ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED AFRICAN UNION CAMPUS PROJECT LOCATED ON LAND REFERENCE NUMBER 22375/8 ALONG KAPENGURIA ROAD IN LORESHO SUB - LOCATION, KITISURU LOCATION, WESTLANDS SUB - COUNTY, NAIROBI COUNTY

SITE COORDINATES: LATITUDE 1°06'22.4"S, LONGITUDE 37°21'22.4"E

ENVIRONMENTAL CONSULTANT

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PROPONENT

AFRICAN UNION
INTERAFRICAN BUREAU
FOR ANIMAL RESOURCES

AFRICAN UNION
(INTER-AFRICAN BUREAU FOR ANIMAL RESOURCES)
P.O Box 30786 - 00100, Nairobi – Kenya

JUNE 2024

DECLARATION

I, submit the following Environmental and Social Impact Assessment (ESIA) Study Report for the proposed African Union Campus Project located on Land Reference Number (L.R No.) 22375/8 along Kapenguria Road in Loresho Sub-Location, Kitisuru Location, Westlands Sub-County, Nairobi County. To my knowledge, all information contained in this Report is accurate and a truthful representation of all findings as relating to the proposed Project.

ENVIRONMENTAL CONSULTANT

Rolta East Africa Limited ***Official Stamp***

Firm of Experts NEMA Reg. No. 6928

Name of Signatory ……

Signatory Designation ……..

Signature: .....

Date: …….....……..…….……

PROJECT PROPONENT

Name: ……..…….

Designation: ……..……..

Signature: ……..……..

Date: ……..…....……....

PLANNING AND PARTICIPATING CONSULTANTS

The planning and participating Consultants during the ESIA for the proposed African Union Campus Project on L.R No 22375/8 along Kapenguria Road in Loresho Sub-Location, Kitisuru Location, Westlands Sub-County, Nairobi County were as presented in **Table 1** below.

Table 1: List of Planning and Participating Consultants

NAME	ACADEMIC QUALIFICATIONS	PROFESSIONAL QUALIFICATIONS	COMPANY/ AFFILIATION
Theobald Musungu Luchidio	– Msc. Occupational Safety and Health. – BSc. Environmental Studies.	– EIA/EA Lead Expert (NEMA Reg. No. 1864). – Safety and Health Adviser (OSH/ADV 106). – Member Environment Institute of Kenya (EIK). – Project Team Leader 1 (Senior Environmental, Social and Safety Scientist).	Rolta East Africa Limited
Elijah Muthusi	– MSc. Occupational Safety and Health. – BSc. Environmental and Biosystems Engineering.	– EIA/EA Lead Expert (NEMA Reg. No. 0754). – Safety Adviser (OSH/ADV 105). – Member Environment Institute of Kenya (EIK). – Full Ordinary Member Kenya Occupational Health and Safety Association (KOHSA). – Grad. Engineer Engineers Board of Kenya (EBK). – Grad. Member Institution of Engineers of Kenya (IEK). – Project Team Leader 2 (Senior Environmental, Social and Safety Scientist).	Rolta East Africa Limited
Jacinta Kaliti	– MPH Monitoring and Evaluation. – BSc. Environmental Health. – Dip. Disaster Management. – Cert. Sustainable	– EIA/EA Lead Expert (NEMA Reg. No. 2065). – Member Environment Institute of Kenya (EIK). – Association Member of Public Health Officers Kenya.	Rolta East Africa Limited

NAME	ACADEMIC QUALIFICATIONS	PROFESSIONAL QUALIFICATIONS	COMPANY/ AFFILIATION
	Development and Environment Protection. – Cert. HIV/AIDS Benchmark.	– Assistant Project Team Leader (Environmental, Social and Health Scientist).	
Christine Kiteshuo	– B.A. in Social Sciences (Major in Sociology and Psychology). – Diploma in Clinical Medicine and Surgery.	– Lead Sociologist/Socio-Safeguards Expert	Rolta East Africa Limited
Faith J. Seroney	– BSc. Environmental Studies. – Diploma in Disaster Management and Preparedness. – NEBOSH International Diploma in Occupational Health and Safety. – Certificate in Environment Impact Assessment.	– EIA/EA Lead Expert (NEMA Reg. No.7768). – Member of Environmental Institute of Kenya (EIK). – Assistant Project Team Leader (Environmental, Social, Safety and Health Scientist)	Rolta East Africa Limited
Violet Oigo	– BSc. Environmental Science. – NEBOSH International Diploma in Occupational Health and Safety. – Certificate in Environment Impact Assessment.	– EIA/EA Associate Expert (NEMA Reg. No. 10,033). – Member of Environmental Institute of Kenya (EIK) – Assistant Project Team Leader (Environmental, Social, Safety and Health Scientist).	Rolta East Africa Limited

ACRONYMS

%	percent
^{0}C	Degree Celsius
AU	African Union
AUC	African Union Commission
AU-IBAR	African Union Inter-African Bureau for Animal Resources
CCTV	Closed Circuit Television
EA	Environmental Audit
EEE	Electrical and Electronic Equipment
EMCA	Environmental Management and Co-ordination Act
ESMP	Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
GPS	Global Positioning System
JKIA	Jomo Kenyatta International Airport
km	kilometres
km^2	square kilometres
KPCL	Kenya Power Company Limited
KPLC	Kenya Power and Lighting Company
L.R. No.	Land Reference Number
LPG	Liquefied Petroleum Gas
m	metres
mm	millimetres
MSD	Musculoskeletal Disorders
MSDS	Material Safety Data Sheets
NCCG	Nairobi City County Government
NCWSC	Nairobi City Water and Sewerage Company
NEAP	National Environmental Action Plan
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
OAU	Organisation of African Unity
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Act
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
SEA	Strategic Environmental Assessment
SHE	Safety Health and Environment
SPM	Suspended Particulate Matter
SPR	Summary Project Report
SWM	Solid Waste Management
TOR	Terms of Reference
RPM	Respiratory Particulate Matter

DEFINITION OF TERMS

Environmental Audit: means a systematic evaluation of activities and processes of an ongoing project to determine how far these activities and programmes conform with the approved environmental management plan of that specific project and sound environmental management practices.

Environmental and Social Impact Assessment: means a systematic examination conducted to determine whether or not a proposed activity or project will have any adverse impacts on the environment.

Environmental Management: includes the protection, conservation and sustainable use of the various elements or components of the environment.

Environmental aspect: Element of the organization's activities, products and services that can interact with the environment.

Environmental impacts: Any changes to the environment, whether adverse or beneficial, wholly or partially resulting from an organization s activity, product or service.

Environmental management systems: Part of an organizations management system used to develop and implement its environmental policy and manage its environmental aspects.

Environmental performance: Measurable results of an organization's management of its environmental aspects.

Environmental Management Plan: means all details of project activities, impacts, mitigation measures, time schedule, costs, responsibilities and commitments proposed to minimize environmental impacts of activities, including monitoring and environmental audits during implementation and decommissioning phases of a project.

Environmental Monitoring: means the continuous or periodic determination of actual and potential effects of any activity or phenomenon of the environment whether short-term or long-term.

Mitigation measures: include engineering works, technological improvements, management and ways and means of minimizing negative aspects, which may include socio-economic and cultural losses suffered by communities and individuals, whilst enhancing positive aspects of the project**.**

Natural resources: include resources of air, land, water, animals and plants including their aesthetic qualities.

Plan: A purposeful, forward-looking strategy or design, often with coordinated priorities, options, and measures that elaborate and implement policy.

Stakeholder: Those who may be interested in, potentially affected by, or influence the implementation of the project.

Sustainable Development: means development that meets the needs of the present generation without compromising the ability of future generations to meet their needs by maintaining the carrying capacity of the supporting ecosystem.

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EXECUTIVE SUMMARY

INTRODUCTION

L.R No. 22375/8 located along Kapenguria Road in Loresho Sub-Location, Kitisuru Location, Westlands Sub-County, Nairobi County is owned by ***African Union Inter-African Bureau for Animal Resources (AU-IBAR)*** as per the attached land ownership documents. AU-IBAR herein referred to as the Proponent intent to establish African Union (AU) Campus on the reference parcel of land: L.R No. 22375/8, in line with Clause 1 in Article 2 of the enclosed Host Country Agreement between the Government of the Republic of Kenya and the African Union Commission (AUC) on the Hosting of AU Organs in Kenya from where they shall carry out their activities. The proposed AU Campus Project will involve the establishment of Hostels Suites, Gate House, Conference Building and Offices backed by elaborate service and utility infrastructure, designated for AU personnel and authorized associates.

PROJECT DESIGN AND IMPLEMENTATION

The proposed Project as designed will be executed in three phases namely Phase 1, Phase 2, and Phase 3. Project implementation in phases is not only a logistical strategy but also an environmental and social sustainability strategy.

Phase 1 of the proposed Project will seek the establish the Office Block compromising of a Ground Floor, Upper Ground Floor, First Floor, Second Floor, Third Floor, Fourth Floor, and Office Roof Terraces. Phase 2 will target the Conference Building comprising of Ground Floor, Upper Ground Floor, First Floor, and Second Floor. While Phase 3 will seek to build Hostels Suites and the Gate House. The Hostels Suites will comprise Lower Ground Level 02, Lower Ground Level 01, Ground Floor, Upper Ground Floor, First Floor, Second Floor, Third Floor, and Fourth Floor. The Gate House will constitute the Upper Ground Floor (Gate A), and the Ground Floor (Gate B).

The salient project design support amenities shall include: Adequate parking slots, 24 hours security/Closed Circuit Television (CCTV) surveillance installations, standby generator, transformer room, water borehole, underground water storage tanks operating on a pressurized water system, loading/offloading bays, 2No. high speed lifts, and play grounds.

The proposed Project components' specifications within the establishment shall be as shown in the attached design plans.

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROCESS

Since the inception of the Environmental Management and Coordination Act (EMCA) Cap 387, it has now become a legal requirement for all projects involving the activities listed in the Second Schedule of the Act to undertake ESIA. Environmental and social concerns need to be part of the planning and development process and not an afterthought as a sustainability measure. In the spirit of sustainable development and also avoid unnecessary conflicts that retard development in the Country, the Proponent undertook this ESIA and incorporated environmental concerns as advised by the Authority. This ESIA study has therefore identified possible environmental impacts that could arise as a result of the proposed development, assessed them, suggested measures of intervention to curb or minimize the negative impacts and developed an Environmental and Social Management Plan (ESMP) to guide all along the proposed Project phases.

EMCA Cap 387 recognizes projects such as the proposed AU Campus as a form of development that would impact the surrounding environment. It was therefore necessary for the Proponent to contract services of environmental experts to subject the proposed Project to the ESIA process and compile a report for submission to the National Environment Management Authority (NEMA) for consideration. This was necessary as many forms of developmental activities cause damage to the environment further confounding the present greatest global challenge of ensuring sustainable development without interfering with the environment.

The scope of the assessment covered all the Project phases namely planning, construction, operational and decommissioning which included ground preparation, masonry works, structural works, and installation of service lines as well as the utilities required by the facility.

The Proponent as provided in EMCA Cap 387 contracted Rolta East Africa Limited to subject the proposed Project to the ESIA process. Rolta East Africa Limited herein referred to as the Environmental Consultant is a NEMA Licensed Firm of Expert as per the provisions of EMCA Cap 387 under registration number 6928; make reference to the attached current practising license as issued by NEMA.

The Environmental Consultant at the screening stage in the ESIA process on the basis of significance of the Project's environmental and social impacts established the possibility of having individually insignificant but cumulatively significant impacts synonymous with a high-risk project. From the legal perspective, the Environmental Consultant identified the proposed Project as among the projects listed in the Second Schedule of the Act; Legal Notice No. 31 in the Kenya Gazette Supplement No. 62 (Legislative Supplement No. 16) dated 30th April 2019 under, *"High Risk Projects Category in (2)(a) Change in land use including major change in land use".* Hence the

screening stage finding was that the proposed Project was a high-risk project requiring a full ESIA study hence this comprehensive ESIA Study Report.

The general steps followed during the assessment were as follows: Environment screening in which the Project was identified as among those requiring an ESIA Study Report under the Second Schedule of EMCA Cap 387; environmental scoping that provided the key environmental issues and development of terms of reference (TOR); desktop studies and interviews; physical inspection of the site and surrounding areas; ESIA public participation via the use of a predesigned questionnaire and public meetings and; reporting.

The Environmental Consultant on behalf of the Proponent and in consultation with the Authority developed the ESIA study TOR as provided in EMCA Cap 37; evidences of approval of the TOR attached. After TOR approval, the Environmental Consultant on behalf of the Proponent contacted the ESIA by incorporating but not limited to the following TOR: the nature of the proposed Project; the location of the proposed Project including proof of land ownership, any environmentally sensitive area to be affected, availability of supportive environmental management infrastructure, and conformity to land use plan or zonation plan; a concise description of the national environmental legislative and regulatory framework; baseline information and any other relevant information related to the study area; the materials to be used in the construction and implementation of the Project; the waste to be generated by the Project; analysis of alternatives including project site, design and technologies; potential environmental impacts of the proposed Project; the mitigation measures for all potential negative environmental and social impacts as identified; development of an ESMP for the entire project lifecycle; and a comprehensive public consultation exercise as provided in the Environmental (Impact Assessment and Audit) Regulations, 2003 as read together with the latter's 2016 and 2019 amendments.

ANTICIPATED KEY ENVIRONMENTAL AND SOCIAL IMPACTS

Despite the fact that the proposed Project will be a long-term investment for the Proponent for furtherance of her mandate, other positive impacts will as well come along with the proposed Project such as: creation of employment opportunities, gains in the county and national economy, creation of market for building materials, optimal use of land among others as has been exhaustively outlined within the Report.

Negative impacts are as well likely to occur within the project cycle. They have been identified according to the respective project phases. The construction phase key negative biophysical, health, safety and socio-economic impacts from the proposed Project will include: extraction and use of building materials leading to negative impacts on their availability and sustainability; pressure on the existing service infrastructure e.g. roads, solid and liquid waste facilities, electricity and water; risks of accidents and

injuries to construction workers; increased soil erosion and sediment release at the Project site and surrounding areas; dust emissions resulting from construction machinery, fitting works; exhaust emissions from trucks transporting materials; noise and vibration caused by heavy trucks, and construction machinery; hydrology and water quality degradation, amongst others. The access roads leading to the Project site will serve the additional vehicles used for the transportation of materials, equipment and staff to the Project site. Heavy trucks used in the Project implementation will not only introduce the risk of causing accidents due to their limited manoeuvrability but also the risk of road pavement failure. This failure is however a combination of a number of factors including: number of trips the heavy trucks make along the road, axle load per truck, load profile on the truck, traction conditions, and the road design limits mainly.

Operational phase related key negative environmental and social impacts of the proposed Project will include: solid waste generation, liquid waste generation, increased demand for sanitation, high levels of energy consumption, high levels of water use, increased storm water flow and, risks of occupational incidents e.g. fire outbreak.

Decommissioning phase key negative environmental and social impacts of the proposed Project will include: generation of large quantities of demolition waste, dust emissions during demolition works, noise and vibration during demolition works, among others.

PROPOSED MITIGATION MEASURES FOR THE KEY NEGATIVE IMPACTS

To mitigate the anticipated negative impacts associated with the proposed Project, the Proponent shall put in place adequate measures which shall include: dust emissions will be controlled by the watering all active construction areas as required; covering all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard; paving; applying water when required or applying (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.

The following noise-suppression techniques will be employed to curb the impact of temporary construction noise at the Project site: install portable barriers to shield compressors and other small stationary equipment where necessary; use quiet equipment (i.e. equipment designed with noise control elements); co-ordinate with relevant agencies regarding all construction activities in the area; install sound barriers where applicable; limit pickup trucks and other small equipment to an idling time of a reasonable period, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible; strictly adhere to the provisions of the Noise and Excessive Vibration Pollution Control Regulations, 2009 regarding environmental noise production limits, and strictly adhere to the provisions of the Noise Prevention and control Rules, 2005 regarding workplace noise production limits.

Exhaust emissions shall be controlled through the following measures during the construction phase: vehicle idling time shall be minimized; alternatively, fuelled construction equipment shall be used where feasible; equipment shall be properly tuned and maintained amongst other feasible measures.

Adequate measures shall be put in place to down scale the impacts that are likely to lead to hydrology and water quality degradation. The Proponent will prepare a hazardous substance control and emergency response plan that will include preparations for quick and safe clean-up of accidental spills. It will prescribe hazardous materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe clean-up of accidental spills. The plan will identify areas where refuelling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted.

Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities. The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness creation, and the adoption of procedures. Rapid onsite construction so as to reduce duration of traffic interference and therefore reduce emissions from traffic delays; Work planning shall be undertaken to reduce time spent by the trucks delivering materials to the site and when traffic is low; Traffic control plan will be developed and implemented with designated traffic marshals, maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap, ensuring installation and maintenance of all construction signs, signals, markings, and other devices used to regulate traffic, including posted speed limits.

Adequate waste collection and temporary storage on site prior to transportation to a designated disposal site for such shall be ensured. Further, covers for refuse containers and appropriate personal protective equipment (PPE) to the responsible staff shall be provided by the Proponent. The Proponent shall ensure strict adherence to the provisions of Waste Management Regulations, 2006 when it comes to solid waste management and Water Quality Regulations, 2006 as it regards liquid waste management.

To curb workplace incidents (occupational diseases, accidents, near miss, and dangerous occurrence), the Proponent will strictly adhere to the provisions of the Occupational Safety and Health Act (OSHA), 2007 and the Public Health Act (Cap. 242).

ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

The key environmental and social impacts as per the study and the attached mitigation measures are as summarized in **Table 2** overleaf.

Table 2: Summary of Likely Impacts and Mitigation Measures

Possible Environmental and Social Impacts	Suggested Mitigation Measures
Air Pollution	• Install dust screens around the construction site; • Use of low-sulphur diesel for diesel-operated machinery; • Prohibition of burning of waste onsite; • Sensitise truck drivers to avoid unnecessary racing of vehicle engines; • All vehicles and plant shall be regularly serviced in accordance with the manufacturer's recommendations; • Sprinkle water on loose surfaces and materials as appropriate to curb dust pollution at Project sites; and • Speed limit signs to be erected in unpaved areas on site.
Noise Pollution and Excessive Vibration	• Control of speed and movement of construction vehicles; • Use of ear protection aids by construction workers; • No unnecessary hooting by Project and Occupants' vehicles; • Restriction of construction activities to day time; • Use of attenuated equipment; • Hoarding of the entire construction site; • Limit pickup trucks and other small machinery to an idling time when necessary, observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible; • Construction works to be done during the day between 8am-6pm Mondays to Fridays and 8am-1pm on Saturdays; • Carry out noise baseline survey before construction; and • The number of construction equipment operating simultaneously shall be minimized through efficient management practices.
Clearing of Vegetation	• Maintaining of grass around the site; • Proper demarcation of the Project area to be affected; and • Site vegetation growing/elaborate greenery as a policy.
Disturbance of Soil Structure	• Install soil traps around perimeter fence and on steep areas; • Elaborate landscaping on site as a policy guided by a competent landscape Architect; • Maintaining specified routes for construction vehicles; • Control earthworks; and • Use of light machinery and equipment.

Possible Environmental and Social Impacts	**Suggested Mitigation Measures**
Destruction of Habitat	• Restrict vehicular movement to set out paths; • Maintaining of vegetation on areas not affected; and • Elaborate site greenery as a policy.
Increased Demand for Water Use	• Notices and information signs to be posted on site on need to conserve water; • Encourage water reuse and recycle during construction and operations; • Rain water harvesting (roof catchment and surface runoff) mechanisms; • Provision of water storage tanks; • Install water meters to ensure accountability and responsibility; • Install water-saving devices in the appropriate places (flow regulators, water flow sensors, self-closing taps, low-flush toilets); • Regularly maintain plumbing fixtures and piping in order to avoid losses due to leakages.
Generation of Solid Waste	• Provision of waste collection bins; • Designated waste collection area that is well labelled for the different waste streams; • Re-use of soil, construction debris and other reusable waste; • Proper containment and disposal of solid waste; • Contracting a licensed waste collection and disposal company; • Creation of awareness on proper solid waste disposal; • Reuse of timber off-cuts and wooden support for fuel; and • Comply with the requirements of the Environmental Management (Waste Management) Regulations Legal Notice 120.
Increased Demand for Energy	• Identify and use equipment/systems having minimum energy consumption; • Install energy efficient lighting in common areas such as staircases, driveways and security lights; and • Use alternative energy sources such as solar power for water heating and lighting.

Possible Environmental and Social Impacts	**Suggested Mitigation Measures**
Occupational Safety and Health Risks	• Maintaining safe systems of work at the workplace; • Use of suitable PPE; • Site to be sprinkled with water to minimize dust; • Use of stable ladders and other climbing/support structures; • Sensitize workers on occupational safety; • Maintain cleanliness and organization at the construction site; • Fencing or covering of risky areas such as deep pits; • Safety signage; • Safety induction to all staff on site; • Engagement of skilled labourers; • Insurance of workers; • Designate and mark smoking areas; • Workers to be trained as fire marshals; • Fire escape routes to be shown clearly; • Provide enough first aid kits within the Project site; • Train workers in administering first aid; and • Placing visible and readable signs around where there are risks.
Fire Hazards and Accidents	• Acquire firefighting facilities; • Sensitize workers on fire safety; • No storage of flammable substances on site; • Good housekeeping on site; • Designated fire assembly point; • Keep well stocked first aid box(es); and • Proper handling and use of tools and machinery.
Traffic Management	• Set driving speed limits; • Use of traffic marshals; • Fleet Management Plan when doing deliveries on site; • Implementation of one-way system on site; • Designate pedestrian walkways on site; • Adequate road warning signs to be posted as per the traffic regulations; • Provision of both exit and entry for vehicles accessing the construction site; • Emphasizing on safety aspects among driver; • Improving driving skills and requiring licensing of driver's; • Adopting limits for trip duration and arranging driver rosters to

Possible Environmental and Social Impacts	**Suggested Mitigation Measures**
	avoid overtiredness; • Avoiding dangerous routes and times of day to reduce the risk of accidents; • Use of speed control devices (governors) on trucks, and remote monitoring of driver actions; • Delivery of materials during off pick hours and weekends; • Ensure that the Entry/Exit to the project site is located where it will cause minimal traffic; • All transportation of construction raw materials and excavated materials are to be conducted at traffic off peak hours only; • Sensitize truck drivers to avoid unnecessary road obstruction; and • Cover all trucks hauling soil, sand and other loose materials to avoid spillage and dust emissions that may interfere with smooth motoring.
Control of Oil Spills	• Provision of spill kits in all areas where chemicals are stored. • Training of chemical handlers on site on safe use and disposal of the chemicals; • Emergency procedures to control spills; • Provision of material safety data sheets (MSDS) at all areas where the chemicals are handled • Display MSDS prominently at areas of operations; • Refuelling within the site shall be restricted to the excavators; • Vehicles to be fuelled to the maximum to reduce frequency of refuelling; • Refuelling shall be done away from drainage lines; • Fuel storage at the site shall be minimised; and • Designates area for servicing and maintenance of machinery on site.
Security	• Guarding of site by a reputable security firm; • Constant site patrol; • Adequate screening of visitors to the site; • Collaboration with existing security machinery; • Partnership with neighbours and police in community policing; • Installation of CCTV camera on site; • Site well secured with a fence; and

Possible Environmental and Social Impacts	**Suggested Mitigation Measures**
	• Recording of all staff and visitors to the site.
Storm Water/Run off	• Proper maintenance of the drainage system; • Establish a storm water drainage system; • Design to allow seepage of surface run off; • Runoff shall be harvested as a sustainability measure; • Roof catchment and water channelled to underground storage for reuse; • Storm water management plan that minimizes impervious area infiltration; • Develop a local storm water management plan.
Generation of Waste	• Proper connection of wastewater and sewerage system to existing sewer line as per approved design; and • Install a wastewater treatment plan on site to facilitate wastewater reuse on site.
Public Health and Safety	• Ensure use of the provided sanitary facilities by construction staff; • Proper handling and disposal of solid waste; • Control of visitors to the site; • Installation of adequate water supply; • Controlled developments around the facility; • Designated area for taking meals; and • Provision of hand wash stations and soap.
Community Impact	• Good public relation between the Proponent, Contractor and the local community; • Erect and maintain information boards in the position, quantity, design and dimensions of the proposed AU Campus; • Keep a "Complaints Register" on Site; • Liaison with local leaders; • Post contacts numbers and email for raising public complaints; • Place a grievance redress register at the Area Chief's Camp for capturing community issues; and • Weekly meeting with the Area Chief and local leaders to address community complaints.

RECOMMENDATIONS AND COMMITMENT

This ESIA study recommends that the positive impacts arising from the establishment of the proposed Project be maximized to the extent feasible. It is expected that these measures will go a long way in ensuring the best possible environmental compliance and performance standards.

Further, this ESIA study recommends that the Proponent implement adequate measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the proposed Project. In addition to this commitment, the Proponent shall adopt the measures outlined in the ESMP as well as adhering to all relevant national and international environmental, social, health and safety standards, policies and regulations that govern establishment and operation of such projects.

CONCLUSION

The proposed Project according to the ESIA study shall come along with numerous positive impacts as exhaustively discussed within this ESIA Study Report. Negative impacts are as well anticipated which however, according to the ESIA study can be adequately mitigated.

On the basis of the above and taking cognizance of the fact that the Proponent has proved financially and environmentally credible, it is the Environmental Consultant's submission that the proposed Project be allowed to go on provided the mitigation measures outlined in this Report shall be adhered to and the ESMP shall be fully implemented.

