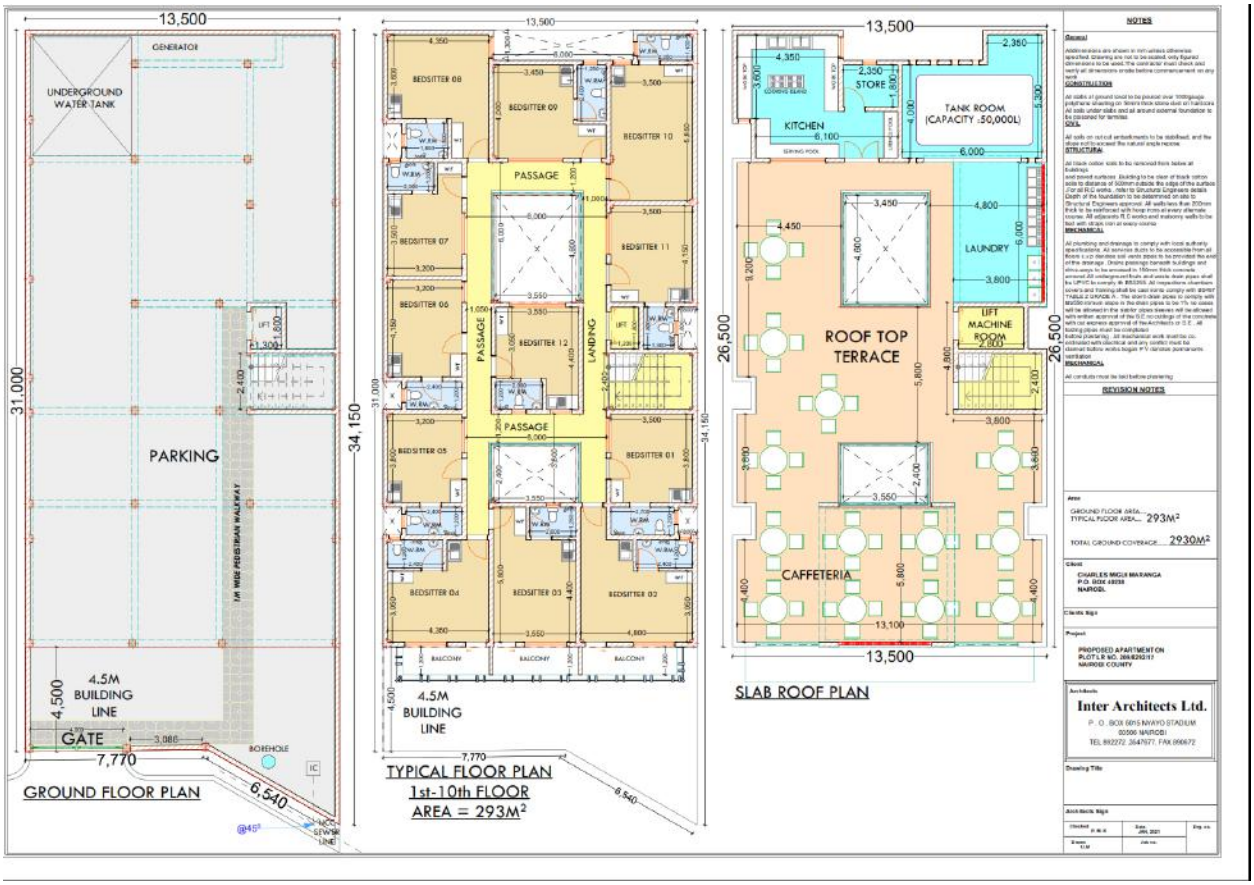
Our Ref: .....
Your Ref: .....

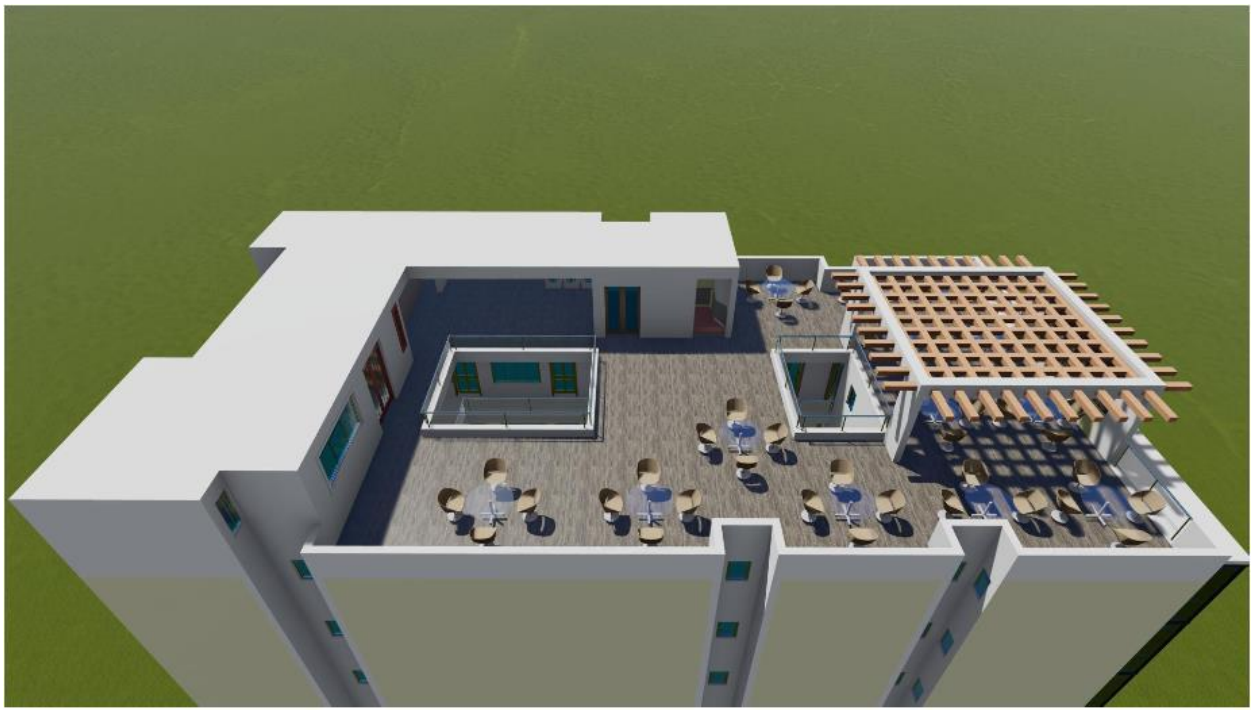
Date: .....

LOCATION MAP L.R NO 209/8292/17 (0·042B/HA)
SOUTH C. NAIROBI



Appendix V: Copies of architectural drawings plans and designs.






NOTES
REVISION NOTES
Area
293M²
2930M²
Inter Architects Ltd.

Appendix VI: Copies of consultations and public participation appraisal questionnaires.