1 INTRODUCTION

1.1 Background information

1.1.1 The African Union

AU is a continental body currently consisting of the 55 Member States that make up the countries of the African Continent. It was officially launched in 2002 as a successor to the Organisation of African Unity (OAU) which was established on 25th May, 1963 and disbanded on 9th July 2002 to usher in AU. The decision to re-launch Africa's pan-African organisation was the outcome of a consensus by African leaders that in order to realise Africa's potential, there was a need to refocus attention from the fight for decolonisation and ridding the continent of apartheid, which had been the focus of the OAU, towards increased cooperation and integration of African states to drive Africa's growth and economic development.

According to history, in May 1963, 32 Heads of independent African States met in Addis Ababa Ethiopia to sign the Charter creating Africa's first post-independence continental institution: OAU. The OAU was the manifestation of the pan-African vision for an Africa that was united, free and in control of its own destiny and this was solemnised in the OAU Charter. The main objectives of OAU were to rid the continent of the remaining vestiges of colonisation and apartheid; to promote unity and solidarity amongst African States; to coordinate and intensify cooperation for development; to safeguard the sovereignty and territorial integrity of Member States and to promote international cooperation. The OAU Charter spelled out the purpose of the Organisation namely:

- To promote the unity and solidarity of the African States;
- To coordinate and intensify their cooperation and efforts to achieve a better life for the peoples of Africa;
- To defend their sovereignty, their territorial integrity and independence;
- To eradicate all forms of colonialism from Africa; and
- To promote international cooperation, having due regard to the Charter of the United Nations and the Universal Declaration of Human Rights.

The AU is guided by its vision of ***"An Integrated, Prosperous and Peaceful Africa, driven by its own citizens and representing a dynamic force in the global arena."***

The work of the AU is implemented through several principal decision-making organs: Assembly of Heads of State and Government, Executive Council, Permanent Representatives Committee, Specialized Technical Committees, Pace and Security Council, and AUC. The AU structure promotes participation of African citizens and civil society through the Pan-African Parliament and the Economic, Social and Cultural Council.

1.1.2 The African Union Inter-African Bureau of Animal Resources

AU-IBAR is a specialized technical office of AUC headed by the Director, who reports directly to the AUC through the Department of Rural Economy and Agriculture (DREA). It was founded in 1951 to study the epidemiological situation and fight rinderpest in Africa. Her mandate is to support and coordinate the utilization of animals (livestock, fisheries and wildlife) as a resource for human wellbeing in the AU Member States and to contribute to economic development. The specific areas of her mandate are to:

1. Improve public and animal health through the control and possible eradication of transboundary animal diseases and zoonosis;
2. Improve the management of animal resources and the natural resource bases on which they depend;
3. Explore investment options and enhance competitiveness of African animal products;
4. Contribute to the development of relevant standards and regulations and enhance compliance by Member States;
5. Strengthen institutional capacity and support policy development and harmonization;
6. Disseminate information and knowledge on animal resources to Member States, Regional Economic Communities and other relevant institutions; and
7. Provide essential support to Member States with special needs or in emergency situations.

1.2 Rationale of the Environmental and Social Impact Assessment

Clause 1 in Article 2 of the enclosed Host Country Agreement between the Government of the Republic of Kenya and the African Union Commission on the Hosting of UN Organs in Kenya as signed at Addis Ababa, Ethiopia on 23rd May 2013 provide for hosting of the Inter-African Bureau of Animal Resources AU Organ in the Republic of Kenya from where they shall carry out their activities. Hence the proposed Project entitled AU Campus. The proposed Project will be located on L.R No. 22375/8 at approximate Global Positioning System (GPS) coordinates 1° 06' 22.4" S, 37° 21' 22.4"E, along Kapenguria Road in Loresho Sub-Location, Kitisuru Location, Westlands Sub-County, Nairobi County. The proposed Project will seek to establish a state-of-the-art AU premises backed by elaborate service and utility infrastructure to promote AU mandate locally, regionally and internationally. The proposed AU Campus broadly will constitute Hostels Suites, Gate House, Conference Building and Offices designated for AU personnel.

Since environmental concerns need to be part of the planning and development process and not an afterthought, the Proponent opted to subject the proposed Project to the ESIA process in line with the provisions of EMCA Cap 387. An ESMP is mandatory for a project of this magnitude and nature because the proposed project will create demand for extraction of building materials, solid wastes and liquid waste will be produced within all the project phases, people will be working within the facility leading to workplace incidents, noise shall be generated and dust/smoke/fumes emissions are anticipated hence the need for a documented

environmental and social management and monitoring plan to ensure that there is no segment of the environment under threat due to the effect of the proposed Project.

1.3 Principles of Environmental and Social Impact Assessment

The main principles of ESIA includes:

1. Environmental concerns must be accounted for in all development activities.
2. Public participation in the development of projects, policies, plans and programmes is important.
3. Recognition of social and cultural principles traditionally used in the management of the environment and natural resources.
4. International cooperation in the use and wise management of shared resources.
5. Integration of socio-economic and environmental factors.
6. Intra-generational and inter-generational equity.
7. The protection and conservation of natural physical surroundings of scenic beauty and the protection and conservation of built environment of historic or cultural significance.
8. Polluter-pays principle.
9. The precautionary principle.

1.4 Terms of Reference for Environmental and Social Impact Assessment process

The screening process qualified the proposed project as a form of development that would impact the surrounding environment hence the need of an ESIA. It was therefore necessary for the Proponent to contract services of the Environmental Consultant to undertake an ESIA with a view of establishing the likely impacts and point out the required mitigation and enhancement measures.

The ESIA included the necessary specialist studies to determine the environmental 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 are provided as part of the ESMP.

The scope of the assessment covered construction works of the proposed Project which included excavation works, masonry works, concrete works, structural & steel works, plumbing, electrical installations and installation of service lines as well as the utilities required for the proposed Project; operation phase activities and; the decommissioning phase activities. The output of this work was a comprehensive ESIA Study Report for decision making and legal compliance. The Environmental Consultant on behalf of the Proponent conducted the ESIA by incorporating but not limited to the following TOR:

a) Location of the proposed Project.
b) A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the proposed Project.
c) The objectives of the proposed Project.

d) The technology, procedures and processes to be used, in the implementation of the proposed Project.
e) The materials to be used in the construction and implementation of the proposed Project.
f) The products, by-products and waste to be generated by the proposed Project.
g) A description of the potentially affected environment by the proposed Project.
h) The environmental effects of the proposed Project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
i) To recommend a specific environmentally sound and affordable wastewater management system.
j) Provide alternative technologies and processes available and reasons for preferring the chosen technology and processes.
k) Analysis of alternatives including the Project site, design and technologies.
l) To develop an ESMP proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
m) Provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the cause of carrying out development activities.
n) Propose measures to prevent health hazards and to ensure security in the working environment for the employees, visitors and for the management in case of emergencies.
o) An economic and social analysis of the proposed Project.
p) Environmental Consultant to submit the ESIA Study Report to NEMA for review.

1.5 Purpose of the ESIA Study Report

The information contained in this ESIA Study Report, along with the comments and inputs received from the Project Stakeholders and Lead Agencies will assist the Regulator: NEMA, in making an informed decision in the licensing of the proposed Project. The ESIA Study Report is also critical in shaping the Proponent's decision-making process within all the Project phases.

1.6 Scope of the Environmental and Social Impact Assessment

The Kenya Government policy on all the new projects listed in the Second Schedule of the Act (EMCA Cap 387), require that an ESIA be carried out at the planning stages of the proposed undertaking to ensure that significant impacts on the environment are taken into consideration during the design, construction, operation and decommissioning phases of the proposed Project. The scope of this ESIA is limited to the provisions of the Environmental (Impact Assessment and Audit) Regulations, 2003 and her 2016 and 2019 amendments and therefore covered:

a) The objective and nature of the proposed Project supported by design and plan drawn to scale and signed by an Engineer.
b) The location of the proposed Project including proof of land ownership, any environmentally sensitive area to be affected, availability of supportive environmental management infrastructure, and conformity to land use plan or zonation plan.

c) Baseline information and any other relevant information related to the Project area.
d) A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the proposed Project.
e) Evidence of comprehensive public consultation including duly signed minutes of consultation meetings with project affected persons and key stakeholders, attendance lists and filled questionnaires.
f) Analysis of alternatives including the Project site, design and technologies.
g) Potential environmental and social impacts of the proposed Project.
h) The mitigation measures for the adverse impacts to be taken during and after implementation of the proposed Project.
i) An ESMP outline for the entire project lifecycle; and
j) Environmental Consultant to submit the ESIA Study Report to NEMA as provided in EMCA Cap 87.

1.7 Objective of the Environmental and Social Impact Assessment

1.7.1 Main objective of the Environmental and Social Impact Assessment

The main objective of the ESIA was to establish the baseline conditions of the Project site, evaluate the existing and the anticipated impacts, propose measures to enhance the positive impacts and proposed measures to mitigate the effects of the negative/adverse impacts. The key goal is to enhance a cleaner and sustainable environment during implementation and operation phases of the proposed Project.

1.7.2 Specific objectives of the Environmental and Social Impact Assessment

The main objective seeks to ensure that environmental concerns are integrated in the proposed Project's activities for sustainable development. The specific objectives for the ESIA study were:

a) To identify potential environmental and social impacts of the proposed Project; both positive and negative.
b) To assess the significance of the above impacts to the environment and other stakeholders.
c) To assess the relative importance of the impacts of alternative plans to the proposed Project.
d) To propose mitigation measures for the significant negative impacts of the proposed Project on the environment and all involved stakeholders.
e) To propose measures that will enhance the positive impacts of the proposed Project to the environment and all involved stake holders.
f) To generate baseline data for monitoring and evaluation of how well the mitigation measures are being implemented during the proposed project cycle'.
g) To present information on the impact of alternatives.

1.8 Criteria of the Environmental and Social Impact Assessment

The criteria of undertaking ESIAs in Kenya as per the EMCA framework is provided in the Environmental Impact Assessment and Audit Regulations (2003), Environmental Impact Assessment and Audit (Amendment) Regulations (2016), and Environmental Impact Assessment and Audit (Amendment) Regulations (2019) as read together with NEMA's Public Notice on Processing of EIA Reports dated 12th March 2020.

1.8.1 Data collection procedures

First, the Environmental Consultant undertook environmental screening and scoping to avoid unnecessary data. The data collection was carried out through a predesigned checklist, a predesigned public participation questionnaire, observation, photography, site visits and desktop environmental studies, where necessary in the manner specified in the Environmental (Impact Assessment and Audit) Regulations, 2003.

1.8.2 Reporting and documentation

The ESIA Study Report from the findings was compiled in accordance with the guidelines issued by NEMA for such works and was prepared and submitted to NEMA for consideration. The Environmental Consultant ensured constant briefing of the Proponent during the exercise.

1.8.3 Responsibilities and undertaking

The Environmental Consultant undertook to meet all logistical costs relating to the assignment, including those of production of the report and any other relevant material. The Environmental Consultant arranged for own transport and travels during the exercise. On the site of the proposed Project, the Proponent provided contact person to provide information required by the Environmental Consultant. The Proponent also provided site plans showing roads, service lines, buildings layout and the actual sizes of the sites, details of raw materials, future development plans, operation permits and conditions, land-ownership documents and site history. The output from the Environmental Consultants includes the following:

- An ESIA Study Report comprising of an executive summary, study approach, baseline conditions, anticipated impacts and proposed mitigation measures, and
- An ESMP outline which also forms part of the report recommendations.

1.8.4 Methodology outline

The ESIA was undertaken in fulfilment of EMCA Cap 387 which require all the project listed in the Second Schedule of the Act to be subjected to the ESIA process prior to commencement. The general steps followed during the assessment were as follows:

- Environment screening in which the proposed Project was identified as among those requiring an ESIA as per Section 58 of EMCA Cap 387,
- Environmental scoping that provided the key environmental issues and development of TOR,
- Desktop studies,
- Physical inspection of the site and surrounding areas,

- Public participation, and
- Reporting.

1.8.4.1 Environmental screening

Screening involves determining whether or not an ESIA is required for a particular development activity and the level/category of the ESIA. This depends on the significance of the project's environmental and social impacts as well as the provisions of the Second Schedule of EMCA Cap 387. This is the initial phase in the ESIA process.

Impacts significance depends on such factors as: the sensitivity of the area likely to be affected; public health and safety; the possibility of uncertain, unique or unknown risks; the possibility of having individually insignificant but cumulatively significant impacts; whether the proposed activity affects protected areas, endangered or threatened species and habitats; size, working methods, project activities including their duration and proposals for waste disposal etc. Considering the impacts significance, the Study team established the possibility of having individually insignificant but cumulatively significant impacts synonymous with a High Risk Project.

From the legal perspective, the Study team identified the proposed Project as among the projects listed in the Second Schedule of the Act; Legal Notice No. 31 in the Kenya Gazette Supplement No. 62 (Legislative Supplement No. 16) dated 30th April 2019 under:

- *3. High Risk Projects -*
  - ✓ *(2) Change in land use including -*
    - ➢ *(a) Major change in land use.*

The screening phase verdict was that, "the proposed Project was a high-risk project requiring a full ESIA study hence this comprehensive ESIA Study Report.

1.8.4.2 Environmental scoping

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

With a verdict of a full ESIA study at the screening phase, the Study team developed the Study TOR as provided in Regulation 11 of the Environmental Impact Assessment and Audit Regulations, 2003. The TOR was presented to NEMA and was approved as per the provisions of Environmental Impact Assessment and Audit Regulations, 2003; evidence of approval of the ESIA Study Report TOR attached to this Report.

1.8.4.3 Desktop study

This included documentary review on the nature of the proposed activities, project documents, designs, policy and legislative framework as well as the environmental setting of the area

among others. It also included discussions with the Proponent representatives as well as interviews with neighbours.

1.8.4.4 Site assessment and public participation

Field visits were meant for physical inspections of the site characteristics and the environmental status of the Site's surrounding area to determine the anticipated impacts. To ensure adequate public participation in the ESIA process, a predesigned questionnaire was administered to the Project site neighbours and the information gathered was subsequently synthesized and incorporated into the ESIA Study Report. Public meetings with the would-be interested or affected parties and communities to explain the proposed Project and its effects, and to receive their oral or written comments were held as provided in Regulation 17 of the Environmental Impact Assessment and Audit Regulations, 2003; see the appendices section of this report for the evidences.

1.8.5 Reporting

In addition to constant briefing of the Proponent, this ESIA Study Report was prepared. The contents were approved by the Environmental Consultant and the Proponent for submission to NEMA. The ESIA Study Report was packaged and submitted to NEMA as provided in EMCA Cap 387 for legal compliance and decision making.

2 DESCRIPTION OF THE PROPOSED PROJECT

2.1 Introduction

The proposed Project entitled AU Campus will seek to establish a state-of-the-art AU premises backed by elaborate service and utility infrastructure to promote AU mandate locally, regionally and internationally. In a nutshell, the proposed AU Campus Project will involve the establishment of Hostels Suites, Gate House, Conference Building and Offices backed by elaborate service and utility infrastructure, designated for AU personnel and authorized associates.

2.2 Location of the proposed Project

The proposed Project will be undertaken on L.R. No. 22375/8 located along Kapenguria Road in Loresho Sub-Location, Kitisuru Location, Westlands Sub-County, Nairobi County. The reference L.R. No. 22375/8 measures approximately 1.2140 ha and is located at approximate GPS coordinates 1° 15' 12.3" S, 36° 43' 35.9" E. The Project site abut Kapenguria Road on the frontage and the University of Nairobi Upper Kabete Campus for the rest of the plot delineation.

2.3 Proposed Project site ownership and status

L.R. No. 22375/8 on which the proposed Project will be undertaken is duly owned by the Proponent: African Union, as Trustees of Inter-African Bureau of Anima Resources of Nairobi; see the attached land ownership document. The premises are well secured with part masonry perimeter wall, part chain-link perimeter fence, a guard house, a storage shed, a kitchen shed and a pit latrine to design.

The entire property as at the time of the ESIA site visits had been put under mixed subsistence crop farming. Crops grown in the property include: maize, beans, cow peas, cassava, kales, sweet potatoes, Irish potatoes, pumpkins, and onions. Sited within the plot is a mature Croton megalocarpus tree and 14No. boundary eucalyptus trees.

It was established that the subsistence crop farming exercise was a security measure by the Security Guards employed to man the property; which is the trend in the immediate neighbourhood. This was as a result of past insecurity incidents in the general area where ill-intentioned people would hide in the bushy properties to ambush locals mostly at night.

It is expected that the current subsistence crop farming will cease as soon as the proposed Project starts.

Existing service and utility infrastructure in the Project area which the Proponent will consider for utilization on convenience, cost and sustainability grounds include: the main electricity grid, the public sewer line, Kapenguria Road, and the open storm water drainage system.

Figure 1: Satellite Image of the Project Site

Plate 1: Erected Signboard at the Project Site

Croton megalocarpus tree at the Project site

Subsistence crops grown at the Project site

Guard house and store at the Project site

Kitchen shed at the Project site

KPLC power lines in the Project area

Kapenguria Road abutting the Project site

Entrance to the Project site

Boundary Eucalyptus Trees at the Project site

Plate 2: ESIA Study Photo Gallery

2.4 Conformity of the proposed Project to land use/area zonation

The current land use for L.R No. 22375/8 within which the proposed Project will be undertaken is Institutional Offices and Related Facilities as provided in the attached Change of Use issued by the Nairobi City County Government (NCCG) on 22nd January 2018. The latter land use as approved is in conformance with the current land use for the immediate properties being the University of Nairobi Upper Kabete Campus, the National Biosafety Authority property, and the Wangari Maathai Institute for Peace and Environmental Studies. The proposed Project as design will constitute Hostels Suites, Gate House, Conference Building and Offices backed by elaborate service and utility infrastructure, designated for AU personnel and authorized associates. Hence, the proposed Project will be in conformity with the Project site land use and zonation. To corroborate the latter, the Proponent has submitted the Project design plans to the NCCG for approval. The Proponent will adhere to the NCCG conditions of approval to the extent feasible for sustainable development.

2.5 The proposed Project's scope of works

The proposed Project's main works will include but not limited to the following:

- Site clearance and preparation;
- Civil works including deep excavations, cut to spoil, etc.;
- Masonry works;
- Steel works;
- Drainage works;
- Plumbing works;
- Electrical works;
- Roof erection;
- Landscaping works;
- Greenery; and
- Supervision and certification of works.

2.6 Project description

The proposed Project will basically seek to establish AU Campus and the associate service and utility infrastructure to design as summarized in **Table 3** below. The proposed Project will be actualized in three phases as follows:

- Phase1: Offices,
- Phase 2: Conference Facility, and
- Phase 3: Hostels Suits and Gate House.

Table 3: The proposed Project's design components summary

LEVEL	PROJECT COMPONENT
PHASE 1: Office Block	
Ground floor	• 70 parking slots;

LEVEL	PROJECT COMPONENT
	• Underground water storage, water treatment and water pump; • Gate B - Generator room, Transformer room, and Meter room; • Lift lobby; • Refusal room; • Store; • Ramp; • Airline offices; • Bank; • Day care; and • Store.
Upper floor	• Foyer; • Lawn; • Washrooms; • Meeting rooms; • Offices 1-7 and open office space; • Filing room; • Server room; • CCTV control room; • Reception area; • Lobby; • Drop off area; and • Ramp.
First floor	• Offices (3No.); • Chair Office with reception and waiting area; • Periodicals reading lounge; • Bookshelves; • Workstation for 50 paxs; • Issuance desk; • Washrooms: ladies, gents, and PWD; • Lobby; • Suite (12No.); • VIP Lounge 1; • Media room; and • Meeting room for 25 pax.
Second floor	• Meeting room; • Collaboration zone;

LEVEL	PROJECT COMPONENT
	• Lobby; • Offices 1-9; • Open office space; • Filing room and server; • Reception area and waiting room; • Chair AU office; • Washrooms: ladies, gents, & PWD; • Store/cleaners' room; • Washroom closet; • Lobby; • 2 call rooms; and • VIP Lounge 2.
Third floor	• Boardroom; • Meeting room 02; • Deputy chair AUC, PA and filing room; • Office 1-6; • Office space; • Server room; • Collaboration zone; • Washrooms: ladies, gents, & PWD; • Reception and waiting area for Chair AUC; • 2 call rooms; and • Lobby.
Fourth floor	• Break out area; • Kitchen; • Store; • Utility; • Lobby; • Washrooms - gents and ladies; and • Entertainment lounge.
Office roof terraces	• R. conic roof above the offices.
PHASE 2: Conference Building	
Ground floor	• Ramp and drive way; • 39 parking lots; • Duty free shop;

LEVEL	PROJECT COMPONENT
	• Mailroom; • Bank; • Daycare; • Airline offices; and • Lobby.
Upper ground floor	• 400 paxs conference room; • Foyer; • Furniture store; • Finishing kitchen; • Washrooms: ladies, gents, & PWD; • Break out space; and • Utilities area.
First floor	• Triple volume conference room; • Committee room for 76 paxs; • Store; • Medium conference room for 50 paxs; • Meeting room 1; • VIP lounge; and • Media room.
Second floor	• Triple volume conference room; • Video conference room; • Washrooms: ladies, gents, & PWD; • Meeting rooms 2,3,4 & 5; • VIP lounge 2 & 3; and • Utilities area.
PHASE 3: Hostels Suites	
Lower ground 02	• Drive way and 93 parking slots; and • Lift lobby.
Lower ground 01	• Drive way and 92 parking slots.
Ground floor	• Ramp to basement; • Garden; • Lawn; • Drop off area; • Dispensary; • 90 parking slots;

LEVEL	PROJECT COMPONENT
	• Server room 1-2; • Garbage room; • Linen room; • Drive way and loading zone; • Kitchen with pastry room, 3 food prep areas, 3 storages areas, staff dining/lounge, dish wash area, and chefs' office; • Receiving office and receiving area; • Security office; • Office; • Prayer room 01-03; • Residents' laundry; • Hostel reception lobby with reception and lounge; • Large storage; • Archives; and • Liquefied Petroleum Gas (LPG) area.
Upper ground floor	• Multipurpose Printing room; • Washrooms: ladies, gents, & PWD; • Banquet room; • Storage area; • Finishing kitchen; • Lawn; • Lobby; and • Basketball court, tennis/soccer.
First floor	• Double volume banquet room; and • Furniture storage area.
Typical second and third floors	• Self-contained suites 1-35.
Fourth floor	• Roof terrace; • Indoor games; • Bar; • Gym equipped with stationary bicycle, strength, cardio, & resistance equipment; • Changing room for men and ladies with steaming and drying area; • Wellness centre; and • Yoga area.
PHASE 3: Gate House	

LEVEL	PROJECT COMPONENT
Upper ground floor - Gate A.	• 18 VIP car parking; • 2 Car entry, 2 car search and 1 car exit; • Pedestrian entry, screening and exit; • Document reception; • Waiting area; • Washroom area; • Lawn; • Ramp down; • R. conic ramp; and • Water Borehole area.
Ground floor -Gate B.	• 5 parking lots and drive way; • Waste treatment plant area; • Refuse room; • 5 planters; • Laundry; • Service entry; • Meter room; • Generator room; and • Transformer room.

Project amenities of interest will include:

- Adequate parking slots;
- 24 Hour Security / CCTV surveillance;
- A standby generator in place to curb power outages;
- A water borehole;
- Pressurized water system;
- Underground water storage tanks to not only ensure constant water supply but also harvest surface runoff;
- Well designated loading / offloading bays; and
- 2 High speed lifts.

2.7 Estimated project investment cost and EIA License fee

The proposed Project investment cost is approximately ***Two Billion Nineteen Million One Hundred Forty Nine Thousand Seven Hundred and Four Kenya Shillings and Thirty Four Cents (Ksh. 2,019,149,704.34)***; make reference to the attached bill of quantities. The Fifth Schedule of the Environmental Impact Assessment and Audit Regulations, 2003 as reviewed vide Gazette Notice No. 13211 of 2013 provide for EIA processing and monitoring fee.

As per Gazette Notice No. 13211 of 2013, pursuant to Regulation 48 of the Environmental Impact Assessment and Audit Regulations, 2003 as read with schedule 4 of the fifth schedule thereof, the EIA fees payable shall be 0.1 percent of the total cost of the project to a minimum of Ksh. 10,000.00 with no upper capping. Therefore, the payable EIA fees for the proposed Project shall be ***Two Million Nineteen Thousand One Hundred and Forty Nine Kenya Shillings and Seventy Cents (Ksh 2,019,149.70)***.

2.8 Context, Components and Activities of the proposed Project

To provide a comprehensive description of the proposed Project and the surrounding environment, specifying any information necessary to identify and assess the environmental effects of the proposed Project is of importance. This includes project objectives and information on, rationale for the project and background, the nature, location/existing setting, timing, duration, frequency, general layout including relocation of people and any additional impacts on the surroundings communities, pre-construction activities, construction methods, works and duration, and post construction plans. A description of raw material inputs, technology and processes to be used as well as products and by-products generated, should be provided. Note areas to be reserved for construction and areas to be preserved in their existing state as well as activities and features which will introduce risks or generate impact (negative and positive) on the environment. The ESIA study shall include an assessment of the context, components and activities of the proposed Project. This includes the following among others:

- *Context*: Description and assessment of the *location* of the land, the *land use characteristics*, including the planned use of the land and description of the existing land use and their patterns within 3 kilometres (km) radius from the boundary of the Project Area and *project characteristic;*
- *Activities*: Description and assessment of the specific phases and activities; including timing and location, for:
    - *(i) Pre-construction (planning) phase (Plan preparation and seeking of the appropriate approvals from the relevant authorities, baseline condition appraisal),*
    - *(ii) Construction phase (contractor's camp establishment, site clearance, acquisition and transportation of building materials, construction of the Campus in all the three phases);*
    - *(iii) Occupation phase (running and managing the Campus as per the laid down rules and procedures); and*
    - *(iv) (iv) Decommissioning/abandonment phase (demolition of facility).*

2.9 Design criteria

The design criteria and characteristics of the proposed development will be guided by the respective consultants including Project manager, architects, quantity surveyor, electrical engineer, structural engineer, mechanical engineers, utilities engineers, etc and as detailed in the architectural, structural, mechanical and electrical design drawings (attached copies of architectural drawings; layouts plan, elevation).

- All dimensions to be checked on site, written rule over scaled dimensions any discrepancies to be reported to the architect before.
- All construction works will comply with the latest standard codes of practice, local authority by-law and fire regulations.
- P.V. denotes permanent ventilation and must be provided above all and doors and windows where indicated or shown.
- All walls less than 200 millimetres (mm) thick to be reinforced with hoop iron at every alternate course.
- Water meter to be 300 mm above ground level.
- Dump Proof Course (D.P.C.) denotes one layer of bituminous felt to be provided under all walls 150 mm above ground level
- All reinforced concrete works to structural engineer's details depth of foundation to be determined on site and should not be less than 1200 mm.
- Provide one row of 600x600x50 mm precast concrete paving slabs around the building unless otherwise shown.
- Heavy duty polythene sheeting and anti-termite treatment to be provided under ground floor slab.
- Plinth level to be minimum 300 mm from proposed parking level or existing ground level.
- All surface beds to be cast on well compacted and well consolidated filling.
- Depth of foundation to be minimum 600 mm below reduced ground level.
- All pipes and services to minimum to be minimum 450 mm below reduced ground level.
- All inspection chambers within building area, drive way and parking areas to be heavy duty, double seal air tight covers. Drains under building, drive-way and parking to be PVC pipes encased in 150 mm concrete surround.

2.10 Roads/Accessibility

The Project site is located along Kapenguria Road in Loresho Sub Location, Kitisuru Location, Kangemi Division, Westlands Sub County, Nairobi County. The Project area has experienced transformation in the road network owing to the mixed development investment in the area being spearheaded by both local and foreign investors. The site is accessible from Loresho Ridge road and Kapenguria Road where the site is situated.

2.11 Electrical system

The site location area is already connected to the Kenya Power and Lighting Company (KPLC) Plc electricity line and therefore the proposed development will be connected to the existing KPLC Plc electricity mains. The various components of the electrical system shall comprise single and twin socket outlet, lockable meter board with glass view panel, gate lights and security alarm panel outlet and probably security connection system. The necessary guidelines and precautionary measures relating to the use of electricity shall be adhered to.

2.12 Water supply

Various water sources have been evaluated by the Proponent and various professionals involved. After extensive discussions and relevant considerations, the various options were assessed and the most optimal water source agreed on was the Nairobi City Water and Sewerage Company (NCWSC) Limited's water supply supplemented by a water borehole to be drilled on site, roof catchment rain water harvesting during operation phase, surface runoff harvesting, and re-usage of wastewater from a wastewater treatment plant build on site to design. It is worth to note that the supplementary (alternative) water sources for NCWSC Limited's water supply are sustainability good practices proposed to the Proponent for consideration at the opportune time during the project cycle; alternatives which shall be independently subjected to the ESIA process as per the laws of the land prior to implementation.

2.13 Wastewater management

The proposed Project by design will be connected to NCWSC Limited's sewer system serving the general Project area. To avoid further straining the already strained NCWSC Limited's sewer line, it is hereby recommended that the Proponent in future considers construction of a wastewater treatment plant onsite to design. The proposed wastewater treatment plant will not only relief the strained NCWSC Limited's sewer line, but also serve a sustainability function by facilitating re-usage of wastewater within the establishment. The guiding principle with respect to wastewater management within the establishment in all the project phases will be strict adherence to the provisions of the Water Quality Regulations, 2006.

2.14 Stormwater management

The basic sustainability principle with respect to stormwater management at the establishment is to endeavour to "contain stormwater generated within the property within-the-property". This will be through deployment of array of measures including incorporating green spaces within the establishment to the extent feasible, establishing under-ground water recharge zones within the establishment, and harvesting stormwater into both sub-surface and surface water storage structures.

The last result option with respect to stormwater management with respect to the proposed Project shall be directing stormwater into the existing stormwater system. This option is not recommended for the proposed Project unless at Policy level the Regulators in both the Water Sector and Environment Sector spearheads establishment of stormwater management plan anchored on localized watershed studies for Developer's/Public adoption. The latter position is informed by the current state of the existing public stormwater drains which are compromised design wise, legally and functionally hence a recipe for flood episodes in the wake of climate change.

2.15 Waste Management strategy

The principle objective of waste management program is to minimize the pollution of the environment as well as to utilize the waste as a resource. This goal should be achieved in a way that is environmentally and financially sustainable by coming up with waste management plan during construction and operations phase. The provisions of the Waste Management Regulations, 2006 shall guide on matters solid waste management at the premises throughout the project cycle.

2.16 General security

The Proponent will put in place adequate security measures to secure the facility to international standards. These shall include construction of a Perimeter Fence and Gate House to design with state-of-the-art security installations including but not limited to security lighting system, CCTV system, sensing system, detectors, anti-terror installations, amongst others. Competent security staff will be deployed to offer security services within the establishment.

2.17 Construction activities

The construction activities shall begin from the time the Proponent obtains all the relevant approvals/permits including the EIA License.

2.17.1 Project implementation sequencing

- **Pre-construction stage**

This involved mainly the following:

a) Baseline studies;
b) Baseline surveys;
c) Design works;
d) Design approval;
e) ESIA study; and
f) Acquisition of the EIA License.

- **Construction stage**

This will involve the following:

a) Mobilization of resources

Once all relevant licenses and approvals have been granted, the main Contractor shall commence with the resource mobilization to include but not limited to; transportation and delivery of all relevant equipment and machinery on site; deployment of workers on site in readiness to start the works; The machinery would involve excavators; mixer, trucks and setting up of tower cranes when need be; Trucks for use in transportation of excavated materials and required construction materials; setting up of the construction site office for use during the works; The Contractor will also mobilize human workforce casual, permanent, skilled and unskilled; site hording.

b) Establishment of related works and all support infrastructures that are significant for the construction work

This would involve the transportation of machinery and deployment of the workers to the construction site. The machinery would be used for ground breaking and transportation of materials from the sources to the site. The major machineries that will be used include mixers, welding machines and transmission machines. The Contractor will also mobilize human workforce casual, permanent, skilled and unskilled.

c) Acquisition and transportation of building materials

The Contractor shall source construction materials from the various available suppliers. Supply of materials will be a continuous activity throughout the project life since different materials will be needed at future phases of the construction. Such materials include building stones, sand, ballast, cement, timber, reinforced concrete frame, steel, bars, G.I pipes, PVC pipes, pavement blocks, concrete slabs, murram, hard core, insulated electrical cables and timber among others.

d) Site clearance

Site clearance entails the removal of all physical barriers, all the vegetation on the actual site for the construction works. The anticipated clearance shall entail clearing of the land to the extent required by the Engineer for checking the setting out of the works. The Contractor shall also clear out that part of the site to be occupied by the permanent works. The Contractor shall backfill with appropriate material those cavities and losses of soil which result from clearing the part of the site not subsequently to be occupied by the work. Clearance of none 'essential' parts of the land should be discouraged as much as possible with comprehensive landscaping encouraged on the cleared areas after construction works are over. This will involve the use of heavy earthmoving machinery such as excavators and bulldozers and trucks to cart away the excavated materials for disposal.

e) Excavation and land filling works

Excavation will be carried out to prepare the site for construction of foundations and drainage systems. This will involve the use of heavy earthmoving machinery such as excavators and bulldozers.

f) Storage of materials

Building materials shall be stored on site. Bulky materials such as ballast, tiles, sand and steel shall be carefully piled on site. To avoid piling large quantities of materials on site, the Contractor shall order bulky materials such as sand, gravel and stones in quotas. Materials such as cement, paints and glass among others shall be stored in temporary storage structures built for that purpose.

g) Masonry, Concrete Work and Related Activities

The engineering designs and site layout plans that have been approved shall be implemented. The setting will comply with the specifications set out by the Proponent to the Contractor under the supervision of qualified Engineers. In accordance with the designs and the layout plans, the construction of the proposed Project and associated infrastructure will begin immediately NEMA approves it. The Contractor will then be supplied with all the approved documents including the ESIA Study Report.

The construction of the building walls, foundations, floors, pavements, drainage systems among other components of the proposed Project 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 labour intensive and will be supplemented by machinery such as concrete mixers.

h) Structural Steel Works

The buildings will be reinforced with structural steel for stability. Structural steel works will involve steel cutting, welding and erection.

i) Transportation of the construction wastes from the site for disposal

Construction waste that cannot be used for landscaping work at the site will be disposed in approved dumpsites by a contracted licensed waste handler.

j) Electrical work

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

k) Plumbing

Installation of pipe work for water supply and distribution will be carried out within the buildings and associated facilities. In addition, pipe work will be done to connect sewage from the premises to the sewer line, and for drainage of storm water. Plumbing activities will include metal and plastic cutting, the use of adhesives, metal grinding and wall drilling among others.

l) Landscaping

To improve the aesthetic value or visual quality of the site once construction ceases, the Proponent will carry out landscaping. This will include cabro paving the site and elaborate greenery works.

2.18 Description of the project's operational activities

The property shall upon completion be occupied for institutional purposes and any other related.

2.18.1 Solid waste and liquid waste management

By design, the proposed Project shall come along with a central solid waste collection point to the principal Engineer's specification. The Occupier shall provide facilities for collecting solid waste at source which shall include dust bins/skips for temporarily holding waste before final disposal at the sentry area. Services of a NEMA registered waste collector and transporter shall be sought to collect the waste from the central waste disposal area, transport and dispose to an authorized dump site. The Environmental Management and Co-ordination (Waste Management) Regulations, 2006 will guide and The Sustainable Waste Management Act 2022.

By design, the facility will be connected to the public sewer into which it will channel its wastewater (sanitary, kitchenette, etc.) However, for sustainability the Proponent should consider construction of a wastewater treatment plant to design for the facility. Ultimately, the provisions of the Water Quality Regulations, 2006 shall guide when it comes to liquid waste management with the establishment.

2.18.2 General repairs and maintenance

The building and associated facilities will be repaired and maintained regularly during the operational phase of the Project. Such activities will include repair of building walls and floors, repair and maintenance of electrical gadgets, painting and replacement of worn-out materials among others which will be coordinated by the care taker/property manager. These activities will lead to generation of solid waste in form of broken tiles, paints containers, broken bricks, etc.

2.18.3 Cleaning

The Occupier will be responsible for ensuring regular washing and cleaning of the entire premises. General fumigation and pest control of the facility shall be coordinated by the Proponent to keep pests at bay. Cleaning operations will involve the use of substantial amounts of water, disinfectants and detergents and generation of wastewater that needs to be effectively managed. Pest control activity shall use hazardous substances such as pesticides which shall be handled through contracted experts and handled in strict adherence to the respective MSDS.

2.18.4 Utilities maintenance

The utilities installed at the facility shall undergo regular preventive and corrective maintenance which shall be undertaken by appointed competent persons who shall ensure they are in good working condition at all times and available for use. Maintenance works will generate waste including hazardous waste such as used oil; replaced parts such as oil filters; etc the service contract shall require the maintenance team to service and carry the replaced parts and waste such as used oil for safe disposal.

2.19 Description of the project's decommissioning activities

2.19.1 Demolition works

Upon decommissioning, the project components including buildings, pavements, drainage systems and perimeter fence will be demolished. This will produce considerable solid waste, which will be re-used for other construction works or if not re-usable, disposed off appropriately by a licensed waste disposal company.

2.19.2 Dismantling of equipment and fixtures

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

2.19.3 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 top soil and re-vegetation using indigenous plant species.

2.20 Climate Change risk and vulnerability assessment

Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. However, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels (like coal, oil and gas), which produces heat-trapping gases.

The purpose of the Climate Risk and Vulnerability Assessment is to develop an understanding of the current and future climate risks that will be attributed to the existence of the proposed Project in the larger Kabete, Loresho area.

Objectives:

- To inform participatory action planning processes that lead to community-driven and owned adaptation mechanisms,
- To identify lower risk areas in which climate-resilient infrastructure can be developed,
- To develop targeted early warning systems, training programs in environmental management and risk reduction and community capacity building within the Project area, and
- To select, prioritize, and design appropriate resilient infrastructure development options.

Vulnerability assessment is a function of exposure, sensitivity, and adaptive capacity. The Proponent together with the Environmental Consultant will identify critical sectors and populations vulnerable to climate hazards. The adaptive capacity of these assets population groups to climate change will also be evaluated. The aspects of vulnerable conditions that will

be examined include physical, social, economic, and environmental factors. This assessment involves the following:

- Critical assets, sectors, and services will be identified, organized, and mapped
- Vulnerable populations will be identified and mapped using area population data previous studies. This may also involve engaging with community members, vulnerable groups, and climate experts.
- A vulnerability assessment will be conducted, taking into account the exposure sensitivity, and adaptive capacity of assets and groups.

Risk assessment is a function of the probability of a hazard impact and the overall consequence of the impact i.e. Risk = Probability x Consequence.

This assessment allows for the prioritization of the most at-risk assets, systems, and groups, focusing on the most vulnerable ones identified during vulnerability assessment.

3 BASELINE INFORMATION OF THE STUDY AREA

3.1 Introduction

Baseline information (background information on the biophysical, social and economic settings) is important reference point for conducting ESIA. Baseline data is essential for the assessment of the potential impacts of a proposed Project. The conditions of the natural environment form a basis for the selection by planners of the area to be developed for various land uses for the sustainability of the proposed Project and therefore evaluation of the baseline information is important in understanding the existing environmental set up. The main objective of baseline information is to provide adequate and accurate environmental baseline information and this can be broken down as follows:

- To provide a description of the status and trends of environmental factors, against which predicted changes can be compared and evaluated in terms of importance; and
- To provide a means of detecting actual change by monitoring once the proposed Project is implemented.

3.2 Location of the proposed Project

The proposed Project will be located on L.R. No. 22375/8 along Kapenguaria Road in Loresho Sub-County, Kitisuru Location, Kangemi Division, Westlands Sub-County, Nairobi County. Nairobi County is one of the 47 counties in the Republic of Kenya. It borders Kiambu County to the North and West, Kajiado County to the South and Machakos County to the East. Among the three neighbouring counties, Kiambu County shares the longest boundary with Nairobi County. The County has a total area of 696.1 square kilometres (km^2) and is located between longitudes 36^o 45‘ East and latitudes 1^o 18’ South. It lies at an altitude of 1,798 metres (m) above sea level. The County is divided into seventeen constituencies/sub-counties, with the Project site located in Westlands Sub County within the County.

3.3 Environmentally sensitive area to be affected

The targeted Project site is not located in or near a wetland or any other environmentally sensitive area. Hence, the proposed Project activities will not impact negatively on any known environmentally sensitive area.

3.4 Tertiary Education

Nairobi County hosts two public universities, that is the 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.

3.5 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 - Langata area is characterized by plains surrounded by Nairobi National Park on the east and Ngong Forest on the south. Several streams with steep-sided valleys covered with vegetation are a dominant landscape feature of the County. The main rivers in the County are Nairobi River, Ngong River and Kabuthi River. 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 23.19 km^2.

3.6 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.

3.7 Climatic Conditions

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

3.8 Infrastructure and Access

Infrastructure is the underlying foundation for a Country's development. This section describes the various infrastructural facilities and their access in the County. They include: the road network, rail network, airports, posts and telecommunication, financial and education institutions.

3.8.1 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. There has been increasing number of vehicles; in 2012 Kenya had 1.4 million registered vehicles and 400,000 motorcycles with a greater number of 60 percent (%) being used in Nairobi (KNHR, 2013). The total road network covers 553.7 km: 423 km are of bitumen standard while 54 km and 76.7 km are gravel and earth roads respectively. 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 Jomo Kenyatta International Airport (JKIA) which is the biggest Airport in East and Central Africa, and is the focal point for major aviation activity in the region. Its importance as an aviation Centre makes it the pacesetter for other airports in the region.

JKIA, located 18 km to the East of Nairobi City centre, is served by 49 scheduled airlines. JKIA has direct flight connections to Europe, the Middle East, Far East and the rest of Africa. JKIA has five cargo facilities with a capacity to handle 200,000 tonnes of cargo annually, and an animal holding facility which occupies 4,318.95 square feet. The Airport has a runway measuring 4,117 m long and 45 m wide on 4,472.2 ha of land.

Wilson Airport is the second airport in the County. It has two runways one that is 1,463 m long and 24 m wide while the other is 1,558 m by 24 m with displaced threshold giving a landing distance of 1,350 m.

The County has a railway network of 298 km and a total of 10 functional railway stations which are: 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.

3.9 Information, communication and technology

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% 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.

3.10 Energy Access

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

the Project site that can be reinforced by KPLC Plc for the provision of the power requirements of the proposed Project.

3.11 Water and Sanitation

Nairobi County has no major water tower and relies on other neighboring counties within Tana Basin for its water supply which is around 50 km from the City. This bulk water-supply is not reliable during periods of drought, and is also endangered by siltation of the reservoir due to deforestation in the catchment areas. The supply problem is further aggravated by the poor state of the distribution system, which results in about 38% losses due to leakage, illegal connection and inefficient and wasteful use of water by some consumers.

3.12 Water supply schemes

NCWSC Limited is the water service provider and a company fully owned by NCCG. Its mandate is to offer water and sanitation service to Nairobi residents on behalf of NCCG. The water connection is currently at about 80%. To bridge the gap, there are boreholes / wells that are mostly operated by large private consumers (industrial enterprises, hotel complexes) or by individual residential owners in parts of the City that receive only intermittent supply (for example, Langata, Karen). Wells are often shared with neighbors or water is sold for distribution by tankers. Many private well owners are also connected to the main water-supply network (which provides cheaper water) but use groundwater as a back-up. The Project site has an existing borehole that will supplement NCWSC Limited's supply because it is not reliable.

3.13 Water sources and access

The main sources of water for the residents in Nairobi County are from Sasumua Dam in Nyandarua, Kikuyu Springs, Ruiru Dam, Thika Dam and Ngethu Water Works. Although Nairobi River is permanent, its water is unsafe for human consumption. There are residents that use borehole water, water kiosks especially those in slums, wells and roof catchments. Over 80% of the residents have access to piped water. On average, 52.5% and 24.7% of the population takes 0 and 1-4 minutes respectively to fetch water. Only 0.9% of the population takes 30-59 minutes to nearest water point.

3.14 Water management

The responsibility for water supply and sewerage in Nairobi is shared between an asset holding company: Athi Water Services Board (AWSB), and an operating company: NCWSC Limited. Also, some of water is managed by Community Based Organizations (CBOs) and Non-Governmental Organizations (NGOs). Water and sewer services in Nairobi City are provided by the NCWSC Limited. Service standards are set and monitored by a national water regulatory agency called the Water Services Regulatory Board (WASREB). There is poor quality and inadequate water supply in Nairobi. Only 40% of those with home connections receive water continuously. Measures for future sustainable use are; expansion of supply sources to keep pace with ever growing population; reduction of water losses by use of metered zoning system; and dealing with water cartels.

3.15 Tourism

Nairobi County is a major centre of tourism in the region. Its relative proximity to many tourist attractions both in Kenya and East Africa makes it an asset of great importance in the tourism sector. As the capital City and commercial centre, it attracts many businessmen and leisure tourists. This is partly because JKIA the main point of entry to Kenya by air is located in the County.

3.15.1 Main Tourist Attractions, National Parks/Reserves

Nairobi is the only capital City in the world with a national park close to its City centre. 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 Karen Blixen Museum. Nairobi is considered the safari capital of the world and has many spectacular hotels to cater for safari bound tourists. It is also home to the largest skating ice rink in East Africa at the Panari Hotel‘s sky centre covering 15,000 square feet and accommodating 200 people.

3.16 Solid Waste Management

Major challenges facing Nairobi County with respect to Solid Waste Management 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.

3.17 Major Contributors to Environment Degradation in the County

Nairobi‘s large and growing population is one of the main forces driving the County‘s overwhelming environmental degradation. Other contributors include increased number of vehicles, unplanned and uncontrolled settlements, poor solid waste management, uncontrolled development, untreated industrial discharge and inefficient energy use. The leading contributor to climate change is from industrial and motor vehicle emissions. Pollution control measures are hampered by inadequate capacity for enforcement of existing environment conservation policies. In addition, there is need to address existing policy gaps particularly on Bio-Technology, environmental planning and accounting for natural resources.

4 RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORK

4.1 Introduction

Kenya has a policy, legal and administrative framework for environmental management. Under the framework, NEMA is responsible for ensuring that ESIA for proposed projects and environmental audit (EA) for existing facilities are undertaken as provided in EMCA Cap 387. EMCA Cap 387 qualifying as the current legislation referred to in Article 72 of the Constitution of Kenya 2010.

An ESIA is carried out in order to identify potential positive and negative impacts associated with a proposed project with a view to taking advantage of the positive impacts and developing mitigation measures for the negative impacts. Section 147 of EMCA Cap 387 provides for the development of the various regulations to give full effect to the provisions of the Act. These provisions however should be within the confines of Article 2 Sub-Article 4 of the Constitution of Kenya 2010 that, *"Any law, including customary law, that is inconsistent with this Constitution is void to the extent of the inconsistency, and any act or omission in contravention of this Constitution is invalid".*

The Government of Kenya has in place a number of Policies and Legal Statutes aimed at enhancing environmental conservation and sustainable development. The Proponent will need to observe the provisions of the various policies and legal statutes that are aimed at maintaining a clean, healthy and sustainable environment. The relevant policy, legal and institutional provisions to the proposed Project have been reviewed below.

4.2 Environmental Impact Assessment Process in Kenya

In applying for an EIA license, a proponent shall submit at least ten copies of the Project Report or Study Report as it is appropriate to the Authority or the Authority's appointed agent in the prescribed form accompanied by the prescribed fees. The Authority shall review the submitted report and communicated the decision thereof as provided in EMCA Cap 387. Below is the schematic presentation of the current ESIA process in Kenya.

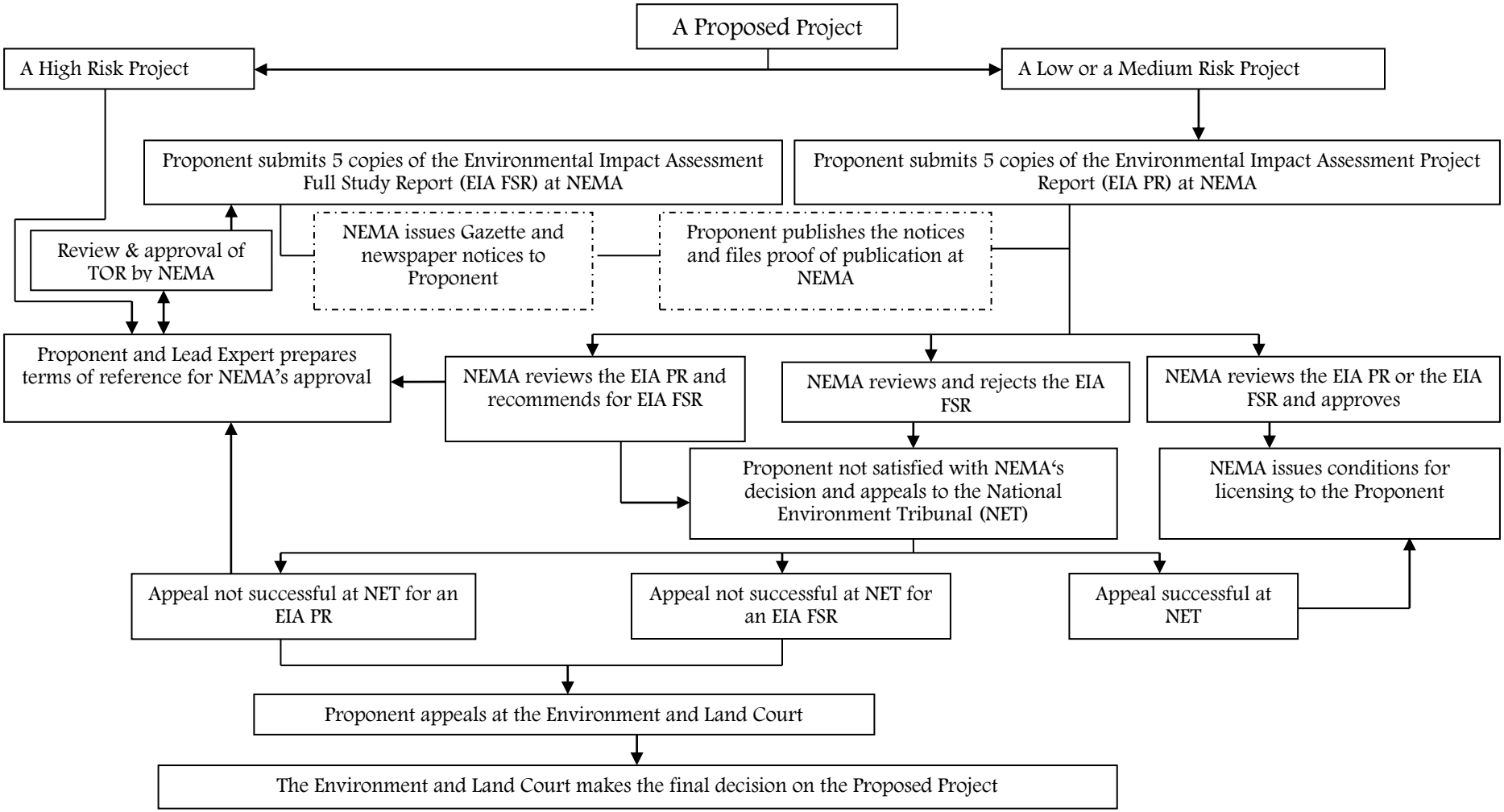

Figure 2: Schematic Presentation of the Current ESIA Process in Kenya

4.3 Policy Framework

The Kenya Government policy on all new projects or activities requires that an ESIA study is carried out at the planning stages of the proposed development. The requirement for development plans, programs and policies is to subject them to Strategic Environmental Assessment (SEA) at the planning stage. This is to ensure that significant potential impacts on the environment are taken into consideration during the design, construction, operation, and decommissioning phases. The ESIA or SEA report will include but not limited to the following information:

- Human Environment: socio-economic, socio-cultural and socio-legal aspects;
- Built Environment: material assets; and
- Natural Environment: flora, fauna, soil, water, air, climate, landscape, historical landmarks, archeological and ecological aspects.

Environmental policies cut across all sectors and government departments. As such policy formulation should be consultative steered by interdisciplinary committees.

4.3.1 National Environmental Action Plan

National Environmental Action Plan (NEAP) was a deliberate policy effort to integrate environmental concerns into the Country's development initiatives/plans. This assumed a consultative and multisectoral approach. Such an approach ensured that environmental management and the conservation becomes integral in various decision-making platforms. 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 and/or are in the process of development. Under the NEAP process, ESIA was introduced targeting the industrialists, business community and local authorities.

4.3.2 The Kenya National Climate Change Response Strategy

The purpose of this strategy is to put in place robust measures needed to address most of the challenges posed by climate variability and change through thorough impact assessments and monitoring of various projects. According to Climate Change Projections, the Country is likely to experience hotter drier sunny seasons, warmer wetter rainy seasons, rise in sea levels and an increase in extreme weather events. In the construction sector, priority inclusion areas should include energy efficient innovations and technologies, and utilization of low-carbon appliances and tools; the utilization of eco-friendly energy resources such as wind, solar, biogas, etc.; as well as possible utilization of biofuels.

The Proponent shall incorporate the use of energy efficient fixtures and fittings for the development and use solar power as a renewable and green energy source.

4.3.3 National Policy on Water Resources Management and Development

It enhances a systematic development of water facilities in all sectors for the promotion of the Country 's socioeconomic progress, and also recognizes the by-products of these processes as

wastewater. It calls for development of appropriate sanitation systems to protect people's health and water resources from pollution. The policy guideline will be used to provide an effective and efficient waste water management system.

4.3.4 The world commission on environment and development–the Brundtland Commission of (1987)

The Brundtland Commission addresses the environmental aspects of development. It has emphasized on sustainable development that produces no lasting damage to the biosphere and to particular ecosystems. In addition to environmental sustainability is the economic and social sustainability. Economic sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resource. The guidelines will be used to develop an ESMP to guide the developer in order to ensure environmental enhancement.

4.4 Legal Framework

4.4.1 The Constitution of Kenya 2010

The Constitution of Kenya 2010 is the supreme law of the Republic of Kenya and binds all persons and all state organs at all levels of government. Any law, including customary law, that is inconsistent with this Constitution of Kenya 2010 is void to the extent of the inconsistency, and any act or omission in contravention of the Constitution of Kenya 2010 is invalid (Constitution of Kenya 2010, Article 2).

In relation to environment Article 42 on the Bill of Rights confers to every person the right to a clean and healthy environment, through legislative and other measures, particularly those contemplated in Article 69; and to have obligations relating to the environment fulfilled under Article 70.

On Principles of Land Policy in Article 60(1)(c)&(e), Land in Kenya shall be held, used and managed in a manner that is equitable, efficient, productive and sustainable, and in accordance with sustainable and productive management of land resources principle and sound conservation and protection of ecologically sensitive areas principle.

Article 69(1)(d) also stipulates that the State shall encourage public participation in the management, protection and conservation of the environment, and in (f) the State shall establish systems of environmental impact assessment, environmental audit and monitoring of the environment. In Article 69(2), every person has a duty to cooperate with state organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Article 72 states that Parliament shall enact legislation relating to the environment.

The Proponent shall adhere to the provisions of the ESMP provided in this Report and ensure the right to a clean and safe environment is not infringed. Further the Proponent shall abide by the provisions of EMCA Cap 387 being the principal environmental legislation in Kenya for sustainability throughout the project cycle

4.4.2 Environmental Management and Coordination (Amendment) Act, 2015

The Act states in Section 3(1) and (2) that every person in Kenya is entitled to a clean and healthy environment in accordance with the Constitution and relevant laws and has the duty to safeguard and enhance the environment. The entitlement to a clean and healthy environment 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.

In Section 43 of the Act, Section 58 of the principal Act is amended by deleting Sub-Section (2) and substituting therefor the following new Sub-Section –
(2) The proponent of any project specified in the Second Schedule shall undertake a full environmental impact assessment study and submit an environmental impact assessment study report to the Authority prior to being issued with any license by the Authority: Provided that the Authority may direct that the proponent forego the submission of the environmental impact assessment study report in certain cases.

The Proponent has engaged the services of the environmental experts to conduct the ESIA in line with the provisions of this Act.

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

These Regulations provides the basis and criteria of undertaking ESIAs and EAs in Kenya. The Regulations' amendment for 2016 sought to review the review timelines for Project Reports and revision of the various fees payable to the Authority. The 2019 amendments introduced a risk-based screening process in the ESIA process. Whereby, low and medium risk projects should start at the Summary Project Report (SPR) level with a provision of upgrading a SPR to a Comprehensive Project Report (CPR) should the Authority deem it necessary, while high risk projects should start at the full study level.

The EIA/EA Experts have undertaken this ESIA in line with all the provisions set out in these Regulations.

4.4.4 Environmental Management and Co-ordination (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. The effective enforcement of the Water Quality Regulations, 2006 will lead to a marked reduction of water-borne diseases and hence a reduction in the health budget. Regulation 4(1) states that

every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act. Regulation 4(2) further states that no person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit.

These Regulations also provide guidelines and standards for the discharge of poisons, toxins, noxious, radioactive waste or other pollutants into the aquatic environment in line with the Third Schedule of the Regulations. The Regulations have standards for discharge of effluent into the sewer and aquatic environment. While it is the responsibility of the sewerage service providers to regulate discharges into sewer lines based on the given specifications, NEMA regulates discharge of all effluent into the aquatic environment. Everyone is required to refrain from any actions, which directly or indirectly cause water pollution, whether or not the water resource was polluted before the enactment of EMCA Cap 387.

The proposed Project will generate wastewater within all the Project phases. The Proponent will endeavour to comply with the provisions of these Regulations as the bare minimum on matters liquid waste management at the premises throughout the project cycle for sustainable development.

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

These Regulations are contained in the Kenya Gazette No. 69, Legal Notice No. 121 of 2006. Regulation 4(1) and (2) states that no person shall dispose any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle and that any person whose activities generate waste shall collect, segregate and dispose of or cause to be disposed of such waste in the manner provided for under these Regulations. Regulation 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.

The proposed Project will generate solid wastes within all the Project phases. The Proponent will endeavour to comply with the provisions of these Regulations as the bare minimum on matters solid waste management at the premises throughout the project cycle for sustainable development e.g. By engaging the services of a licensed waste transporter to collect waste from the central waste collection point within the establishment, transport and dispose the waste to a designated disposal site(s).

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

Regulation 3(1) and (2) of these Regulations state 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 these Regulations. These Regulations also relate noise to its vibration effects and seek to ensure no harmful vibrations are caused by controlling the level of noise. Regulation 4 states that except as otherwise provided in these Regulations, no person shall make or cause to be made excessive vibrations that annoys, disturbs, injures or endangers the comfort, response, health or safety of others and the environment; or cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 meters from any moving source.

The Proponent shall ensure that noise and vibration levels within the premises abide by the provisions of these Regulations within all the project phases e.g. By limiting construction works during the day time, ensuring that noise from site motor vehicles does not exceed 84 dB(A) when accelerating, etc.

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

The objective of these Regulations is to provide for the prevention, control and abatement of air pollution to ensure clean and healthy ambient air. Regulation 5 states that no person shall act in a way that directly or indirectly causes, or is likely to cause immediate or subsequent air pollution; or emit any liquid, solid or gaseous substance or deposit any such substance in levels exceeding those set out in the first Schedule. In addition, Regulation 6 stipulates that no person shall cause or allow emission of the priority air pollutants prescribed in the Second Schedule to cause the ambient air quality tolerant limits prescribed in the First Schedule to be exceeded.

The Proponent shall institute adequate measures to ensure that air quality with the establishment is maintained within the prescribed limits as per these Regulations e.g. By sprinkling water on loose services on site during construction to curb dust pollution, setting speed limits on site and adherence to the set speed limits to curb dust pollution during construction phase, etc.

4.4.8 The Energy Act, 2019

The Energy Act, 2019 is am Act of Parliament to consolidate the laws relating to energy, to provide for National and County Government functions in relation to energy, to provide for the establishment, powers and functions of the energy sector entities; promotion of renewable energy; exploration, recovery and commercial utilization of geothermal energy; regulation of midstream and downstream petroleum and coal activities; regulation, production, supply and use of electricity and other energy forms; and for connected purposes. Under the Act, the Cabinet Secretary shall in consultation with the relevant stakeholders develop and publish a national energy policy which shall be reviewed every five years. The Government is obligated in Section 7 of the Act to facilitate the provision of affordable energy services to all persons in Kenya.

The Act in Section 9 establishes Energy and Petroleum Regulatory Authority (EPRA) whose

functions includes to regulate: generation, importation, exportation, transmission, distribution, supply and use of electrical energy with the exception of licensing of nuclear facilities; importation, refining, exportation, transportation, storage and sale of petroleum and petroleum products with the exception of crude oil; and production, conversion, distribution, supply, marketing and use of renewable energy.

In Section 148(1), a person who wishes to carry out electrical installation work must be licensed as an electrical contractor by the Authority. Under Section 151(2), it shall be the duty of the owner or occupier of any premises to ensure, in accordance with regulations issued under this Act, that the electrical installation in the subject premises is: carried out only by a duly authorized electrical contractor and appropriate certificates detailing particulars of the installation submitted to the licensee, before initial connection to a supply of electricity; and tested and inspected periodically, any defects being remedied, and appropriate certificates detailing particulars of the installation issued and displayed at the point of supply.

The Proponent shall endeavour to abide by the provisions of the Energy Act, 2019 throughout the project cycle.

4.4.9 Occupational Health and Safety Act, 2007

This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. Section 6 of the Act dictates that every occupier is obliged to ensure safety, health and welfare of all persons working in his workplace. The occupier shall achieve this objective by preparing and as often as may be appropriate, revising a written statement of his general policy with respect to the safety and health at work of his employees and the organization and arrangements for the time being in force for carrying out that policy (Section 7). He is also required to establish a safety and health committee at the workplace in a situation where the number of employees exceeds twenty (Section 9) and to cause a thorough safety and health audit of his workplace to be carried out at least once in every period of twelve months by a registered safety and health Advisor (Section 11).

To ensure machinery safety, every hoist or lift (Section 63) and all chains, ropes and lifting tackles [Section 64 (l, d)], shall be thoroughly examined at least once in every period of six months by a person approved by the Director of Occupational Health and Safety Services. In relation to fire safety, Section 78(3) requires spillage or leaks of any flammable liquid to be contained or immediately drained off to a suitable container or to a safe place, or otherwise treated to make it safe. Further, Section 78(5) states that a clear and bold notice indicating that smoking is prohibited should be conspicuously displayed in any place in which explosive, highly flammable or highly combustible substances, are manufactured, used, handled or stored. In summary, this Act will be used a guideline to ensure health and safety of workers is guaranteed.

The Proponent shall ensure that the site is registered with Directorate of Occupational Safety and Health Services. The Proponent shall further engage competent Environment Health and Safety personnel to oversee the safety and health of the workers during installation. The Proponent shall as well provide insurance cover for all the workers and the public against all risks related to construction activities.

4.4.9.1 Occupational Safety and Health (First Aid in the Workplace) Regulations, 2023

These Regulations describe the contents of a First Aid Box or Cupboard for workplaces depending on the number of employees i.e. less than ten or more than fifty employees. It also stipulates that there should be employees who are trained on First Aid on every shift. The Regulations will be applicable during the execution of the proposed Project. It will be noble to ensure availability of enough First Aid supplies and trained personnel at the workplace throughout the project cycle.

4.4.9.2 Factories & Other Places of Work (Safety and Health Committee) Rules, 2004

These Rules stipulate that all workplaces which regularly employ twenty or more employees must establish Safety and Health Committees. The committees should have representatives from the management and all other departments in the workplace. The duties of the committees will be to oversee all the safety issues within the workplace and provide effective corrective measures for any safety incidences or accidents to ensure the Safety and Health of all employees and visitors. The proposed development will incorporate these Rules to ensure the safety and health of all employees, visitors and the surrounding community.

4.4.9.3 Factories and Other Places of Work (Fire Risk Reduction) Rules, 2007

These Rules stipulate the measures that should be put in place in all workplaces, processes or operations as provided for by the Act. They provide guidance on the storage and handling of flammable substances, measures to prevent the occurrence and spread of fires, measures to evacuate employees and measures to provide First Aid care or treatment in case of injuries during fires. The Proponent shall abide by the provisions of these Rules for optimal fire safety safeguards at the workplace throughout the project cycle.

4.4.9.4 Factories and Other Places of Work (hazardous Substances) Rules, 2007

These Rules apply to every factory, premises, places, process, operation, or work to which the provisions of OSHA, 2007 apply and also to employees and occupiers of premises. The Rules stipulate that it is the responsibility of the employer to ensure that the hazardous substances are within the required limits, and should provide personal protective equipment to protect the employees. The Rules provide for measures to control, handle and dispose of the hazardous substances. The Rules will be considered in the envisioned developments to ensure the hazardous substances are controlled.

4.4.9.5 Factories and Other Places of Work (Medical Examination) Rules, 2005

These Rules stipulate that medical examinations should be carried out on employees who may be exposed to various hazards within the workplaces in order to control the spread of occupational diseases. The employees working in occupations described in the Eighth Schedule of the Act should undergo medical examinations as stipulated in the First Schedule of these Rules. The Rules will be incorporated in the proposed project to ensure the health of the employees during the proposed Project execution.

4.4.9.6 Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005

These Rules stipulate the maximum level of noise that employees should be exposed to at given times. They also stipulate measures that should be put in place to ensure that the noise generated and exposed to workers at the workplace such as in the industrial sector envisioned by the proposed Project.

4.4.10 The Occupiers Liability Act (Cap. 34)

Section 3 requires that an occupier of premises owe the "common duty of care" to all visitors and workers. The Proponent shall fully abide by the provisions of this Act throughout the project cycle.

4.4.11 Climate Change Act, 2016

This Act provides for a regulatory framework for enhanced response to climate change; to provide for mechanism and measures to achieve low carbon climate development, and for connected purposes. This Act is applicable for the development, management, implementation and regulation of mechanisms to enhance climate change resilience and low carbon development for the sustainable development of Kenya. The Act's main objectives related to the various development zones for the proposed Project are:

a) Mainstream climate change responses into development planning, decision making and implementation;
b) Build resilience and enhance adaptive capacity to the impacts of climate change;
c) Formulate programmes and plans to enhance the resilience and adaptive capacity of human and ecological systems to the impacts of climate change;
d) Mainstream and reinforce climate change disaster risk reduction into strategies and actions of public and private entities;
e) Mainstream intergenerational and gender equity in all aspects of climate change responses;
f) Provide incentives and obligations for private sector contribution in achieving low carbon climate resilient development;
g) Promote low carbon technologies, improve efficiency and reduce emissions intensity by facilitating approaches and uptake of technologies that support low carbon, and climate resilient development;
h) Facilitate capacity development for public participation in climate change responses through awareness creation, consultation, representation and access to information;

i) Mobilize and transparently manage public and other financial resources for climate change response;
j) Mainstream the principle of sustainable development into the planning for and decision making on climate change response.

The Proponent shall fully abide by the provisions of the Act.

4.4.12 The Water Act, 2016

The purpose of the Act as per Section 3 is to provide for the regulation, management and development of water resources and water and sewerage services in line with the Constitution. Section 4 requires the Cabinet Secretary, the Authority, the Regulatory Board, County Governments and any person administering or applying this Act to be guided by the principles and values set out in Articles 10, 43, 60 and 232 of the Constitution.

Section 5 of the Act vest ownership of all water resources to the national government who hold them in trust for the Kenyan people. Section 6 states that "The Authority established in Section 11 shall serve as an agent of the national government and regulate the management and use of water resources". Section 10 (1) mandates the Cabinet Secretary within one year of commencement of this Act and every five years thereafter, following public participation, to formulate a National Water Resource Strategy. The purpose of the National Water Strategy as per Section 10 (2) shall be to provide the Government's plans and programs for the protection, conservation, control and management of water resources.

Section 11(1) provides for the establishment of the Water Resources Authority (WRA). According to Section 12, the functions of the Authority are to: Formulate and enforce standards, procedures and Regulations for the management and use of water resources and flood mitigation; Regulate the management and use of water resources; Enforce Regulations made under this Act; Receive water permit applications for water abstraction, water use and recharge and determine, issue, vary water permits; and enforce the conditions of those permits; Collect water permit fees and water use charges; Determine and set permit and water use fees; Provide information and advice to the Cabinet Secretary for formulation of policy on national water resource management, water storage and flood control strategies; Coordinate with other regional, national and international bodies for the better regulation of the management and use of water resources; and Advise the Cabinet Secretary generally on the management and use of water resources.

As per Section 40(1), "*An application for a permit shall be made to the Authority at the applicable basin area"*, and in Section 40 (4), *"An application for a permit shall be the subject of public consultation and, where applicable, of EIA in accordance with the requirements of the EMCA, 1999".* In Section 63, *"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"*.

According to Section 143(1), a person shall not without authority conferred under this Act: willfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource.

The Proponent will fully abide by the provisions of this Act when it comes to the water resource exploitation.

4.4.13 Water Resources Regulation, 2021

The Regulations implement provision of the Water Act, 2016. They shall apply to the regulation, management, use and development of all water resources, perennial or seasonal and including water resources of the territorial sea. Issues covered by these Regulations include: Prescription of water use activities; Issue of approvals, permits and authorizations for water use and water works; Guidelines on surface water including declaration of a watercourse, wetlands, land reclamation, water use for irrigation, and works associated for protection and control of fish; Groundwater development including boreholes and issues of specific permits and authorization; Water quality monitoring and liquid waste disposal including control of water pollution, water quality monitoring, inspection and controls concerning water works; Water use charges that is the penalties for misuse; Roles and powers of water resource users' associations and basin water resources committees; Identification of protected and designated groundwater conservation areas; Categories of water sector professionals and contractors and related permits and licenses; and Composition of reserves.

The Proponent will fully abide by the provisions of these Regulations when it comes to the water resource exploitation.

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

An Act of Parliament to make provision for the planning, use, regulation and development of land and for connected purposes. Section 55(1) of the Act provide the objectives of development control as: to ensure orderly physical and land use development; to ensure optimal land use; to ensure the proper execution and implementation of approved physical and land use development plans; to protect and conserve the environment; to promote public safety and health; to promote public participation in physical and land use development decision-making; to ensure orderly and planned building development, planning, design, construction, operation and maintenance; and to promote the safeguarding of national security.

In Section 56 of the Act, the Urban Areas and Cities Act (2011) and the County Governments Act (2012), the County Governments shall have the power within their areas of jurisdiction to: prohibit or control the use and development of land and buildings in the interests of proper and

orderly development of its area; control or prohibit the subdivision of land; consider and approve all development applications and grant all development permissions; ensure the proper execution and implementation of approved physical and land use development plans; formulate by-laws to regulate zoning in respect of use and density of development; reserve and maintain all the land planned for open spaces, parks, urban forests and green belts in accordance with the approved physical and land use development plans; and consider and determine development planning applications made in respect of land adjoining or within reasonable vicinity of safeguarding areas.

The Third Schedule states that any Planning Authorities shall require applications for major developments to be subjected to ESIA. The Proponent shall have to apply for approval from the relevant authorities including the County Government of Nairobi and secure approvals prior to commencement.

The Proponent is in compliance with the County requirements before setting up of such property.

4.4.15 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 county governments take all lawful, necessary and reasonably practicable measures for maintaining its sub 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.

For all projects with direct or indirect implications on the health of the workers or the neighbouring communities. All health and safety measures should be in place to ensure the workers and the neighbouring communities are not exposed to risks.

The Proponent shall contract a licensed waste transporter to collect and dispose of all solid waste if any at designated area.

4.4.16 County Government Act, 2012

The main purpose of the enactment of this Act was to give effect to Chapter Eleven of the Constitution of Kenya 2010; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. The Act gives county the responsibility of planning and co- coordinating all developments within their areas of jurisdiction. The proposed project is within the Nairobi Government and thus there will be need of working in liaison with the County Government. The plans for the proposed project must be approved by the County Government.

The Proponent shall work in liaison with County Governments.

4.4.17 Building Code 2000

Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the local Authority for permit to connect to the sewer line and all the wastewater must be discharged into sewers. The Code also prohibits construction of structures or building on sewer lines.

4.4.18 Land Registration Act, 2012

Section 26 Sub-Section (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, un-procedurally 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.

Copy of land ownership documents is attached to this Report.

4.4.19 Standards Act Cap. 496

This Act is meant to promote the standardization of the specification of commodities, and to provide for the standardization of commodities and codes of practice. It also provides for the establishment of a Kenya Bureau of Standards, definition of its functions and provides for its management and control. The Code of practice is interpreted in the Act as a set of rules relating to the methods to be applied or the procedure to be adopted in connection with the construction, installation, testing, sampling, operation or use of any article, apparatus, instrument, device or process. The Act will be incorporated in the development to ensure that all the commodities that will be purchased and used during the execution will adhere to the provisions of this Act.

4.4.20 Traffic Act Cap 403

This is an Act of Parliament consolidating the laws that govern the use of traffic on the roads. It stipulates the procedures for vehicle registration, licensing, training of drivers and conduct of drivers when using the road. It also stipulates the offences committed on the road and the penalties to be imposed in relation to these offences. The proposed development of the roads execution stage will have a lot of traffic hence the Act provisions will be quite relevant.

4.4.21 The Penal Code (Cap. 63)

Section 191 of the Penal Code makes it an offence for any person or institution that voluntarily corrupts, or foils water for public springs or reservoirs rendering it less fit for its ordinary use. Similarly, Section 192 of the same Act prohibits making or vitiating the atmosphere in any place to make it noxious to health of persons/institution in dwellings or business premises in the neighborhood or those passing along a public way. Section 193 states that any person who, for the purposes of trade or otherwise, makes loud noises or offensive or unwholesome smells in such places and circumstances as to annoy any considerable number of persons in the exercise of their common rights commits an offence and is liable to be punished as for a common nuisance.

The Proponent will be required to ensure strict adherence to the Environmental and Social Management Plan throughout the project cycle in order to mitigate against any possible negative impact.

4.5 Institutional Framework

4.5.1 National Environment Management Authority

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. 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, programs 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.

The ESIA Study Report shall be submitted to the Authority for review and licensing. The Proponent shall work in liaison with the Authority in complying with the provisions of EMCA Cap 387 and the subsidiary legislations under the Act.

4.5.2 National Environment Tribunal

The Tribunal is formed under Section 125 of EMCA Cap 387. All cases related to environmental offences in the Republic of Kenya are handled by the Tribunal. 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 Environment and Land Court.

4.5.3 Environment and Land Court

The Court was established under Section 4 of the Environment and Land Court Act No. 19 of 2011. It has the Jurisdiction to hear any other disputes relating to environment and land. The

Court is the final arbiter in any environmental matter whereby in the event the Proponent feels aggrieved by the National Environment Tribunal's decision can appeal to.

4.5.4 National Environmental Complaints Committee

The National Environmental Complaints Committee performs the following functions:

- Investigate any allegations or complaints against any person or against the authority in relation to the condition of the environment in Kenya and on its own motion, any suspected case of environmental degradation and to make a report of its findings together with its recommendations thereon to the Cabinet Secretary.
- Prepare and submit to the Cabinet Secretary periodic reports of its activities which shall form part of the annual report on the state of the environment under Section 9(3) and
- To undertake public interest litigation on behalf of the citizens in environmental matters.

This Committee will act as a safeguard for members of the public who feel aggrieved by actions taken under the proposed project and can exercise their constitutional rights to launch a complaint should they have exhausted all other grievance redress mechanisms available to them.

4.5.5 Ministry of Environment, Climate Change and Forestry

The Cabinet Secretary is the accounting Officer in the line Ministry and: Is responsible for policy formulation and directions for purposes of the Act; Sets national goals and objectives and determine policies and priorities for the protection of the environment; Promotes co-operation among public departments, County Governments, private sector, NGOs and such other organizations engaged in environmental protection programs; Provide evidence of public participation in the formulation of the policy and the environment action plan; and Performs such other functions as are assigned under the Act. The Proponent shall ensure that the Project abides by the goals and objectives of the Ministry.

4.5.6 County Environment Committees

Governors shall by notice in the gazette constitute a County Environment Committee that shall be responsible for the proper management of the environment within the County for which it is appointed. They should also perform such additional functions as prescribed by the Act or as may, from time to time be assigned by the Governor by notice in the gazette. The decisions of these committees are legal and it is an offence not to implement them.

4.5.7 National Environment Trust Fund

The Trust Fund is vested in NEMA and subject to EMCA Cap 387. A board of five trustees appointed by the Cabinet Secretary administers it. These funds may be received from donations, endowments, grants and gifts from whatever source or sums of money or from monies designated by NEMA for this fund.

5 PUBLIC PARTICIPATION/STAKEHOLDER ENGAGEMENT

5.1 Introduction

Public participation is one of the national values and principles of good governance enshrined in the Constitution of Kenya 2010: Article 10(2) a, b and c. The national values and principles of governance include: democracy and participation of the people; inclusiveness, good governance, integrity, transparency and accountability. It is a policy requirement by the Government of Kenya constitutional requirement that beneficiaries and members of the public living near any project sites who have a stake or interest in the project (both public and private) be consulted to seek their views and opinions regarding the projects before they are implemented. Public and stakeholder consultation is required under EMCA Cap 387 and Environmental Impact Assessment and Audit Regulations, 2003. Public and stakeholder consultation is useful for gathering environmental and socio-economic information, likely understanding impacts, and determining community and individual preferences. Through this process, stakeholders can contribute to the overall project design by making recommendations and raising concerns. In addition, the process creates a sense of responsibility, commitment, and local ownership for the smooth implementation of the project.

Public consultations with Interested and Affected Parties (IAPs) were done in order to:

i. Inform the local people, leaders, and other stakeholders about the proposed Project and its objectives.
ii. Initiate public involvement processes in a bid to induce and cultivate a sense of peoples' belonging to the proposed Project.
iii. Suggest and facilitate the peoples' roles in the proposed Project's sustainability, in terms of management, maintenance, and productivity.
iv. Seek views, concerns, and opinions of people in the Project area concerning the proposed Project.
v. Establish if the local people foresee any positive or negative environmental and social effects from the proposed Project and, if so, how they would wish the perceived impacts to be addressed.
vi. Find out if there are issues or places of cultural/or religious importance to the local communities that the proposed Project and its infrastructure could negatively impact.

5.2 Legal and Policy Provisions for Public Consultations

Article 69(1)(d) of the Constitution of Kenya 2010 obligates the state to encourage public participation in the management, protection and conservation of the environment. EMCA Cap 387 and the Environmental Impact Assessment and Audit Regulations (2003), sets out the minimum requirements for stakeholder consultation and engagement during the ESIA process. Section 9 of EMCA, under the objects and functions of the Authority, public participation in environmental management is a key function. Environmental Impact Assessment and Audit Regulation, 2003 guides on public participation for EIA process: proponent shall in consultation

with the authority, seek the views of persons who may be affected by the project, by holding at least three public meetings with the affected parties and communities to explain the project and it effects, and to receive their oral or written comments.

Public participation does not dictate that everyone must give their views on an issue of environmental governance, but must demonstrate intentional inclusivity and diversity of opinions of those most affected by the proposed project must have a bigger say and their views must be more deliberately sought and taken into account.

5.3 Objectives of Stakeholder and public consultation

The main objective of the stakeholder and Public Consultation was to:

i. Identify community needs and ensure that those needs are documented before the project commences.
ii. Avoid conflicts by addressing issues promptly.
iii. Ensure that any suspicions or uneasiness about the proposed Project are fully addressed.
iv. Avoid misunderstanding about the locations of the proposed Project
v. Inform communities about and discuss the nature and scale of adverse impacts of the proposed Project on their livelihoods in a transparent and direct manner and seek their participation in the project cycle.
vi. Identify and discuss mitigation of the impacts that may arise from the proposed Project.
vii. Initiate public involvement processes in a bid to induce and cultivate a sense of peoples' belonging to the proposed Project.
viii. Suggest and facilitate the peoples' roles in the proposed Project's sustainability, in terms of management, maintenance, and productivity.
ix. Seek views, concerns, and opinions of people in the area concerning the proposed Project.
x. Establish if the local people foresee any positive or negative environmental effects from the proposed Project and, if so, how they would wish the perceived impacts to be addressed.
xi. Find out if there are issues or places of cultural/or religious importance to the local communities that the proposed Project and its infrastructure could negatively impact.
xii. Identify alternatives for the proposed Project.

5.4 Stakeholders for the proposed Project

5.4.1 Primary Stakeholders

These include the Proponent and all the residents in the Project area and business enterprises dotted across a radius of half a kilometre to be likely impacted by the proposed Project.

5.4.2 Secondary Stakeholders

The main secondary stakeholders could include all of the following depending on how the Project is contracted:

- NCCG: This is the County Government where the proposed Project will be domiciled. NCCG are responsible for the building designs approval, land use matters including zoning, water supply and waste management;
- NEMA: The regulatory agency tasked with protecting the environment and avoiding adverse environmental impacts on behalf of society; and
- The Consulting Engineers: Contracted to design and assess the proposed Project.

5.5 Methodology and Data Collection

5.5.1 Overview

Primary, secondary and tertiary data was obtained in order to achieve the objectives of this study. Primary data was collected through the use of key informants, interviews and field observations. Face-to-face interviews were administered by the Environmental Consultant. Observations were made through several visits to the sites to enable the Environmental Consultant to have first-hand information on the Project site.

The exercise was conducted by a team of experienced registered NEMA EIA/EA Experts. The following process was used in carrying out the entire process:

- Pre-designed questionnaire which captured all the phases of the proposed Project;
- Key informant interviews and discussions;
- Field surveys and observations; and
- Public meetings.

5.5.2 Predesigned Questionnaire

The purpose of administering the Predesigned Questionnaire mainly was to identify the positive and negative impacts and subsequently promote proposals on the best practices to be adopted in the mitigation of the negative impacts and enhancement of the positive impacts. It also helped in identifying any other miscellaneous issues, which may bring conflicts in case project implementation proceeds as planned. The information gathered enabled the identification of the specific issues from the stakeholders' response, which provided the basis upon which the aspects of the ESIA was undertaken.

The Environmental Consultant in total managed to receive back thirty (30) filled copies of the Predesigned Questionnaire from the general public/project stakeholders. The Stakeholders' information from the filled questionnaire was analyzed and incorporated in the report to guide in decision making throughout the project cycle. From the Questionnaire analysis, the general public highly welcome the proposed Project in the area and feel honoured to have the AU family within them in the near future. Sample filled Questionnaire copies are attached to this Report with the list of the respondents forming **Table 4** overleaf.

Table 4: Predesigned Questionnaire List of Respondents

SN	NAME	TELEPHONE NO./ID NO./EMAIL ADDRESS
1.	Prof. John D. Mande	Tel No.: 020419006/Email: jdmande@uonbi.ac.ke
2.	Prof. Thuita Thenya	Tel No.: 0721471082/Email: thenya@uonbi.ac.ke
3.	Stephen K. Tirop	Tel No.: 0722623521/Email: stephentirop@uonbi.ac.ke
4.	Samuel Otondi Okerosi	Tel No.: 0710558589/ID No.: 2869509
5.	Patrick Mwaniki Gicovi	Tel No.: 0728494681/ID No.: 13263750
6.	Alex Ndanyi	Tel No.: 0705403426/ID No.: 32542370
7.	Ambrose Kipyegon	Email Address: kipyegon@uonbi.ac.ke
8.	Dorothy Iseu	Email Address: dorothy.iseu@gmail.com
9.	Fredrick Odhiambo Ojwang	ID No. 25504359
10.	Isaac Mwangi Macharia	Tel No.: 0710518837
11.	Washington Omondi	ID No: 25557854
12.	Kasanga JMR	Tel No.: 0746165545
13.	Dr. G. P. Shepelo	Tel No.: 0720350650
14.	Moses Githinji	Tel No.: 0720827723
15.	Ann Waithira	Tel No.: 0781442196
16.	Monicah Misati	Tel No.: 0111485547
17.	Catherine Muhandick	Tel No.: 0720929012
18.	Dorothy Mburugu	Tel No.: 0720331355
19.	Kevin Sangura	Tel No.: 0758529713
20.	Bonface Ndubi	ID No: 32950732
21.	Vera Makumi	Tel No.: 0726140630
22.	Aaron Odanga	Tel No.: 0720233019
23.	Nabusoba Sophie	Tel No.: 0742874241
24.	Vonnies Onkoba	Tel No.: 0721845884
25.	John Gwiji	Tel No.: 0720210428
26.	Michael Zakari Wafula	Tel No.: 0721309155
27.	Mary Wairema	Tel No.: 0794012904
28.	Cheboi	Tel No.: 0733385690
29.	Monica	Tel No.: 0720879714
30.	Dennis Maingi Muthee	Tel No.: 0743179457

5.5.3 Public/Stakeholders' Meetings

To ensure comprehensiveness in the public/stakeholders' consultations, the Environmental Consultant schedules four (4) public/stakeholders' meetings in compliance with Regulation 17(2)(b) of the Environmental Impact Assessment and Audit Regulations, 2003; see the appendices section of this Report for the public/stakeholders' meeting minutes and notices. The public/stakeholders' meetings were scheduled as shown in **Table 5** overleaf.

Table 5: Stakeholders' Consultation Meetings Schedule

DESCRIPTION	VENUE	DATE	TIME
Stakeholders' Consultation Meeting 1	Project Site	04/06/2024	10.30 am
Stakeholders' Consultation Meeting 2	WMI Director's Boardroom	10/06/2024	10.30 am
Stakeholders' Consultation Meeting 3	Project Site	11/06/2024	10.30 am
Stakeholders' Consultation Meeting 4	Project Site	25/06/2024	09.00 am

NOTES:

- ***WMI*** *denotes Wangari Maathai Institute for Peace and Environmental Studies. The Meeting was between the Environmental Consultant, Contractor, University of Nairobi Upper Kabete Campus and WMI; and*
- ***Minutes for Stakeholders' Consultation Meeting 4*** *will be submitted to NEMA as an addendum to the ESIA Study Report.*

STAKEHOLDERS' CONSULTATION MEETING PHOTOS

Date: O4/06/2024

Date: 11/06/2024

Plate 3: Stakeholders' Consultation Meetings Photos

5.5.3.1 Public/Stakeholders' Consultation Meetings' proceedings summary

As evident in the attached Meetings' minutes, the Meetings mainly discussed the following:

On the general construction and related works, it was agreed on that:

- The Proponent/Contractor should ensure structural integrity of the structures to be constructed to curb injuries to workers, loss of life or resources in the event a building collapse;
- The Contractor should ensure that two thirds (2/3) of the population of the labour force are locals (i.e. residents of Ndumbuini Village and the neighbouring Upper Kabete area);
- The farmers at the Project site will be allowed to harvest their crops thereafter construction can commerce;
- The Contractor should reserve 70% of the casual job opportunities to locals;
- The Contractor should consider sharing the semi-skilled job opportunities at a ratio of 1:1 between the locals and the non-locals;
- The Proponent/Contractor should consider utilizing the existing access roads to avoid displacement of road side traders at Ndumbuini Shopping Centre should expansion of the road be triggered;
- The proposed connection into the existing sewer line should be done professionally to avoid pollution of the water resource in the area relied on by locals for farming and domestic water use;
- The design of the AU Campus should incorporate persons with disability for easy movement within the facility;
- Construction works should be limited to normal working hours: 8.00 am – 5.00 pm to minimize disturbance to the residents;
- The Contractor should manage construction waste as per the law;
- Grievance redress mechanism should be put in place to address concerns from the community;
- There should be gender equality during job recruitment;
- Sexual harassment to staff working on site should be explicitly prohibited; and
- Job vacancies for technical staff should be openly advertised and filled competitively.

Other suggestions from the participants included:

- Locals should be given equal employment opportunities;
- The elderly persons in the society should also be considered for employment opportunities;
- Locals with no academic qualifications but posses on-job training competences should be assessed for such with a view of employing them;
- The Contractor should liaise with the community representatives/leadership when recruiting locals;
- Rain water should be harvested and the surplus supplied to the locals as opposed to channeling it into the drainage;
- Water from the water borehole should be availed for community use as a Corporate Social Investment;

- There should be an effective mechanism of communication between the community and the Contractor during construction;
- The Project site boundary should be reinforced with street lights and electric fence from the onset of the construction; and
- The premises should have CCTV cameras during construction and operation phases for optimal security.

5.5.3.2 General Opinion

The Stakeholders overwhelmingly welcomed the proposed Project.

6 ANALYSIS OF PROJECT ALTERNATIVES

6.1 Introduction

This Chapter analyses the proposed Project's alternatives in terms of site, technology scale and waste management options.

6.2 The proposed Action Alternative

The alternative consists of the Proponent 's/Applicant 's final proposal with the inclusion of the legal guidelines, regulations and procedures as stipulated in the EMCA Cap 387 which aims at reducing Environmental and Social Impacts to the maximum extent practicable.

6.3 Relocation alternative

Relocation option to a different site is an option for the Project implementation. At the moment, the Proponent does not have an alternative site for relocation though can look for another site. Finding and acquiring similar property in a suitable place and completing official transaction on it may take a long period. Besides, there is no guarantee that such land would be available and suitability is another very important factor, which cannot be ignored. While we appreciate that monetary costs should not be used to justify a wrong project, this would also call extra costs in terms of money and time for example whatever has been done and paid to date would be a direct loss to the Proponent. This may also lead to a No Action Alternative situation. The other consequence is that it would discourage both foreign and local investors keen on rolling out similar development in the Country. In consideration of the above concerns and assessment of the current proposed site, relocation of the proposed Project is not a viable option. The problem is further aggravated by the fixed characteristics of land and the bottlenecks of the planning policy.

6.4 The No Action Alternative

The No Action Alternative in respect to the proposed Project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. The anticipated negative environmental and social impacts resulting from proposed Project would not occur. This option will however, involve several losses to both the Project Proponent/land owner and other stakeholders; society and government. The No Project Option is the least preferred with reasons such as the Proponent's ease of discharging her mandate will remain constrained, the Proponent's existing institutions in the Country will remain disjointed (operating from different locations) hence increased administrative challenges, the impending "big brotherliness" anticipated by the education and research institution in the Project area will be a pipe dream, forfeiture of economic benefits that would accrue to the Proponent, the public and the government, and it could also discourage investors wishing to invest in the County. From the analysis, it becomes apparent that the No Project Alternative is not the appropriate alternative.

6.5 Alternative design, layout and technology

Various alternative designs and technology have been evaluated by the Proponent and various professionals involved i.e. the architect, engineers, physical planner and surveyors. After extensive discussions and relevant considerations, the various options were assessed and the most optimal design and technology were agreed as per the proposed plans, materials and technology. There is the alternative design as to accommodation details and the size of the usable areas. These alternatives however shall call for little re-designing and could be worth further exploration.

6.6 Alternative land use

The Proponent has an option to use the land for other purposes other than the proposed Campus. The Proponent may decide to use the land for agriculture and the building for commercial use such as a hotel, office block, etc. or even industrial or residential, may opt to sell the leasehold interest; or for a myriad of the alternative other land uses. This option however calls for change of use and whatever the type of project, it will still have its potential impacts some even worse than the proposed Project depending on their nature for example industrial activity.

6.7 The comparison of alternatives

Under the proposed development alternative, the proposed Project would establish a state of the art AU Campus and the associated service and utility infrastructure for AU operations in the Country, region and globally. Further, the anticipated positive impacts (including employment opportunities, improved security, generation of revenue to the government, etc.) which far much outweigh the anticipated negative impacts will be realized. Under the No Action Alternative, there would be no development at all. There would be no benefits from the site and neither would there be insignificant environmental and social impacts. Layout redesign may perhaps give an optimal design and should be explored for optimization of the benefits and environmental enhancement. Provided the environmental and social impact mitigation measures are implemented as well as adoption of sound management practices, negative impacts will be avoided/minimized. However, commitments related to development alternative would ensure that potential impacts are minimized to levels of insignificance.

6.8 Wastewater management alternatives

Five locally available technologies are discussed below:

6.8.1 Alternative one - Connection to sewer system and wastewater treatment plant

Connection to NCWSC Limited's sewer line is one of the likely alternatives for the proposed Project. It solves the wastewater management issue at a very minimal cost and in an environmentally efficient manner. Since the Study area is served by the NCWSC Limited's sewer line, then this option turned out to be the preferred option for this proposed Project.

6.8.2 Alternative two - Use of stabilization ponds/lagoons

This refers to the use of a series of ponds/lagoons which allow several biological processes to take place, before the water is released to the outside environment. 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 stakeholders are not likely to accept the option.

6.8.3 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 a longer time to function. Long term studies on plant species on the site will also be required to avoid weed biological behavioural problems. Hence it is not the best alternative for this kind of project.

6.8.4 Alternative four - Use of septic tanks

This involves the construction of underground concrete-made tanks to temporarily store the sludge with soak pits. In Kenya, this option has been widely accepted in those areas without a sewer line. There is adequate knowledge among investors on this method of waste management and has been customized locally. The challenge regarding this mode of liquid waste disposal presently has been on where the exhausters dump the contents exhausted from the septic tanks. Incidents of waste from septic tanks being dumped in unauthorized dumpsites have of late been reported causing wide public outcry. Such incidents are not only a real threat to public health but also a contravention of the provisions of the Environmental Management and Co-ordination (Water Quality) Regulations, 2006 and not recommended for this project.

6.8.5 Alternative five - Wastewater treatment plant

Waste water treatment plant involves the construction of a plant and use of chemicals to treat the effluents to locally/internationally acceptable environmental standards before it is re-used or discharged in to the outside environment. Technology has brought forth cheap technologies to construct and maintain making it an option to embrace for a project of this kind. The sludge obtained can be composted and used for agricultural and gardening purposes. This option also favors larger projects like this one and therefore it is an option to be considered in future. It is an option that if deployed it will promote sustainable usage of the water resource.

6.9 Solid waste management alternatives

Considerable solid wastes will be generated from the proposed Project. An integrated solid waste management system is recommendable. First, the Proponent will give priority to Reduction at Source of the materials. This option will demand a solid waste management awareness programme in the management and the occupiers. Recycling, reuse and composting of the waste will be the second alternative in priority. This will call for a source separation

programme to be put in place. The recyclables will be used around. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, sanitary landfilling will be the last option for the Proponent to consider.

6.10 Water Sources alternatives

Various water sources have been evaluated by the Proponent and various professionals involved. After extensive discussions and relevant considerations, the various options were assessed and the most optimal water source agreed on is connecting to the NCWSC Limited's water supply serving the Project area supplemented by a private water borehole drilled on site.

The other supplementally option proposed to the Proponent for future consideration in the spirit of sustainability is rainwater harvesting. This option envisions a scenario where roof catchment and surface runoff within the establishment will be harvested, pretreated as applicable and stored in sub-surface, surface and/or overhead water storage facilities design as appropriate.

6.11 ESIA with/without ESMP

6.11.1 Without ESMP

This scenario was based upon the assumption that the proposed development would go ahead without any environmental and social management plan/options being implemented. The total project impact for the scenario is on the appreciably adverse side. This shows that if the proposed Project goes ahead without ESMP, the adverse impact on the existing environment would be several times that of the impact without the proposed Project. Thus, this assumption is disqualified and not applicable since the greatest challenge worldwide presently is geared towards sustainable development and sustainable use of natural resources.

6.11.2 With ESMP

If the environmental management strategies discussed in Chapter 9 of this Report are fully implemented, the adverse impact of the proposed Project would be reduced, and there will be an overall improvement in the physical, chemical, biological and socioeconomic environment of the region. Therefore, the proposed activity will be beneficial for the environment of the area, provided the ESMP is in place. It is clear from the above, that the proposed Project would have negative effect without implementing certain environmental and social management strategies. If ESMP, as discussed in Chapter 9 is adopted and implemented, the adverse impacts will be reduced and the overall environmental quality of the area would improve hence this remains a preferred option.

7 POTENTIAL ENVIRONMENTAL IMPACTS

7.1 Introduction

An impact assessment was undertaken following full characterization of the environmental and social baseline, and identification of all project aspects. The anticipated impacts of the proposed Project on the environmental and social elements are both positive and negative. The magnitude of each impact is described in terms of being significant, minor or permanent, short-term or long term, specific (localized) or widespread, reversible or irreversible.

The scope of the assessment will cover the Project site, and will be undertaken in accordance with, the National Environmental legal requirements, and guidelines triggered for the proposed Project. All the relevant environmental, social and economic aspects will be identified for the proposed activities, the activities will be considered in terms of their potential to interact with the (physical, biological, socio-economic) environment. The ESIA Study Report shall distinguish the impacts through the following phases

- Construction phase;
- Operational phase; and
- Decommissioning phase.

Most of the impacts have been addressed in the proactive design of the proposed Project and other mitigation measures can only be guaranteed through active and responsible management committed to the propositions of the ESMP.

7.2 Construction phase

7.2.1 Positive impacts

7.2.1.1 Promote the informal sector

During the construction period, the informal sector will benefit from the operations thereof from the demand for food, fruits and other consumable due to high number of workers; both skilled and unskilled, to be engaged at the construction site. This will involve food and fruit vendors who will be selling food and fruits to the workers on site. This will promote Jua-Kali entrepreneurs in the Project area.

7.2.1.2 Job opportunities

Employment opportunities are beneficial both in economic and social sense. In the economic sense it means abundant unskilled labour will be used in economic production. In the social sense these young and energetic people will be engaged in productive employment other than remaining idle. The proposed Project will directly and indirectly create employment for a number of workers, especially casual or unskilled workers. However, the exact number cannot be

predetermined at this stage. All in all, the services of the following groups of people will be required during the construction phase among others:

- Contractor;
- Casual Labourers;
- Engineers;
- Site Manager;
- Inspector of Works;
- Laboratory Technologist;
- Survey Assistant / Leveller;
- Laboratory Assistants;
- Environmentalist/ Sociologist;
- Safety officers
- Office Assistants;
- Transporters;
- Security Officers; and
- Other Technical Staff.

Though employment will be temporary (only during construction), those who will be employed will earn income hence use the money to satisfy some of their needs.

7.2.1.3 Stimulation of Trade and Services

The proposed Project will require supply of large quantities of construction materials. Sewerage materials, piping systems most of which will be sourced in the region and from surrounding regions. The increase in the demand for these materials such as hard stones, sand, gravel, sewer materials and piping systems and aggregates for the periodic maintenance of the proposed Project required during the planning and construction will stimulate local and regional trade. Producers and suppliers of materials will thus get market for their goods and services. In addition, the owners of the nearby business premises are also likely to benefit as a result of the construction workers purchasing some of the items from their shops.

7.2.1.4 Gains in the local and national economy

There will be gains in the local and national economy through the consumption of locally available materials like sand, ballast, hardcore, tiles, timber and cement. The consumption of these materials including fuel, oil and others will attract tax including Value Added Tax (VAT) which will be payable to the government. The cost of the materials will be payable directly to the producers.

7.2.1.5 Increased economic activities and revenue

The construction phase of the proposed Project will also increase the economic activities in the region, and revenue for the central government through taxes, through businesses that will be formed to service the increased population. These services include health, food and nutrition,

transport and recreation that the workers taking part in the construction will require from time to time.

7.2.1.6 Increase in property value

Once the proposed plan is executed, the land will appreciate hence leading to the overall increase in property value around. The local community within the area may benefit from selling the property at higher profit margins as compared to when there was no development.

7.2.1.7 Provision of Market for Building Materials

The proposed Project will require supply of building materials most, of which will be sourced locally in Nairobi and the surrounding areas. This provides ready market for building material suppliers such as quarrying companies, hardware shops and individuals with such materials.

7.2.1.8 Increased population

The influx of labour into the Project area and subsequent people/workers to service them or provide them with goods such as food will be another positive impact of the proposed Project. This is taken as positive since the population increase if sustainable will create additional market for goods and services offered in the Project area, increase the amount of mobilized capital and also increase the social capital in the Project area.

7.2.1.9 Livelihood improvement

The proposed Project can also be an income generating project as the management will charge for use in order to ensure sustainability of the Investment. The profits can then form a source of income.

7.2.2 Negative impacts

7.2.2.1 Construction Material Sourcing

Impacts related to the construction material sites such as gravel sites, sand harvesting sites and quarry sites include clearance of vegetation, landscape scars, dust and general disturbance during excavation and the need to reinstate or landscape the material sites when the contractors have completed excavation works. Material sites if not reinstated and rehabilitated after project completion, will create a badlands type of landscape with water bodies, scattered boulders and rubble of ballast on the soil surface. This calls for economic use of these stone resources by the Contractor to avoid wastage. The pools of water that will form during the rainy season, without outflow on the burrow pits shall be suitable habitats for disease vectors for example: malaria, bilharzias and liver fluke. Further impacts in case such burrow pits are abandoned, and left without being rehabilitated are:

- Once burrow pits and quarry sites are filled with water, their banks can burst hence causing flood and associated damage within the nearby sites;

- Unfenced quarry and burrow pits sites full of water will be risky to public especially children, livestock and wildlife due to drowning associated deaths, therefore should be fenced off when in use; and
- Illegal excavation of ballast for sale from abandoned quarries will lead to development of bad-lands leading to erosion of topsoil.

Sand harvesting on the other hand should not be done in rivers as it may cause the following environmental problems:

- Siltation of the river; and
- Drying of river beds hence affecting the water table/storage capacity of the river.

7.2.2.2 Soil erosion

The activities involved in the site preparation and construction phase of the development may have a major negative and moderate impact on soil and geology of the Project site. This is due to the removal of vegetation from the area which will leave considerable areas of soil exposed to the elements, which may result in soil erosion. Heavy machinery will be traversing the site due to the construction activities this may lead to soil compaction and erosion of the soil. Uncontrolled soil erosion can have adverse effects on the local water bodies.

7.2.2.3 Dust generation

Particulate matter pollution is likely to occur from the construction activities during site clearance, excavation, landscaping, loading and transportation of the construction waste, etc. There is a possibility of suspended and settle-able particles affecting the site workers' and even neighbours' health. Dust is also generated in concrete production and transport. Common sources are sand and aggregate mining, material transfer, storage (wind erosion from piles), mixer loading, and concrete delivery (dust from unpaved roads).

7.2.2.4 Noise pollution

Development works will most likely result in noise generation as a result of the machines in use e.g. excavation equipment, mixers and construction vehicles delivering materials to active construction sites. The noise is expected to last for the entire execution period, respective developments operations and is likely to affect the neighbouring residents and institutions. Off-site noise will also be experienced near and along the access roads to the construction materials sources.

7.2.2.5 Air Quality

Air pollution is the single biggest environmental health risk, which include black carbon, methane, ozone, and airborne particles produced by industrial operations and the burning of diesel, coal, kerosene or biomass (UNEP, 2018). These pollutants are also contributing to global warming, lowering labour productivity, and increasing food insecurity around the world. The local ambient air quality will be impacted both during the execution and operation phases of the envisioned development. This will mostly be from dust emitted during excavation/earthworks

and aggregate transportation to construction sites, and from construction vehicles and machinery emitting oxides of carbon, nitrogen, and Sulphur into the atmosphere during the construction phase. The sources of air emission can be grouped into three categories namely:

- Point Source;
- Area Source; and
- Line Source.

A point source is a single source emission with an identified location; an area source is when the source of emission are mainly widely distributed point sources having relatively comparable significance; and a line source is when the sources of emission from a number of fixed or moving facilities have relatively comparable significance, such as roads.

Dust emission is likely to occur during site clearance, excavation and spreading of top soil during construction of the proposed Project especially if the activities are taking place during dry season. However, there will be very small possibility of particulate matter (PM) suspended and settle-able particles affecting the site workers and even neighbour's health, since construction method of minimum excavation and nil cart away of soil will be applied and only residential material and debris carted away.

Dust in construction areas originates mainly from the scraping of the earth surfaces, from the movement of heavy machinery on earth roads especially deviation routes and from haulage activities of the ballast chipping.

During the period of maximum construction activity, the fuel consumption at the Project site is expected to rise significantly and the background concentrations of suspended particulate matter (SPM), respiratory particulate matter (RPM), sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and both carbon monoxide (CO) and lead (*Pb*) are also expected to rise.

These emissions can have significant cardio-pulmonary and respiratory effects on the local population; the health effects may range from subtle biochemical and physiological changes to difficulty in breathing, wheezing, coughing and aggravation of existing respiratory and cardiac condition. The impact of such emissions can be greater in areas where the materials are sourced and at construction site. Activities associated with site clearance, excavations, spreading of the top soil during construction, frequent vehicle turning and slow vehicle movement loading, and offloading areas can be implicated in this process. **Table 6** below is a summary of the impact of these emissions on human health.

Table 6: Summary of Impacts of Emissions on Human Health

Pollutant	Source	Primary effects
Sulphur Dioxide (SO_2)	Combustion of sulphur containing fossil fuels for: ▪ Construction equipment;	▪ Plant injury; ▪ Reduced visibility; ▪ Deterioration of metals, textiles,

Pollutant	Source	Primary effects
	▪ Vehicle; and ▪ Diesel engine.	leather, finishes and coatings; ▪ Aggravation of respiratory diseases (asthma, emphysema); and ▪ Irritation.
Nitrogen Oxides (NO_X)	Combustion of fossil fuel from: ▪ Construction equipment; ▪ Vehicles; and ▪ Diesel generators.	▪ Aggravation of respiratory illness; ▪ Reduced visibility; ▪ Reduced plant growth; and ▪ Formation of acid rain.
SPM (Dust)	▪ Construction activities; and ▪ Combustion of fossil fuels for construction equipment, vehicles and diesel generators.	▪ Soiling; ▪ Reduced visibility; ▪ Aggravation of the effects of gaseous pollutants; ▪ Increased cough and chest discomfort; ▪ Reduced lung function; and ▪ Aggravation of respiratory and cardio-respiratory diseases.
Carbon Monoxide (CO)	Combustion of fossil fuels from: ▪ Construction equipment; ▪ Vehicles; and ▪ Diesel generators.	▪ Plant visibility; ▪ Reduced visibility; ▪ Deterioration of metals, textiles, leather, finishes, coatings; ▪ Irritation of eyes; and ▪ Aggravation of respiratory diseases (asthma, emphysema).

Even then, dust and exhaust gas emissions from construction machineries will be temporary. Therefore, no adverse impacts, except for those close to the Project and the construction workers, are likely to be affected. On completion of the construction, the adverse impacts of SPM, RPM and engine emissions on ambient air close to the construction site will be eliminated.

7.2.2.6 Excavation

Landscaping will likely lead to rejection of some soil which will call for a judicial disposal manner e.g. landfill, authorized dump site, etc. and also due to deep excavations it would lead to risks of falling into the excavated areas by the workers or passersby.

7.2.2.7 Oil spills

The machines on site will be containing moving parts which will require continuous oiling to minimize the usual friction cum wear and tear. Possibilities of such oils spilling and

contaminating the soil and water on site are real. Likewise, moving vehicles on site may require oil change and therefore will lead to fire risks in the area.

7.2.2.8 Increased water demand

The development is likely to lead to increased demand on water resources. This water will be sourced from NCWSC Limited's line supplemented by a private water borehole drilled on site. Without conservative use of these water resources, there is likely to be adverse impacts such as depletion of groundwater resources from over-abstraction, and increased water scarcity in Nairobi area. Water will be mostly used in the preparation of concrete for construction works and for wetting surfaces or cleaning completed structures.

7.2.2.9 Generation of exhaust emissions

Exhaust emissions are likely to be generated by the construction equipment during the construction phase. Motor vehicles used to mobilize the work force and materials for construction would cause a potentially significant air quality impact by emitting pollutants through exhaust emissions. Because considerable quantities of building materials are required, some of which are sourced outside the project area, such emissions can be enormous and may affect a wider geographical area. The impacts of such emissions can be greater in areas where the materials are sourced and at the construction site as a result of frequent gunning of vehicle engines, frequent vehicle turning and slow vehicle movement in the loading and offloading areas.

7.2.2.10 Increased runoff from new impervious areas

Construction of paved roads and pavements could result in additional runoff through creation of impervious areas and compaction of soils. Impervious areas and compacted soils generally have higher runoff coefficients than natural area, and increased flood peaks are a common occurrence in developed areas.

7.2.2.11 Surface and groundwater hydrology and water quality degradation

Changes in surface hydrology alter the flow of water through the landscape. Construction of impervious surfaces such as roads and water reservoir increase the volume and rate of runoff, resulting in habitat destruction, increased pollutant loads, and flooding. Built or paved areas and changes in the shape of the land also influence groundwater hydrology (i.e. recharge rates, flow, conditions). Project related excavation could lead to surface and groundwater quality degradation. Contaminated soil or groundwater in the path of the project could be disturbed by excavation resulting in a potential transfer of the contamination to surface waters. The excavated area, if linear could act as a conduit to extend groundwater contamination to new areas. Spills of hazardous materials in excavated areas during construction could introduce contaminants to groundwater. Development activities such as the proposed development as well as the spillover effects of development such as increased demand for drinking water and increased water use can impact water quality by contributing sediment, nutrients, and other

pollutants to limit water supplies, increasing the temperature of the water, and increasing the rate and volume of runoff.

7.2.2.12 Impact on Soils and Geology

Development of the proposed Project will affect the soil and geology of the land in ways such as depletion of the local soil resource from excavation and carting away of spoil material, and soil degradation from compaction and soil sealing leading to increased surface runoff and soil erosion. Soil compaction happens during construction or when remodeling of some type occurs near trees. Other causes of compaction are hardscape or landscape modifications such as driveways, sidewalks, or patios. Any time that equipment, vehicles, or people are driving or operating under trees, there will likely be soil compaction, leading to unhealthy and possibly dead trees.

Spillage of hazardous construction chemicals (such as oils, fuel, grease, paints, solvents, curing compounds, adhesives, acids, soil stabilizers and binders etc.) may also lead to soil contamination while importation of soil in landscaping and fill activities may lead to introduction of invasive species / noxious weeds and pathogens such as bacteria, fungi and nematodes. Increased soil erosion and sedimentation is likely to be expected, usually an indirect impact of vegetation clearance Such bare land will be prone to wind and water erosion.

7.2.2.13 Water Pollution

Another environmental issue with cement and concrete production is water pollution. The concern is the greatest at the concrete production phase. "Wash-out water with high pH is the number one environmental issue for the ready-mix concrete industry," and the alkalinity levels of wash water can be as high as pH 12. Highly alkaline water is toxic to fish and other aquatic life. Effluent from the proposed developments has potential to cause ground/surface water pollution, and health hazards to human and aquatic life. Management of construction wastewater, spill control mechanisms, and treatment of effluent will be required to ensure protection of water resources.

7.2.2.14 Occupational incidents

During construction of the proposed Project, it is expected that construction workers will be exposed to varied hazards and the risk of suffering from a work-related incident is real. Construction works involve the interaction between man and machine/plant/equipment in the varied activities which constitute construction works e.g. deep trenching, welding, metal grinding and cutting, concrete work, steel erection, working at height, use of hand tools, repetitive movements, material handling, among others. Some of these activities are high risk and construction workers are likely to suffer from the incidents (accidents, occupational diseases, near miss or dangerous occurrences) thereof.

7.2.2.15 Vector borne and water borne disease incidence

When solid wastes are not well managed there is potential of disease outbreak due to suitable breeding conditions for vectors of cholera and typhoid. If the wastes find their way to water body its quality may be lowered. Malaria outbreak could also be exacerbated by the presence of open water ditches for breeding of anopheles' mosquitoes. The major vulnerable groups are children who could be exposed to these conditions.

7.2.2.16 Solid waste generation

All the proposed developments and land uses will generate a substantial amount of solid and liquid waste. During development phase spoil materials (soil, rocks, vegetation) packaging materials (e.g. paper, polythene, plastic and metallic packaging), reject materials (including damaged bricks, concrete and mortar, plastics), among others will be generated. Other non-hazardous solid wastes include office, kitchen wastes when these types of operations are part of construction project activities. Hazardous solid waste includes contaminated soils, which could potentially be encountered on-site due to previous land use activities, or small amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill cleanup materials from oil and fuel spills. During construction, solid waste will be generated both hazardous and non-hazardous. These shall include paint tins, paper used for packing cement, plastics and timber remains among others. Dumping around the site will interfere with the aesthetic status of the area. This has a direct effect to the surrounding community. Disposal of the same solid wastes off-site could also be a social inconvenience if done in the wrong places. The off-site effects could be aesthetic, pest breeding, pollution of physical environment, invasion of scavengers and informal recycling communities. Inadequate management of solid and sewerage waste from the developments will lead to pollution and creation of human health hazards endangering the residents and the public.

7.2.2.17 Clearing of Vegetation

The main vegetation to be affected is the subsistence crops grown on the reference property. Crops which will not have matured during the Project commencement will be cleared to give way to the proposed works.

7.2.2.18 Disaster Preparedness

During and construction works, there might be cases of injuries, accidents or occupation hazards which might result in injuries of construction workers, service station employees, pedestrians, motorists, private properties and infrastructure.

7.2.2.19 Extraction and use of building materials

Building materials such as hard core, ballast, cement, rough stone, tar and sand required for construction will be obtained from quarries, hardware shops and sand harvesters who extract such materials from natural resource banks such as rivers and land. Since substantial quantities of these materials will be required for construction works, the availability and sustainability of such resources at the extraction sites will be negatively affected as they are not renewable in

the short term. In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, displacement of animals and vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health impacts.

7.2.2.20 Energy consumption

The proposed development will result in a higher demand on energy resources both during execution of the planned developments and operation phases. The forms of energy to be utilized include grid energy and fossil fuel. Construction activities will mostly require fossil fuel in the running of construction vehicles, and generators. Some grid energy will also be required during construction but will be more so required for lighting and powering of machinery/equipment. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. The project will also use electricity supplied by KPLC Plc. Electricity in Kenya is generated mainly through natural resources, namely, water and geothermal resources. In this regard, there will be need to use electricity sparingly since high consumption of electricity negatively impacts on these natural resources and their sustainability.

7.2.2.21 Increased Heavy Traffic

Kapenguria Road leading to the site area will serve the additional vehicles used for the transportation of materials, equipment and staff to the site. Heavy trucks will not only pose the risk of causing accidents due to their limited maneuverability but also place added pressure on the roads and can lead to cracks and potholes on the road. This failure is however a combination of factors including: The total of trips of heavy trucks and the strength of the roads in context of carrying the heavy loads.

7.3 Operation phase

7.3.1 Positive impacts

7.3.1.1 Revenue to the Proponent

On completion of the facility, the Proponent's existing institutions housed elsewhere under lease will occupy the Premises hence financial savings. Additionally, some of the completed facilities will be available for hire by other institutions hence generating income to the Proponent. Further, the Proponent's functions which in the absence of the premises would have been held in hired venues will be held within the premises hence financial saving by the Proponent.

7.3.1.2 AU Personnel capacity building

The Campus will help in building capacity for AU staff by having access to variety of trainings that will be offered by the different departments within the Union.

7.3.1.3 Revenue to national and county government

Through payment of relevant taxes, rates and fees to the national and county government, the facility will contribute towards the national and county revenue earnings.

7.3.1.4 Employment creation

Employment opportunities are some of the long-term major positive impacts anticipated from the proposed Project which will be realized after construction and during the operation and maintenance of the facility. These will involve trainers, security personnel, solid waste management staff and electricity maintenance staff, etc.

7.3.1.5 Training on OHS

During the operational phase of the Campus, the employees shall be trained on workplace safety and health including emergency response, firefighting skills, first aid administration, handling of flammable products, how to respond to workplace accidents, hazards and other conditions, among others.

7.3.2 Negative impacts

7.3.2.1 Increased pressure on existing infrastructure

The expected increase in population and the needs of this population would place more pressure on the existing infrastructure such as roads, water, waste facilities, electricity, social amenities, etc. This is basically because of increase in the dependants of the infrastructure without a commensurate expansion on the existing infrastructures. These services also encompass security as the project may attract people with different motives to the area. A considerable amount of demand will be placed on KPLC Plc mains, NCWSC Limited's infrastructure and the NCCG waste collection services. Additionally, the roads in the area will experience more traffic due this increased in population and this can cause more or increase the duration of traffic jams as well as increase the probability of traffic hazards.

7.3.2.2 Solid waste generation

The Project is expected to generate substantial amount of solid waste during its operation phase. The bulk of the solid waste generated during the operation of the Project will basically be office and domestic wastes. Some of these wastes can be injurious to the environment through blockage of drainage systems, choking of water bodies and negative impacts on animal health. Other waste materials especially the plastic are not biodegradable hence may cause long-term injurious effects to the environment. Even the biodegradable ones such as organic wastes may be injurious to the environment because as they decompose, they produce methane gas, a powerful greenhouse gas known to contribute to global warming. Office waste in the wake of technology is known for generation of e-waste [electrical and electronic equipment (EEE) and its

parts that have been discarded by the owner as waste without the intent to re-use] which is classified as both hazardous and none hazardous waste according to the Basel Convention, 2011.

7.3.2.3 Liquid waste generation

The Project is expected to generate liquid waste during the operation phase. This will be through the sanitation system, laundry activities and general cleaning activities.

7.3.2.4 Increased storm water flow

The building roof and pavements will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the facility. This will lead to increased amounts of storm water entering the drainage systems, resulting in overflow, flooding and damage to drainage infrastructure in addition to increased erosion or water logging in the neighbouring areas.

7.3.2.5 Workplace incidents

The operational phase of the proposed Project will fully assume the status of a workplace and like any other place where people are working, workers may get injuries in the cause of work e.g. fire outbreaks especially from the LPG in the storage may lead to injuries or even death, back injuries, muscle strain, skin inflations, etc.

7.4 Decommissioning phase

7.4.1 Positive impacts

7.4.1.1 Improved visual quality

Upon decommissioning of the Project, rehabilitation of the Project site will be carried out to restore the site to its original status. This will include replacement of topsoil and re-vegetation which will lead to improved visual quality of the area.

7.4.1.2 Job creation

For demolition to take place on schedule, several people will be involved. As a result, several employment opportunities will be created for the demolition staff during the demolition phase of the proposed Project.

7.4.2 Negative impacts

7.4.2.1 Dust

Large quantities of dust will be generated during demolition works. This will affect demolition staff as well as the neighbouring residents.

7.4.2.2 Noise and vibration

The demolition works will lead to significant deterioration of the acoustic environment within the Project site and the surrounding area.

7.4.2.3 Solid waste

Demolition of the Project buildings and related infrastructure will result in large quantities of solid waste. The waste will contain the materials used in construction including concrete, metal, drywall, wood, glass, paints, adhesives, sealants, e-waste, and fasteners. Once upon a time demolition waste was generally considered as less harmful to the environment by virtue of its composition being inert materials. However, owing to technological advancement where EEE have taken a centre stage in the human day-to-day life, demolition waste can be hazardous waste due to presence of e-waste where materials like lead, cadmium, beryllium, or brominated flame retardants are involved. There is growing evidence that demolition waste may lead to release of certain hazardous chemicals into the environment. In addition, even the generally non-toxic chemicals such as chloride, sodium, sulphate and ammonia which may be released as a result of leaching of demolition waste, are known to lead to degradation of groundwater quality.

8 MITIGATION MEASURES AND MONITORING PROGRAMMES

8.1 Introduction

This Chapter presents the mitigation measures for the likely negative impacts from the proposed Project. The potential negative impacts and the possible mitigation measures have herein been analyzed under three categories: construction, operational and decommissioning phases.

8.2 Mitigation of construction related negative impacts

8.2.1 Minimize the effects of noise emitted from the site

Significance of noise impacts depends on whether the project would increase noise levels above the existing ambient levels by introducing new sources of noise. Noise impacts would be considered significant if the Project would result in the following:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels (more than five dBA) in the Project vicinity above levels existing without the Project; and
- A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project.

The Proponent shall put in place adequate measures to mitigate noise pollution arising during the construction phase. The following noise-suppression techniques will be employed to minimize the impact of temporary construction noise at the Project site:

- Install portable barriers to shield compressors and other small stationary equipment where necessary;
- Use quiet equipment (i.e. equipment designed with noise control elements);
- Co-ordinate with relevant agencies regarding construction activities in the area;
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible;
- The Proponent to schedule most of the operations during the day. Only operations that meet the required permissible noise levels should be allowed to operate at night;
- Install ‘no hooting’ signs in zones where noise will be of most nuisance like the education area;
- Sensitization of motorists within these zones against unnecessary noise making;
- Construction/demolition works should be done during the day when people are away and also the outside environment is also noisy;

- Establishment of buffer zones between different land uses will attenuate noise, further reducing the potential impacts;
- Institute noise attenuation mechanisms for point sources;
- Adhere to the provisions of the Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005 regarding workplace noise limits; and
- Strict adherence to the provisions of Noise and Excessive Vibration Pollution Control Regulations, 2009 regarding environmental noise and vibration limits.

8.2.2 Air quality

The following measures shall be implemented during construction to minimize exhaust emission:

- Engine size of construction equipment shall be the minimum practical size;
- The number of construction equipment operating simultaneously shall be minimized through efficient management practices;
- Construction machinery idling time shall be minimized;
- All vehicles and plant shall be regularly serviced in accordance with the manufacturer's recommendations to ensure that they operate efficiently and without excessive noxious emissions;
- The burning of waste, such as vehicle tyres causing noxious emissions shall be prohibited;
- Alternatively, fuelled construction equipment shall be used where feasible equipment shall be properly tuned and maintained; and
- Sensitise truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off or keep vehicle engines at these points.

This will be achieved through proper planning of transportation of materials to be used during construction of the proposed Project to ensure that vehicle fills are increased in order to reduce the number of trips done or the number of vehicles on the road.

Dust emissions from construction sites can also pose health risk to workers, and sensitive receptors surrounding the site, if not managed properly. It is the responsibility of the Contractor to provide appropriate safety training, information equipment, signage, security and emergency response plans on site.

To mitigate SPM impacts, the following measures are recommended for implementation:

- All dusty materials shall be sprinkled with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet;
- Cover stockpiles of sand, soil and similar materials or surround them with wind breaks;
- Watering all roads used for any vehicular traffic when necessary;
- Down wash of trucks (especially tyres) prior to departure from site;

- Vehicles delivering loose and fine materials like sand and fine aggregates shall be covered to reduce spills on roads;
- The height from which excavated materials are dropped shall be controlled to a minimum practical height to limit fugitive dust generation from unloading;
- Post signs that limit vehicle speeds onto unpaved roads and over disturbed soils;
- Rapid onsite construction so as to reduce duration of traffic interference and therefore reduce emissions from traffic delays; and
- Suitable PPE to be worn.

8.2.3 Minimise the effects of exhaust emission

In order to control exhaust emissions, the following measures shall also be implemented during construction:

- Vehicle idling time shall be minimized;
- Equipment shall be properly tuned and maintained;
- Vehicles shall be maintained and serviced regularly;
- Vehicles and equipment shall be fuelled with high quality fuels sourced from renowned marketers;
- Work planning shall be undertaken to reduce time spent by the trucks delivering materials to the site and when traffic is low;
- Development and implementation of preventive maintenance of all equipment at the site; and
- Traffic control will be developed and implemented.

8.2.4 Minimisation of Clearing of Vegetation

The Contractor will ensure proper demarcation of the Project area to be affected by the construction works. The removal of vegetation shall be kept to the minimum necessary to accommodate the permanent works. This will be aimed at ensuring that any loss of vegetation is restricted to the actual Project area and avoid spill over effect on the neighbouring areas.

8.2.5 Hydrology and water quality degradation

Several measures shall be put in place to mitigate the impacts that are likely to lead to hydrology and water quality degradation. The Proponent will prepare a hazardous substance control and emergency response plan that will include preparations for quick and safe clean-up of accidental spills. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe clean-up of accidental spills. The plan will identify areas where refuelling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted. If necessary, ground water will be collected during construction contained and disposed of in accordance with all applicable regulations. Appropriate PPE will be used and waste management will be performed in accordance with applicable regulations. Oil absorbent material, tarps and storage drums will be used to contain and control any minor releases of engine and other equipment oil.

8.2.6 Minimization of Construction Material Sourcing Impacts

In order to minimize construction material sourcing impacts, the Proponent through the Contractor shall do the following:

- Aggregates and rock will be sourced locally from an established quarry instead of starting another quarry for purposes of the proposed Rehabilitation of the area;
- Gravel and sub-grade soil-murram will be sourced locally also from an established quarry instead of starting another quarry;
- Carry out inspection of each of the site's soil stability before excavation;
- Cordon off the gravel site areas to keep livestock and the general public;
- The use of burrow pits for material spoil sites may be approved by the Engineer (and/or with the appropriate consent of the "landowner"). Where this occurs, the materials spoiled in the burrow pit shall be profiled to fit into the surrounding landscape and covered with topsoil;
- The Contractor is expected to follow the National Sand Harvesting Guidelines published by NEMA in 2007; and
- In case of blasting:
    i. The Contractor will be responsible for obtaining a current and valid authorisation from the Department of Mines and Geology prior to any blasting activity. A copy of this authorisation shall be given to the Engineer;
    ii. A qualified and registered blaster by the Department of Mines and Geology shall supervise all blasting and rock-splitting operations at all times;
    iii. The Contractor shall ensure that appropriate pre-blast monitoring records are in place (i.e. photographic and inspection records of structures in close proximity to the blast area);
    iv. The Contractor shall ensure that emergency services are notified, in writing, a minimum of 24 hours prior to any blasting activities commencing on Site;
    v. The Contractor shall take necessary precautions to prevent damage to special features and the general environment, which includes the removal of fly-rock. Environmental damage caused by blasting/drilling shall be repaired at the Contractor's expense to the satisfaction of the RE and the relevant authorities;
    vi. The Contractor shall ensure that adequate warning is provided to the local communities immediately prior to all blasting. All signals shall also be clearly given; and
    vii. The Contractor shall use blast mats for cover material during blasting. Topsoil shall not be used as blast cover.

To reduce the negative impacts on availability and sustainability of the materials, the Contractor will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities. Moreover, the Proponent will ensure that wastage, damage or loss (through run-off, wind, etc.) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials.

In addition to the above measures, the following should be taken into consideration:

- The tender documents should specify required standards and certification of procurement of all materials and appliances including acquisition of independent ESIA license by the Contractor for any material site necessitated by the proposed Project;
- As far as possible, environmentally friendly and sustainable materials should be used;
- The Contractor should be instructed in the use of all materials that may have negative environmental and health effects; and
- If any material or substance is at any point in the future deemed to be deleterious to health, then it must be replaced with an acceptable alternative.

8.2.7 Potential Mitigation Measures for Disaster Preparedness

- Provide accessible and clearly marked EXIT routes that in the event of an accident;
- Install enough fire-fighting equipment at strategic locations and within reach;
- Train workers and office caretakers on fire fighting and first Aid and personal safety;
- Carry out fire and emergency drills to assess disaster preparedness; and
- Provide appropriate PPE during construction.

8.2.8 Occupational incidents during construction

Workplace incidents especially in deep trenching operations, working in confined space, working at height, material handling, plant and machine/equipment operation, amongst others shall be mitigated by enforcing adherence to safety procedures and preparing contingency plan for accident response. In addition, safety education and training shall be emphasized on. The provisions of OSHA, 2007 shall be enforced at the workplace**.** Measures to be implemented shall include:

- Adherence to the safe working procedures and implementation of the safety policy as prescribed;
- Induction for all workers before engagement at the site;
- The Safety Officer shall undertake regular toolbox meetings to create awareness amongst all onsite workers;
- Hazard communication shall be ensured at the site;
- Risk assessment and job safety analysis shall be undertaken for all activities including sub-contractor's activities and control measures implemented;
- Provision of emergency provisions such as adequately stocked first aid boxes manned by qualified first aiders;
- All employees engaged in hazardous activities shall be taken through medical surveillance in accordance with the legal requirements;
- Safety signage shall be posted strategically throughout the site to ensure that all are made aware of the hazards they are exposed to while on site and precautionary measures to take while on site;

- Constitute and train a safety and health committee whose function shall be as outlined in the safety policy manual;
- Undertake safety inspections and auditing internally and externally to ensure safety management systems are working well;
- Ensure incidents are reported and investigated to unearth root causes and corrective action recommended and implemented to prevent recurrence of similar incidents;
- All shall be involved in safety management through such activities as hazard reporting, toolbox meeting and inspections;
- All operators shall be required to undertake pre-use checks for the equipment;
- There shall be a planned maintenance schedule for the machinery at the site;
- Training of workers on safety precautions and preventions at site;
- Provision of appropriate PPE to workers at the site exposed to hazards; and
- Register the site in tandem with OSHA, 2007.

8.2.9 Working at Heights

Falls from elevation associated with working with ladders, scaffolding, and partially built or demolished structures are among the most common cause of fatal or permanent disabling injury at construction or decommissioning sites. If fall hazards exist, a fall protection plan should be in place which includes one or more of the following aspects, depending on the nature of the fall hazard:

- Developing and implementing a fall prevention plan;
- Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight, when working at heights equal or greater than two meters or at any height if the risk includes falling into operating machinery, into water or other liquid, into hazardous substances, or through an opening in a work surface;
- Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards, as well as fall rescue procedures to deal with workers whose fall has been successfully arrested. The tie in point of the fall arresting system should also be able to support weight subjected; and
- Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labelling covers for openings in floors, roofs, or walking surfaces.

8.2.10 Ergonomics/human factors

Ergonomic is about "*suiting work to the worker but not suiting worker to the work*". It is about designing and arranging things people use so that the people and things interact most efficiently and safely. Repetitive movements, working in awkward position and material handling, are among the most common causes of workplace injuries at construction and decommissioning sites; are the main caused of musculoskeletal disorders (MSD) among construction workers. Strict adherence to the fundamental ergonomics principles is key in curbing workplace injuries including MSD by:

- Training of workers in lifting and materials handling techniques in construction and decommissioning projects, including the placement of weight limits above which mechanical assists or two-person lifts are necessary;
- Planning work site layout to minimize the need for manual transfer of heavy loads;
- Selecting tools and designing work stations that reduce force requirements and holding times, and which promote improved postures, including, where applicable, user adjustable work stations;
- Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks; and
- Mechanization.

8.2.11 Slips and Falls

Slips and falls on the same elevation associated with poor housekeeping, such as excessive waste debris, loose construction materials, liquid spills, and uncontrolled use of electrical cords and ropes on the ground, are also among the most frequent cause of lost time accidents at construction and decommissioning sites. Recommended methods for the prevention of slips and falls from, or on, the same elevation include:

- Implementing good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot path;
- Cleaning up excessive waste debris and liquid spills regularly;
- Locating electrical cords and ropes in common areas and marked corridors; and
- Use of slip retardant footwear.

8.2.12 Struck by Objects

Construction and demolition activities may pose significant hazards related to the potential fall of materials or tools, as well as ejection of solid particles from abrasive or other types of power tools which can result in injury to the head, eyes, and extremities. Techniques for the prevention and control of these hazards include:

- Using a designated and restricted waste drop or discharge zones, and/or a chute for safe movement of wastes from upper to lower levels;
- Conducting sawing, cutting, grinding, sanding, chipping or chiselling with proper guards and anchoring as applicable;
- Maintaining clear traffic ways to avoid driving of heavy equipment over loose scrap;
- Use of temporary fall protection measures in scaffolds and out edges of elevated work surfaces, such as hand rails and toe boards to prevent materials from being dislodged;
- Evacuating work areas during blasting operations, and using blast mats or other means of deflection to minimize fly rock or ejection of demolition debris if work is conducted in proximity to people or structures; and
- Wearing appropriate PPE, such as safety glasses with side shields, face shields, hard hats, and safety shoes.

8.2.13 Confined Spaces and Excavations

Examples of confined spaces that may be present in the construction or demolition sites includes, utility vaults, tanks, pipes, and access shafts. Ditches and trenches may also be considered a confined space when access or egress is limited. Occupational hazards associated with confined spaces and excavations in construction and decommissioning sites should be prevented according to the following recommendations:

- Controlling site-specific factors which may contribute to excavation slope instability including, for example, the use of excavation dewatering, side-walls support, and slope gradient adjustments that eliminate or minimize the risk of collapse, entrapment, or drowning;
- Providing safe means of access and egress from excavations, such as graded slopes, graded access route, or stairs and ladders; and
- Avoiding the operation of combustion equipment for prolonged periods inside excavations areas where other workers are required to enter unless the area is actively ventilated,

8.2.14 Workplace incidents when handling hazardous wastes

Adequate collection and storage of waste on site and safe transportation to the disposal sites and disposal methods at designated area shall prioritized. In addition, the Proponent is committed to adherence to occupational safety and health (OSH) rules and regulations stipulated in OSHA, 2007. In this regard, the Proponent is committed to the provision of appropriate PPE as well as ensuring a safe and healthy environment for construction workers as outlined in the ESMP. The Proponent will adhere to the Environmental Management and Coordination (Controlled Substances) Regulations, 2007.

8.2.15 Populations of disease vectors

Disease vectors such as rats, flies and cockroaches increase where refuse is exposed or uncollected and can be a hazard. Complete refuse collection and handling service and pest control and fumigation will be provided by the Proponent so that this is not a hazard in compliance with the Public Health Act and as also required in OSHA, 2007 regarding hygiene at the workplace.

8.2.16 Increased runoff

Increased runoff from paved grounds causing extreme flooding and overflows of drainage systems shall be mitigated. In the spirit of sustainability, rain water should be harvested, treated if need be and stored as appropriate to limit surface runoff and ensure water resource utilization. The guiding principle should be anchored on total containment of the rain water falling “within the premises within the premises” by among others:

- By design incorporating green spaces within the establishment to the extent feasible;
- Establishing under-ground water recharge zones within the establishment;
- Harvesting rainwater including stormwater into sub-surface, surface and overhead water storage facilities; and

- The fall back as a last result shall be directing stormwater into the existing stormwater system. This option is not recommended for the proposed Project unless at Policy level the Regulators in both the Water Sector and Environment Sector spearheads establishment of stormwater management plan anchored on localized watershed studies for Developer's/Public adoption. The latter position is informed by the current state of the existing public stormwater drains which are compromised design wise, legally and functionally hence a recipe for flood episodes in the wake of climate change.

8.2.17 Possible exposure of workers to diseases

Possible exposure of workers to diseases from building materials at construction site shall be mitigated by OSH standards enforcement as required in OSHA, 2007.

8.2.18 Reduction of impacts at extraction sites & efficient use of raw materials

The Proponent will source building materials such as sand, ballast and hard core from registered quarry and sand dealers, whose projects have undergone satisfactory ESIA/EA and received NEMA approval. Since such firms are expected to apply acceptable environmental performance standards, the negative impacts of their activities at the extraction sites are considerably well mitigated. To reduce the negative impacts on availability and sustainability of the materials, the Proponent will only order for what will be required through accurate budgeting and estimation of actual construction requirements. This will ensure that materials are not extracted or purchased in excessive quantities. Moreover, the Proponent will ensure that wastage, damage or loss (through run-off, wind, etc.) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials. In addition to the above measures, the Proponent shall consider reuse of building materials and use of recycled building materials. This will lead to reduction in the amount of raw materials extracted from natural resources as well as reducing impacts at the extraction sites.

8.2.19 Minimization of water wastage

The Contractor and Proponent shall implement the following water use and management to maximum utilization:

- Provision of notices and information signs within the Project site to notify on means and need to conserve water resource;
- Installation of water conserving taps that turn-off automatically when water is not in use will be done;
- Encouragement of water re-use/recycling during both construction and operation phases of the Project;
- Avoid wasting the water supplied to the site;
- Roof catchments should be provided with rainwater harvesting systems to enhance collection and storage of rain water. Such water can be used to water flower gardens and all kind of cleaning required on site;
- Suitable underground and surface water storage facilities should be provided at the site to harvest storm water;

- Install water meters to ensure accountability and responsibility; and
- Provide water storage tanks to handle water shortages.

8.2.20 Minimization of soil erosion

The Proponent will put in place adequate measures aimed at minimizing soil erosion and associated sediment release from the Project site during construction. These measures will include terracing and levelling the Project site to reduce run-off velocity and increase infiltration of rain water into the soil. In addition, construction vehicles will be restricted to designated areas to avoid soil compaction within the Project site, while any compacted areas will be ripped to reduce run-off.

- Scheduling to avoid heavy rainfall periods (i.e., during the dry season) to the extent practical;
- Contouring and minimizing length and steepness of slopes;
- Mulching to stabilize exposed areas;
- Re-vegetating areas promptly;
- Designing channels and ditches for post-construction flows;
- Reducing or preventing off-site sediment transport through use of settlement ponds, silt fences, and water treatment, and modifying or suspending activities during extreme rainfall and high winds to the extent practical;
- Avoid cut-slope creation and embankments greater than the angle of response for the soil type;
- Minimize the ground clearance area;
- Balance the cut-and-fill requirements by rightly choosing the route in order to avoid creating excess spoil materials and borrow pits;
- Store and re-use top soil during the initial excavation to be deposited on the slopes to form a superficial layer for seedling establishment; and
- Replant cleared areas and slopes with herbaceous plants such as vetiver grass according to the soil type and the desired engineering function so as to reduce erosion and stability problems.

8.2.21 Moving Machinery

Vehicle traffic and use of lifting equipment in the movement of machinery and materials on a construction site may pose temporary hazards, such as physical contact, spills, dust, emissions, and noise. Heavy equipment operators have limited fields of view close to their equipment and may not see pedestrians close to the vehicle. Center-articulated vehicles create a significant impact or crush hazard zone on the outboard side of a turn while moving. Techniques for the prevention and control of these impacts include:

- Planning and segregating the location of vehicle traffic, machine operation, and walking areas, and controlling vehicle traffic through the use of one-way traffic routes, establishment of speed limits, and on-site trained flag-people wearing high-visibility vests or outer clothing covering to direct traffic;

- Ensuring the visibility of personnel through their use of high visibility vests when working in or walking through heavy equipment operating areas, and training of workers to verify eye contact with equipment operators before approaching the operating vehicle;
- Ensuring moving equipment is outfitted with audible back-up alarms; and
- Using inspected and well-maintained lifting devices that are appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations.

8.2.22 Minimization of construction waste

It is recommended that demolition and construction waste be recycled or reused to ensure that materials that would otherwise be disposed off as waste are diverted for productive uses. In this regard, the Proponent is committed to ensuring that construction materials left over at the end of construction will be used in other projects rather than being disposed off.

In addition, damaged or wasted construction materials including cabinets, doors, plumbing and lighting fixtures, marbles and glass will be recovered for refurbishing and use in other projects. Such measures will involve the sale or donation of such recyclable/reusable materials to construction companies, local community groups, institutions and individual residents or home owners.

The Proponent shall put in place measures to ensure that construction material requirements are carefully budgeted and to ensure that the amount of construction materials left on site after construction is kept minimal. Any waste which cannot be reused in any way shall be disposed in an authorized dumpsite in the manner specified in the Waste Management Regulations, 2006.

It is further recommended that the Proponent consider the use of recycled or refurbished construction materials. Purchasing and using once-used or recovered construction materials will lead to financial savings and reduction of the amount of construction debris disposed of as waste.

Additional recommendations for minimization of solid waste during construction of the project include:

- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time;
- Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements;
- Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials;
- Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste; and
- Use of construction materials containing recycled content when possible and in accordance with accepted standards.

8.2.23 Reduction of energy consumption

The Proponent shall ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity by switching off electrical equipment or appliances when they are not being used. In addition, proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. It will be imperative to carry out energy audits for evaluation and improvement of energy consumption and saving practices adopted by all sectors involved. It is however imperative to institute energy conservation measures in proposed developments while at the same time taking advantage of the renewable energy opportunities that the site and proposed developments provide. These include the harnessing of solar energy, and generation of energy from waste. Further, legal compliance on energy management will be critical for success in energy efficiency. Practical energy management and conservation options also require to be implemented as highlighted below:

- Energy conservation through installation/use of energy efficient appliances / fittings;
- Continually seek avenues for energy conservation as international best practices evolve; and
- Institution awareness programmes to conserve energy.

8.2.24 Controlling oil spills during construction phase

The Proponent will control the dangers of oil, grease and fuel spills during construction by maintaining the machinery in specific areas designed for this purpose. Machinery site repair will be discouraged and repair work restricted to only approved garages to avoid pollution from oil, grease and fuel other measures includes:

- Spill kits shall be provided at all areas where chemicals are stored;
- All the chemical handlers shall be trained appropriately on safe use and disposal of the chemicals and emergency procedures;
- Provision of MSDS at all areas where the chemicals are handled prominently displayed;
- Refuelling within the site shall be restricted to the excavators and other equipment for vehicles they shall be fuelled at petrol stations;
- The frequency of refuelling shall be minimised by ensuring during refuelling the vehicle is refuelled to the maximum;
- Refuelling shall be done away from drainage lines; and
- Fuel storage at the site shall be minimised.

8.2.25 Traffic Safety

Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities. The incidence of road accidents involving project vehicles during construction should be minimized through a combination of education and awareness-raising, and the adoption of procedures:

- Ensure Installation and maintenance of all construction signs, signals, markings, and other devices used to regulate traffic, including posted speed; and
- The Proponent will provide traffic marshals to help in controlling the flow of vehicles accessing and exiting the site.

8.3 Mitigation of operation phase impacts

8.3.1 Ensuring efficient solid waste management

The Proponent will be responsible for efficient management of solid waste generated by the proposed Project during its operation. In this regard, the Proponent will provide waste handling facilities such as waste bins and skips for temporarily holding waste generated. In addition, the Proponent will ensure that such are disposed off regularly and appropriately. It is recommended that the Proponent engage the services of a licensed waste collection and disposal company to collect and dispose solid waste as required by the law. The Proponent will adhere to the provisions of Waste Management Regulations, 2006.

8.3.2 Liquid water management

The Proponent will ensure that there are adequate means for handling liquid waste generated within the premises. It will also be important to ensure that wastewater pipes are not blocked or damaged so that the wastewater can be directed to the sewer line (or the wastewater treatment plant in case the Proponent deploys it as a sustainability measure) as applicable since such vices can lead to release of the effluent, resulting in land and water contamination. Such blockages or damages will be fixed expeditiously. Wastewater shall be disposed in compliance with the provisions of the Water Quality Regulations, 2006. The Proponent shall also ensure effluent tests are carried out and have a valid effluent discharge license.

8.3.3 Ensure general safety within the premises

An appropriate fence will be erected round the premises and maintained with state-of-the art security systems installed for optimum security with the establishment. A competent security firm preferably will be engaged to ensure the general safety and security at all times within and around the premises.

8.3.4 Ensure efficient energy consumption

The Proponent plans to install an energy-efficient lighting system within the premises. This will contribute immensely to energy saving during the operational phase of the facility. In addition, the Proponent together with the workers will be sensitised to ensure energy efficiency in their various activities during the occupation period. To complement these measures, it will be important to monitor energy use during the operation of the project and set targets for efficient energy use.

8.3.5 Ensure efficient water use

The Proponent will install water-conserving automatic taps and toilets. Moreover, any water leakages through damaged pipes and faulty taps will be fixed promptly by qualified staff. In addition, the Proponent and the workers will be sensitized to use water efficiently.

8.3.6 Reduce pressure on the existing infrastructure

The proposed Project will utilize most of the existing service infrastructure e.g. roads, electricity, sewer line, solid water facilities, among other purely on economic and convenience grounds. The Proponent will fully liaise with the relevant development partners to avoid stretching the existing infrastructure beyond limit e.g. consider solar power, wind power, use of borehole among other feasible measures aimed at easing pressure on the existing infrastructure.

8.3.7 Traffic management

Traffic accidents have become one of the most significant causes of injuries and fatalities among members of the public worldwide. Traffic safety should be promoted by all project personnel during displacement to and from the workplace, and during operation of project equipment on private or public roads. Prevention and control of traffic related injuries and fatalities should include the adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents. Road safety initiatives proportional to the scope and nature of project activities should include adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public.

There is already a road reserve abutting the Project site to give way for the construction vehicles and machines as they await access and exit into the construction site to allow free flow of traffic on Kapenguria Road. Traffic management measures with regards to the proposed Project shall include:

- Provision of both exit and entrance of the vehicles accessing and exiting the premises which will assist in reduce congestions on both the provided road reserve and Kapenguria Road;
- Emphasizing safety aspects among driver;
- Improving driving skills and requiring licensing of driver's;
- Adopting limits for trip duration and arranging driver rosters to avoid overtiredness;
- Avoiding dangerous routes and times of day to reduce the risk of accidents; and
- Use of speed control devices (governors) on trucks, and remote monitoring of driver actions.

Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. The proposed Project will contribute to a significant increase in traffic along existing roads, and road transport is a significant component of the Project, recommended measures include:

- Minimizing pedestrian interaction with site vehicles;
- Collaboration with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present. Collaborating with local communities on education about traffic and pedestrian safety (e.g. school education campaigns);
- Coordination with emergency responders to ensure that appropriate first aid is provided in the event of accidents;
- Using locally sourced materials, whenever possible, to minimize transport distances. Locating associated facilities such as worker camps close to project sites and arranging worker bus transport to minimizing external traffic; and
- Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions.

8.4 Mitigation of decommissioning phase impacts

8.4.1 Efficient solid waste management

Solid waste resulting from demolition or dismantling works will be managed as applicable in line with Section 8.3.1 above.

8.4.2 Reduction of dust emission

High levels of dust concentration resulting from demolition or dismantling works will be minimized as described in the Sections 8.2.2 and 8.2.3 above.

8.4.3 Minimization of noise and vibration

Significant impacts on the acoustic environment will be mitigated as described in the Section 8.2.1 above.

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1 Introduction

The Proponent acknowledges the fact that the proposed Project activities will have some impacts on the biophysical environment, health and Safety of her employees and members of the public, and the socio-economic well-being of the local residents. Thus, the main focus will be on reducing the negative impacts and maximizing the positive impacts associated with the Project activities through a program of continuous improvement. An ESMP has been developed to assist the Proponent in mitigating and managing environmental and social impacts associated with the life cycle of the project. The ESMP has been developed to provide a basis for an environmental management system (EMS: ISO 14001 principles) for the proposed Project. It is noteworthy that key factors and processes may change through the life of the proposed Project and considerable provisions have been made for dynamism and flexibility of the ESMP. As such, the ESMP will be subject to a regular regime of periodic review.

9.2 Objectives of the Environmental and Social Management Plan

The objectives of the ESMP are to:

- Place the proposed/existing activity in the context of the local and regional environment;
- Adequately describe all components of the proposed/existing activity, so that the Authority can consider approval of a well-defined Project;
- Identify the environmental issues/risks associated with the proposed/existing activity;
- Provide the basis of the Proponent's environmental management programme, which shows that the environmental and social impacts resulting from the proposed/existing activity, including cumulative impact, can be acceptably managed, and
- Provide a document that clearly sets out the reasons why the proposed/existing activity should be judged by the Authority to be environmentally acceptable.

9.3 Types of Environmental and Social Management Plans

There are three broad categories of ESMPs in a project lifecycle: The construction ESMP, the operation ESMP and the decommissioning ESMP.

9.4 Construction Phase Environmental and Social Management Plan

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the construction phase of the proposed Project are outlined in **Table 7** overleaf.

Table 7: Construction Phase ESMP for the proposed Project

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1. Minimize extraction site impacts and ensure efficient use of raw materials during construction				
High Demand of Raw material	Source building materials from local suppliers who use environmentally friendly processes in their operations	Project Manager & Contractor	Throughout construction period	0.00
	Ensure accurate budgeting and estimation of actual construction material requirements to ensure that the least amount of material necessary is ordered	Project Manager & Contractor	Throughout construction period	0.00
	Ensure that damage or loss of materials at the construction site is kept minimal through proper storage.	Project Manager & Contractor	Throughout construction period	0.00
	Use at least 5%-10% recycled, refurbished or salvaged materials to reduce the use of raw materials and divert material from landfills	Project Manager & Contractor	Throughout construction period	0.00
2. Minimize vegetation disturbance at and or around construction site				
Vegetation disturbance	Ensure proper demarcation and delineation of the project area to be affected by construction works.	Contractor, Civil engineer & Project Manager	1 month	50,000.00
	Specify locations for trailers and equipment, and areas of the site which should be kept free of traffic, equipment, and storage	Civil Engineer, and Project Manager	1 month	0.00
	Designate access routes and parking within the site	Civil Engineer, Architect and Project Manager	1 month	10,000.00
	Introduction of vegetation (trees, shrubs and grass) on open spaces and their maintenance	Architect & Landscape specialist	Monthly to Annually	15,000.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Design and implement an appropriate landscaping programme to help in re-vegetation of part of the project area after construction	Architect & Landscape specialist	2 months	100,000.00
3. Reduce storm-water, runoff and soil erosion				
Increased storm water, runoff and soil erosion	A storm water management plan that minimizes impervious area infiltration by use of recharge areas and use of detention and/or retention with graduated outlet control structure will be designed	The Civil Engineer, Mechanical Engineer and Project Manager	1 month	0.00
	Apply soil erosion control measures such as levelling of the project site to reduce run-off velocity and increase infiltration of storm water into the soil	The Civil Engineer, Mechanical Engineer and Project Manager	1 months	
	Ensure that construction vehicles are restricted to existing graded roads to avoid soil compaction within the project site	The Civil Engineer, Mechanical Engineer and Project Manager	Throughout construction period	
	Ensure that any compacted areas are ripped to reduce run-off.	The Civil Engineer, Mechanical Engineer and Project Manager	2 months	
	Open drains all interconnected will be provided on site	Civil Engineer	Throughout construction period	5,400.00
	Consider harvesting storm water at the Project site as a sustainability measure	Proponent	Throughout construction period	-

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
4. Minimisation of Soil Geology and Degradation				
Soil Geology and Degradation	• Use properly maintained hoses and fittings. • Make the cement screeds in all the chambers using water proof material. • Excavated materials should be removed promptly from the site to avoid erosion. • Avoid unnecessary movement of soil materials from the site. • Control activities especially during rainy any windy conditions. • Regular sprinkling of water to reduce dust. • Landscaping after completion with appropriate local vegetation.	The Civil Engineer, Mechanical Engineer and Project Manager	One-off	250,000.00
5. Minimize solid waste generation and ensure efficient solid waste management				
Increased solid waste generation	Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary land filling	Project Manager & Contractor	Throughout construction period	30,000.00
	Thorough accurate estimation of the sizes and quantities of materials required, order materials in the sizes and quantities they will be needed rather than cutting them to size, or having large quantities of residual materials	Project Manager & Contractor	One-off	0.00
	Ensure that construction materials left over at the end of construction will be used in other projects rather than being disposed off.	Project Manager & Contractor	One-off	0.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Ensure that damaged or wasted construction materials including cabinets, doors, plumbing and lighting fixtures, marbles and glass will be recovered for refurbishing and use in other projects	Project Manager & Contractor	One-off	25,000.00
	Donate recyclable/reusable or residual materials to local community groups, institutions and individual local residents or homeowners.	Project Manager & Contractor	One-off	0.00
	Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time	Project Manager & Contractor	Throughout construction period	0.00
	Provide facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements	Project Manager & Contractor	One-off	50,000.00
	Purchase of perishable construction materials such as paints should be done incrementally to ensure reduced spoilage of unused materials	Project Manager & Contractor	Throughout construction period	0.00
	Use building materials that have minimal or no packaging to avoid the generation of excessive packaging waste	Project Manager & Contractor	Throughout construction period	0.00
	Use construction materials containing recycled content when possible and in accordance with accepted standards.	Project Manager & Contractor	Throughout construction period	0.00
	Reuse packaging materials such as cartons, cement bags, empty metal and plastic containers to reduce waste at the site	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	0.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Dispose waste more responsibly by dumping at designated dumping sites or landfills only.	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	15,000.00/month
	Waste collection bins to be provided at designated points on site	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	5,000.00/month
	Private waste disposal company to be contracted to transport and dispose the solid waste from site	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	
	Running educational campaigns amongst employees, e.g. through use of posters, to encourage reuse or recycling of the solid waste	Project Manager, Mechanical Engineer & Contractor	Throughout construction period	10,000.00
	Comply with the provisions of Environmental Management and Co-ordination (Solid Waste) Regulations, 2006	Project Manager & Contractor	Throughout construction period	0.00
6. Reduce dust emission				
Dust emission	Ensure strict enforcement of on-site speed limit regulations	Project Manager & Contractor	Throughout construction period	55,000.00
	Avoid excavation works in extremely dry weather	Project Manager & Contractor	Throughout construction period	

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	All dusty materials shall be sprayed with water prior to any loading, unloading or transfer operation so as to maintain the dusty materials wet	Project Manager & Contractor	Throughout construction period	
	Cover stockpiles of sand, soil and similar materials or surround them with wind breaks	Project Manager & Contractor	Throughout construction period	
	Watering all roads used for any vehicular traffic when necessary	Project Manager & Contractor	Throughout construction period	
	Down wash of trucks (especially tyres) prior to departure from site	Project Manager & Contractor	Throughout construction period	
	Vehicles delivering loose and fine materials like sand and fine aggregates shall be covered to reduce spills on roads	Project Manager & Contractor	Throughout construction period	
	The height from which excavated materials are dropped shall be controlled to a minimum practical height to limit fugitive dust generation from unloading	Project Manager & Contractor	Throughout construction period	
	Rapid onsite construction so as to reduce duration of traffic interference and therefore reduce emissions from traffic delays	Project Manager & Contractor	Throughout construction period	
	Comply with the provisions of Environmental Management and Co-ordination (Air Quality) Regulations, 2014	Project Manager & Contractor	Throughout construction period	

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
7. Minimization of Air Pollution				
Poor Air Quality	The engine size of the construction equipment shall be the minimum practical size	Project Manager & Contractor	Throughout construction period	0.00
	The number of construction equipment operating simultaneously shall be minimized through efficient management practices	Project Manager & Contractor	Throughout construction period	0.00
	Construction machinery idling time shall be minimized	Project Manager & Contractor	Throughout construction period	0.00
	All vehicles and plant shall be regularly serviced in accordance with the manufacturer's recommendations to ensure that they operate efficiently and without excessive noxious emissions	Project Manager & Contractor	Throughout construction period	100,000.00
	The burning of waste, such as vehicle tyres causing noxious emissions shall be prohibited	Project Manager & Contractor	Throughout construction period	0.00
	Alternatively, fuelled construction equipment shall be used where feasible equipment shall be properly tuned and maintained	Project Manager & Contractor	Throughout construction period	0.00
	Sensitise truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off or keep vehicle engines at these points	Project Manager & Contractor	Throughout construction period	0.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Use of clean fuels e.g. unleaded and de-sulphurated fuels.	Project Manager & Contractor	Throughout construction period	0.00
	Comply with the provisions of Environmental Management and Co-ordination (Air Quality) Regulations, 2014	Project Manager & Contractor	Throughout construction period	
8. Minimization of exhaust emissions				
Exhaust emission	Vehicle idling time shall be minimized	Project Manager & Contractor	Throughout construction period	0.00
	Equipment shall be properly tuned and maintained;	Project Manager & Contractor	Throughout construction period	0.00
	Vehicles shall be maintained and serviced regularly;	Project Manager & Contractor	Throughout construction period	0.00
	Alternatively fueled construction equipment shall be used where feasible equipment shall be properly tuned and maintained	Project Manager & Contractor	Throughout construction period	0.00
	Work planning shall be undertaken to reduce time spent by the trucks delivering materials to the site and when traffic is low	Project Manager & Contractor	Throughout construction period	0.00
	Development and implementation of preventive maintenance of all equipment at the site;	Project Manager & Contractor	Throughout construction period	125,000.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Sensitize truck drivers to avoid unnecessary racing of vehicle engines at loading/offloading points and parking areas, and to switch off or keep vehicle engines at these points	Project Manager & Contractor	Throughout construction period	0.00
	Traffic control will be developed and implemented.	Project Manager & Contractor	Throughout construction period	
	Comply with the provisions of Environmental Management and Co-ordination (Air Quality) Regulations, 2014	Project Manager & Contractor	Throughout construction period	0.00
9. Minimization of Construction Material Sourcing Impacts				
Construction Material Sourcing Impacts	Aggregates and rock will be sourced locally from an established quarry	Project Manager & Contractor	Throughout construction period	350,000.00
	Gravel and sub-grade soil-murram will be sourced locally also from an established quarry instead of starting another quarry	Project Manager & Contractor	Throughout construction period	350,000.00
	Carry out inspection of each of the site's soil stability before excavation	Project Manager & Contractor	Throughout construction period	200,000.00
	Cordon off the gravel site areas to keep livestock and the general public	Project Manager & Contractor	Throughout construction period	100,000.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	The use of burrow pits for material spoil sites may be approved by the Engineer (and/or with the appropriate consent of the "landowner"). Where this occurs, the materials spoiled in the burrow pit shall be profiled to fit into the surrounding landscape and covered with topsoil.	Project Manager & Contractor	Throughout construction period	350,000.00
	The Contractor is expected to follow the National Sand Harvesting Guidelines published by NEMA in 2007;	Project Manager & Contractor	Throughout construction period	0.00
10. Minimization of Oil and Spill leakages				
Oil and Spill leakages	1. Spill kits shall be provided at all areas where chemicals are stored. 2. All the chemical handlers shall be trained appropriately on safe use and disposal of the chemicals and emergency procedures. 3. Provision of MSDS at all areas where the chemicals are handled prominently displayed. 4. Refuelling within the site shall be restricted to the excavators and other equipment for vehicles they shall be fuelled at petrol stations. 5. The frequency of refuelling shall be minimised by ensuring during refuelling the vehicle is refuelled to the maximum. 6. Refuelling shall be done away from drainage lines. 7. Fuel storage at the site shall be minimised.	Project Manager & Contractor	Throughout construction period	0.00
11. Curb Hydrology and Water Quality Degradation				

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Hydrology and Water Quality Degradation	• A well-drained area should be identified for parking, maintenance of the vehicles and equipment. • Provide drainage channels should during construction to minimize any possible water logging. • Provide a segregated drainage system where water contaminated with oils drains to instead of draining into the open storm drains. • The drainage system should ensure that surface flow is drained appropriately to control flooding within the site. • The channels should be covered with gratings or other suitable and approved materials to prevent occurrence of accidents and entry dirt that would compromise flow of run-off. • The drainage channels should ensure the safe final disposal of runoff/surface water and should be self-cleaning which means it should have a suitable gradient. • Consider storm water/surface runoff harvesting within the establishment as a sustainability measure. • Implementation of roof water harvesting within the establishment as a sustainability measure.	Project Manager & Contractor	Throughout construction period	200,000.00
12.	**To minimize OSH incidents**			

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
OSH incidents	• Registration of all workplaces by the Directorate of Occupational Safety and Health Services (DOSHS) • Erect conspicuously clear warning and informatory signs at the workplace. • Implement safe systems of work at the workplace including toolbox talks, job safety analysis, risk assessment, Permit to Work, workplace auditing, surveillance and monitoring. • Designate fire assembly point(s) at the workplace. • Comply with all standards and legally required safety and health regulations as set out under OSHA, 2007 in Section 96 as pertains to construction activities. • Provide fully functional standard First Aid Kit on site. • Place portable fire extinguishers at suitable locations. • Sensitize all staff on fire safety policy and procedures. • Clearly mark all fire exits within the site. • Provide appropriate PPE to workers after a risk assessment of the task to be undertaken. • Appropriately fence/cordon off all dangerous areas at site. • Preparing and implement a contingency plan for accident response. • Train and sensitize workers on safety and health at the workplace.	Project Manager & Contractor	Throughout construction period	900,000.00
13. Reduce pressure on existing utilities				

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Increased pressure on existing utilities	• Employing water conservation techniques and using the required amounts of water to prevent wastage. • Stormwater/surface runoff harvesting. • Roof catchment harvesting. • Employing power saving techniques such as switching off equipment when not in use, using natural light whenever possible. • Using machines with power saving technologies. • Providing proper sanitary facilities for construction workers. • Inspecting the drainage facilities regularly to ensure they are free of debris that may reduce their efficiency.	Project Manager & Contractor	Throughout construction period	400,000.00
14. Minimisation of increased traffic				
Increased traffic	• Placing signs around the site notifying other vehicles about the heavy traffic and to set the speed limit around the site. • Ensuring all drivers for the project comply to speed regulations. • Making sure the construction does not occupy the road reserves and complying with traffic and land demarcation obligations. • Ensuring all vehicles used for the project are in good working condition both legally and commensurate to their intended use.	Project Manager & Contractor	Throughout construction period	400,000.00
15. Minimisation of Occupational Safety and Health risks				

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Occupational Safety and Health risks	• Provide all workers with the necessary protective gears. • Ensure all workers are in protective gears all the time when on site. • Place fire extinguishers in strategic areas within the station. • Designate and mark smoking areas. • Workers to be trained as fire marshals. • Fire escape routes to be shown clearly. • Provide enough first aid kits within the project site. • Train workers in administering first aid. • Label all potential hazards such as movable machine parts. • Raise awareness and educating workers on risks from equipment and training them on the use of the equipment. • Placing visible and readable signs around where there are risks. • Ensuring security in and around the site to control the movement of people. • Providing safe and secure storage for equipment and materials in the site.	Project Manager & Contractor	Throughout construction period	400,000.00
16. To Minimize Clearing of Vegetation				

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Clearing of Vegetation	Ensure proper demarcation of the Project area to be affected by the construction works. This will be aimed at ensuring that any loss of vegetation is restricted to the actual Project area and avoid spill over effect on the neighbouring areas.	Project Manager & Contractor	Throughout construction period	0.00
	Clearing of work sites and roadside vegetation will be done to an acceptable minimum.	Project Manager & Contractor	Throughout construction period	150,000.00
17. Minimization of noise and vibration				
Noise and vibration	Install portable barriers to shield compressors and other small stationary equipment where necessary.	Project Manager & Contractor	Throughout construction period	10,000.00
	Use quiet equipment (i.e. equipment designed with noise control elements).	Project Manager & Contractor	Throughout construction period	120,700.00
	Co-ordinate with relevant agencies regarding construction activities in the area.	Project Manager & Contractor	Throughout construction period	0.00
	Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to shut off vehicle engines whenever possible.	Project Manager & Contractor	Throughout construction period	0.00
	The Proponent to schedule most of the operations during the day. Only operations that meet the required permissible noise levels should be allowed to operate at night	Project Manager & Contractor	Throughout construction period	0.00
	Install ‘no hooting’ signs in zones where noise will be of most nuisance like the education area.			0.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Sensitization of motorists within these zones against unnecessary noise making	Project Manager & all site foremen	Throughout construction period	0.00
	Construction/demolition works should be done during the day when people are away and also the outside environment is also noisy.	Project Manager & all site foremen	Throughout construction period	0.00
	Adhere to the provisions of the Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005 regarding workplace noise limits	Project Manager & all site foremen	Throughout construction period	0.00
	Ensure that construction machinery are kept in good condition to reduce noise generation	Project Manager & Contractor	Throughout construction period	20,400.00
	Ensure that all generators and heavy-duty equipment are insulated or placed in enclosures to minimize ambient noise levels	Project Manager & Contractor	Throughout construction period	26,200.00
	Establishment of buffer zones between different land uses will attenuate noise, further reducing the potential impacts. Adherence to noise ordinances such as the Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009 and employment of noise attenuation mechanisms for point sources will mitigate the impact.	Project Manager & all site foremen	Throughout construction period	300,000.00
18. Minimization of energy consumption				

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Increased energy consumption	Ensure electrical equipment, appliances and lights are switched off when not being used	Project Manager & Contractor	Throughout construction period	0.00
	Install energy saving fluorescent tubes at all lighting points instead of bulbs which consume higher electric energy	Project Manager & Contractor	Throughout construction period	10-40% higher than ordinary lighting
	Ensure planning of transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts	Project Manager & Contractor	Throughout construction period	3,500.00/month
	Monitor energy use during construction and set targets for reduction of energy use.	Project Manager & Contractor	Throughout construction period	22,500.00
19. Minimize water consumption and ensure more efficient and safe water use				
High water demand	Install water conserving taps that turn-off automatically when water is not being used	Project Manager & Contractor	One-off	10-40% higher than ordinary taps
	Promote recycling and reuse of water as much as possible	Project Manager & Contractor	Throughout construction period	3,400.00
	Install a discharge meter at water outlets to determine and monitor total water usage	Project Manager & Contractor	One-off	2,500.00
	Promptly detect and repair of water pipe and tank leaks	Project Manager & Contractor	Throughout construction period	2,000.00 per month

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Sensitize staff to conserve water by avoiding unnecessary water use	Project Manager & Contractor	Throughout construction period	0.00
	Ensure taps are not running when not in use	Project Manager & Contractor	Throughout construction period	0.00
20. Minimize release of liquid effluent				
Generation of wastewater	Provide means for handling liquid waste generated by construction workers	Mechanical Engineer & Project Manager	One-off	7,500.00/ month
	Conduct regular checks for pipe blockages or damages since such vices can lead to release of the effluent into the land and water bodies	Mechanical Engineer & Project Manager	Throughout construction period	
	Dispose liquid waste in accordance with the provisions of Environmental Management and Co-ordination (Water Quality) Regulations, 2006	Mechanical Engineer & Project Manager	Throughout construction period	
21. Minimize occupational health and safety risks				
Approval of building plans	Ensure that all building plans are approved by the Ministry of Lands and Physical Planning and the local OSH office	Developer	One-off	done
Registration of the premises	Registration of the premises under OSHA, 2007 laws of Kenya is mandatory	Developer	One-off	5,050.00 per year
General register	A general register should be kept in the facility as stipulated in Sec 122&123 of OSHA, 2007.	Project Manager & Contractor	One-off	1,000.00
Posting of abstract of Act, rules and notices	There shall be displayed at prominent places within the site the prescribed abstract of the OSHA and the relevant notices as stipulated in Section 121 of the OSHA, 2007.	Project Manager & Contractor	One-off	5,00.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Incidents, accidents and dangerous occurrences.	Ensure that provisions for reporting incidents during construction using prescribed forms obtainable from the local OSH office are in place.	Project Manager, Developer & Contractor	Continuous	0.00
	Enforcing adherence to safety procedures and preparing contingency plan for accident response in addition safety education and training shall be emphasized.	The Contractor, Project Manager& Site Safety Officer	Continuous	0.00
Insurance	Ensure that the premises are insured as per statutory requirements (WIBA, 2007)	Developer	Annually	0.00
Safety, health and environment (SHE) policy	Develop, document and display prominently an appropriate SHE policy for construction works	Project Manager, Developer & Contractor	One-off	35,000.00
Health and safety committee	Provisions must be put in place for the formation of a health and safety committee, in which the employer and the workers are represented	Project Manager	One-off	0.00
Sanitary conveniences	Suitable, efficient, clean, well-lit and adequate sanitary conveniences should be provided for construction workers	Project Manager	One-off	3,500.00/month
Medical examination	Arrangements must be in place for the medical examination of all construction employees before, during and after termination of employment	Project Manager, Developer & Contractor	Continuous	5,00.00 per examination
Machinery/equipment safety	Ensure that machinery, equipment, PPE, appliances and hand tools used in construction do comply with the prescribed safety and health standards and be appropriately installed maintained and safeguarded	Project Manager, Developer & Contractor	One-off	0.00
	Ensure that equipment and work tasks are adapted to fit workers and their ability including protection against mental strain	Project Manager, Developer & Contractor	Continuous	0.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	All machines and other moving parts of equipment must be enclosed or guarded to protect all workers from injury	Project Manager	One-off	0.00
	Arrangements must be in place to train and supervise inexperienced workers regarding construction machinery use and other procedures/operations	Project Manager	Continuous	5,000.00 per training
	Equipment such as fire extinguishers must be examined by a government authorized person. The equipment may only be used if a certificate of examination has been issued	Project Manager	Continuous	5,500.00 per examination
	Reports of such examinations must be presented in prescribed forms, signed by the examiner and attached to the general register	Project Manager	Continuous	2,500.00per examination
Storage of materials	Ensure that materials are stored or stacked in such manner as to ensure their stability and prevent any fall or collapse	Project Manager	Continuous	11,700.00
	Ensure that items are not stored/stacked against weak walls and partitions	Project Manager	Continuous	
Safe means of access and safe place of employment	All floors, steps, stairs and passages of the premises must be of sound construction and properly maintained	Project Manager & Contractor	Continuous	0.00
	Securely fence or cover all openings in floors	Project Manager & Contractor	One-off	0.00
	Provide all staircases with suitable handrails on both sides	Project Manager & Contractor	One-off	0.00
	Ensure that construction workers are not locked up such that they would not escape in case of an emergency	Project Manager & Contractor	Continuous	0.00
	All ladders used in construction works must be of good construction and sound material of adequate strength and be properly maintained	Project Manager & Contractor	One-off	0.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
Emergency preparedness and evacuation procedures	Design suitable documented emergency preparedness and evacuation procedures to be used during any emergency	Project Manager & Contractor	One-off	0.00
	Such procedures must be tested at regular intervals	Project Manager & Contractor	Every 3 months	
	Ensure that adequate provisions are in place to immediately stop any operations where there in an imminent and serious danger to health and safety and to evacuate workers	Project Manager & Contractor	One-off	
	Ensure that the most current emergency telephone numbers posters are prominently and strategically displayed within the construction site	Project Manager & Contractor	One-off	
	Provide measures to deal with emergencies and accidents including adequate first aid arrangements	Project Manager & Contractor	Continuous	
First Aid	Well stocked first aid box which is easily available and accessible should be provided within the premises	Project Manager & Contractor	One-off	5,500.00
	Provision must be made for persons to be trained in first aid, with a certificate issued by a recognized body.	Project Manager & Contractor	One-off	6,000.00 per person
22. Ensure the general safety and security of the site and surrounding area				
Increased Pressure on Infrastructure	Coordinate with other planning goals and objectives for the region	Architect, Project Manager, Contractor and the Developer	Continuous	30,000.00
	Upgrade existing infrastructure and services, if and where feasible.	Architect, Project Manager, Contractor and the Developer	Continuous	
Insecurity	Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction site.	Security Officer, Project Manager & Police	Continuous	20,000.00/ month

	Body-search the workers on entry, to avoid getting weapons on site, and leaving site to ensure nothing is stolen.	Security Officer	Continuous	
	Ensure only authorized personnel get to the site	Security Officer	Continuous	
	Security alarms will be installed	Security Officer	Continuous	
23. Environmental monitoring of the project				
Environmental concern during the construction phase	As required by the law, the Proponent will liaise with the Environmental Consultant throughout the construction phase and ensure that the EIA licensing conditions are adhered to.	Proponent, Contractor and EIA/EA Experts	Throughout construction phase	2,000,000.00

9.5 Operational Phase Environmental and Social Management Plan

The necessary objectives, activities, mitigation measures, and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and maximization of positive impacts associated with the operational phase of the proposed Project are outlined in **Table 8** overleaf.

Table 8: Operation Phase ESMP for the proposed Project

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1 Minimization of solid waste generation and ensuring more efficient solid waste management				
Solid waste generation	Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary landfill.	Proponent/Property Managers	Continuous	0.00
	Provide solid waste handling facilities such as waste bins and skips	Proponent/Property Managers	Continuous	30,000.00
	Ensure that solid waste generated is regularly disposed off appropriately at authorized dumping sites	Proponent/Property Managers	Continuous	15,000.00/month
	Donate redundant but serviceable equipment to charities and institutions	Proponent/Property Managers	Continuous	0.00
	Comply with the provisions of Environmental Management and Co-ordination (Solid Waste) Regulations, 2006	Proponent/Property Managers	Continuous	0.00
2 Minimise risks of liquid waste release to the environment				
Liquid waste release to the environment	Provide adequate and safe means of handling liquid waste at the premises	Proponent/Property Managers	One-off	0.00
	Conduct regular inspections for pipe blockages or damages and fix appropriately	Proponent/Property Managers	Continuous	500.00 per inspection

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Comply with the provisions of Environmental Management and Co-ordination (Water Quality) Regulations, 2006	Proponent/Property Managers	Continuous	0.00
3 Minimize energy consumption				
Increased energy use	Switch off electrical equipment, appliances and lights when not being used	Proponent/Property Managers	Continuous	0.00
	Install occupation sensing lighting at various locations such as the stores which are not in use all the time	Proponent/Property Managers	One-off	10-40% higher than ordinary lighting
	Install energy saving fluorescent tubes at all lighting points within the building instead of bulbs which consume higher electric energy	Proponent/Property Managers	One-off	10-40% higher than ordinary lighting
	Monitor energy use during the operation of the project and set targets for efficient energy use	Proponent/Property Managers	Continuous	7,500.00/month
	Sensitize workers and the premises occupiers to use energy efficiently	Proponent/Property Managers	Continuous	2,000.00/month
4 Minimize water consumption and ensure more efficient and safe water use				
Water management	Promptly detect and repair of water pipe and tank leaks	Proponent/Property Managers	Continuous	3,500.00/month
	Occupier of the premises to conserve water e.g. by avoiding unnecessary toilet flushing	Proponent/Property Managers	Continuous	2,500.00/month
	Ensure taps are not running when not in use	Proponent/Property Managers	Continuous	2,500.00/month

Expected Negative impact	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Install water conserving taps that turn-off automatically when water is not being used	Proponent/Property Managers	One-off	10-40% higher than ordinary taps
	Install a discharge meter at water outlets to determine and monitor total water usage	Proponent/Property Managers	One-off	3,000.00
5 Minimization of health and safety impacts				
Implement all necessary measures to ensure health and safety of the Occupier and the general public during operation of the premises as stipulated in OSHA, 2007 and the Public Health Act		Proponent/Property Managers	Continuous	0.00
6 Ensure the general safety and security of the premises and the surrounding area				
Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the premises		Proponent/Property Managers	Continuous	20,000.00/month
7 Ensure environmental compliance				
Undertake an EA within 12 months after operation commences as required under the law		Licensed lead EIA/EA Expert(s)	12 months after operation commences	80,000.00

9.6 Decommissioning Phase

In addition to the mitigation measures provided in the tables above, it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the project 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 9** overleaf.

Table 9: Decommissioning Phase ESMP for the proposed Project

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
1. Demolition waste management				
Demolition waste	Use of an integrated solid waste management system i.e. through a hierarchy of options: 1. Source reduction 2. Recycling 3. Composting and reuse 4. Combustion 5. Sanitary land filling.	Project Manager & Contractor	Once-off	100,000.00
	All buildings, machinery, equipment, structures and partitions that will not be used for other purposes must be removed and recycled/reused as far as possible	Project Manager & Contractor	Once-off	50,000.00
	All foundations must be removed and recycled, reused or disposed off at a licensed disposal site	Project Manager & Contractor	Once-off	60,000.00
	Where recycling/reuse of the machinery, equipment, implements, structures, partitions and other demolition waste is not possible, the materials should be taken to a licensed waste disposal site	Project Manager & Contractor	Once-off	0.00
	Donate reusable demolition waste to charitable organizations, individuals and institutions	Project Manager & Contractor	Once-off	0.00
2. Rehabilitation of project site				
Site degradation	Implement an appropriate re-vegetation programme to restore the site to its original status	Project Manager & Contractor	Once-off	60,000.00

Expected Negative Impacts	Recommended Mitigation Measures	Responsible Party	Time Frame	Cost (Ksh)
	Consider use of indigenous plant species in re-vegetation	Project Manager & Contractor	Once-off	
	Trees should be planted at suitable locations so as to interrupt slight lines (screen planting), between the adjacent area and the development.	Project Manager & Contractor	Once-off	

10 CONCLUSION AND RECOMMENDATIONS

The proposed Project according to the ESIA study shall come along with numerous positive impacts as exhaustively discussed within this ESIA Study Report. Negative impacts are as well anticipated which however, according to the ESIA study can be adequately mitigated.

This ESIA study recommends that the positive impacts arising from the establishment of the proposed Project be maximized to the extent feasible. It is expected that these measures will go a long way in ensuring the best possible environmental compliance and performance standards. Further, this ESIA study recommends that the Proponent implement adequate measures to mitigate the negative environmental, safety, health and social impacts associated with the life cycle of the proposed Project. In addition to this commitment, the Proponent shall adopt the measures outlined in the ESMP as well as adhering to all relevant national and international environmental, health and safety standards, policies and regulations that govern establishment and operation of such projects.

On the basis of the above and taking cognizance of the fact that the Proponent has proved financially and environmentally credible, it is the Environmental Consultant's submission that the proposed Project be allowed to go on provided the mitigation measures outlined in this Report shall be adhered to and the ESMP shall be fully implemented.

11 REFERENCES

1. Kenya gazette supplement Acts 2015, Environmental Management and Coordination (Amendment) Act Number 5 of 2015. *Government printer.*
2. Kenya gazette supplement Acts 2000, Environmental Management and Coordination Act Number 8 of 1999. Government printer, Nairobi.
3. Kenya gazette supplement number 56. Environmental Impact Assessment and Audit Regulations 2003, Government Printers, Nairobi.
4. Kenya gazette supplement Acts Building Code 2000, Government Printers, Nairobi.
5. Kenya gazette supplement Acts Penal Code Act (Cap.63) Government Printers, Nairobi.
6. Kenya gazette supplement Acts Physical and Land Use Planning Act, 2019, Government Printers, Nairobi.
7. Kenya gazette supplement Acts Public Health Act (Cap. 242) government printer, Nairobi.
8. Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 regarding noise production limits. Government Printers, Nairobi.
9. Kenya gazette supplement number 57, Environmental Management and Coordination (Controlled Substances) Regulations, 2007, Government printer, Nairobi.
10. Kenya gazette supplement number 68, Environmental Management and Coordination (Water Quality) Regulations, 2006, Government printer, Nairobi.
11. Kenya gazette supplement number 69, Environmental Management and Coordination (Waste management) Regulations, 2006, Government printer, Nairobi.
12. Noise Prevention and Control Rules 2005, Legal Notice No. 24, government printer, Nairobi.
13. The Occupational Safety and Health Act, 2007, Government Printers, Nairobi.
14. Constitution of Kenya 2010.
15. Convention on Biological Diversity, 1993.
16. County Government Act, 2012.
17. Kenya Vision, 2030.
18. Kyoto Protocol, 1997.
19. Montreal Protocol on Substances that Deplete the Ozone Layer, 1987.
20. National Occupational Safety and Health Policy, 2012.
21. Nairobi County Integrated Development Plan, 2023-2027.

12 APPENDICES

1. NEMA Practicing License for the Environmental Consultant.
2. ESIA Study TOR Approval Evidences.
3. Filled Sampled Public Consultation Questionnaire Copies.
4. Public Meetings Notices Issued.
5. Minutes for the Public Meetings held.
6. Land Ownership Document.
7. Land Rates Payment Receipt for the Study Property.
8. Change of Use for the Study Property.
9. KRA Pin for the Proponent
10. Bill of Quantities for the proposed Project.
11. Agreement between AU and Kenya on Hosting of AU Organs in Kenya.
12. Design Plans for the Proposed Project.