MINISTRY OF HEALTH

EAST AFRICA'S CENTRE OF EXCELLENCE FOR SKILLS AND TERTIARY EDUCATION IN BIOMEDICAL SCIENCES

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY REPORT FOR THE PROPOSED RESEARCH AND TEACHING COMPLEX FOR THE EAST AFRICAN KIDNEY INSTITUTE ON KENYATTA NATIONAL HOSPITAL PLAYGROUND - L.R. NO. 209/13978 - ALONG NGONG ROAD, NAIROBI CITY COUNTY, KENYA

PREPARED BY

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CERTIFICATION

This ESIA study report has been prepared in accordance with the Environmental Management and Coordination Act (EMCA), and the Environmental (Impact Assessment and Audit) Regulations 2003 for submission to the National Environment Management Authority (NEMA).

We the project proponent and the Firm of ESIA Experts certify that the particulars given in this TOR are correct to the best of our knowledge.

PROJECT PROPONENT:

The Principal Secretary,
Ministry of Health,
P.O. Box: 30016–00100, Nairobi, Kenya.

Signature Date

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Signature Date

NON – TECHNICAL SUMMARY

The Government of Kenya has received financing from the African Development Bank in the form of a loan toward the cost of East Africa's Centre of Excellence for skills and Tertiary Education in Biomedical Sciences, towards this end, GOK (the Ministry of Health) is proposing to construct a research and teaching building complex for East African Kidney Institute (EAKI) - a Centre of Excellence (CoE) for urological and nephrological (kidney related) diseases in the East African Region.

The project will be located on the lower section of KNH Playground (L.R. No.209/13978) which is situated along Ngong Road. The site is jointly owned by the Kenyatta National Hospital, Kenya Medical Training College and University of Nairobi. The size of project land / plot is approximately 2.544 Ha and it is designated for recreational use / purpose.

This report presents our findings and recommendations of the Environmental Impact and Social Assessment (ESIA) study for the proposed project for purposes of applying for an EIA license from NEMA.

Project Description

The proposed project will first entail subdivision of the project plot (L.R. No.209/13978) into two plots, one plot (the upper section) will be retained for recreational use, while the proposed project will be build on the lower plot - on which the existing football pitch is located. Change of user of the project plot (the lower plot) will be secured from the Nairobi City County before the construction activities start.

Once subdivision of the plot is done, the project proponent will construct a modern standard artificial turf football pitch on the plot retained for recreational use, he will also rehabilitate the volleyball and netball pitches on the plot.

Thereafter, the project proponent will then proceed to establish the proposed EAKI on the lower section of the site.

The proposed EAKI Building Complex will have a basement and rise up to five floors – with a possibility of adding two additional floors in future. The building will be Y shaped comprising of 3 interconnected blocks; two long blocks will form the East African Institute Hospital while the shorter block will house the research and teaching University.

The key components of the project are highlighted below:

Table 1: Key Components of EAKI Building Complex

Components	Description
Basement	Refectory; Laboratories; Kitchen; Storages Rooms; an Office; Morgue, Laundry; Parking Spaces; Pharmacy; Storage areas.

Components	Description
	Several Technical Functions are located in the external area of the basement, these are: CED Room; BCM; Electrical General Board; UPS; Water Treatment Plant; Fire Fighting Pump; MT/BT; E.G.; Medical Gases Room; Plant Room; Temporal Waste Storage Cubicles; Heating and Cooling Plant; Water Storage Tanks; Ecological Area
Ground Floor	Cafeteria; 45 Dialysis Points; 4 Dialysis Critical Care Beds; 4 Dialysis Arm Chairs; MRI; CAT; X-Ray, Brachytherapy; Ultrasound; Examination Rooms; Two Shops; Clinics; Laboratories; Radiology; Reception Area; Staff Changing Area; Technical; Circulation Area; Lecture Rooms; Translation Rooms; Storage Areas; Critical Care Beds.
1st Floor	Critical Area; Surgical Theatres; Laboratory; Utoradiology Lithotripsy; Uroradiology; P.A.C.U.; Circulation Area; Temporal Deceased Holding Room; Offices; Multimedia Room; Library.
2nd Floor	12 – six (6) bed Wards; 2 – four (4) bed Wards; 2 – one (1) bed Wards; Library; Technical; Terrace; Circulation Area; Staff Offices; Staff Changing Rooms; Boardroom; Library.
3rd Floor	12 – four (4) bed Wards; 3 – two (2) bed Wards; Wards; Staff Offices & Changing Rooms; Seminar Rooms; Technical; & Circulation Area
4th Floor	1 – four (4) bed Ward; 7 – two (2) bed Wards; 6 – one (1) bed Wards; Offices; Staff Changing Rooms; Seminar Rooms; Video Conferencing Room.
Rooftop	Water Reservoir 36 M^3 , Solar Water Heaters, Faraday Cage & Lightening Arrestors

Key Environmental Issues & Potential Impacts

The proposed EAKI is expected to have net positive benefits to the country and the East African Community. The positive impacts include: land use optimization, improved access to specialized public medical care; and improvement of biomedical research & knowledge on renal diseases.

The key potential negative impacts and proposed mitigation measures for the proposed project are summarized in the table below:

Table 2: Summary of Key Negative Impacts and Proposed Mitigation Measures

Potential Impact	Mitigation measures
Land Pollution	• Establish a robust solid waste management system
Air pollution	• Preventive maintenance of emergency diesel generator • Incorporation of renewable energy technologies

Potential Impact	Mitigation measures
	• Landscaping & tree planting along site boundary
Land Use conflict	• Subdivision of the land into two (for EAKIP and recreational purpose) • Change of use approval for the EAKIP plot from physical planning department NCC • Seek approval from KCAA for the project as the site is adjacent to KNH heliport (helicopter landing area) • Relocation & upgrade of recreational facilities
Water and Ecosystem pollution	• Connect the facility to the existing public sewer line • Seek WRMA approval for drilling proposed borehole • Abstraction of ground water much permitted by WRMA • Wastewater & storm water collection & treatment prior to discharge to environment
Occupational safety & health concerns	• Undertake risk assessment of facility; • Continuous training of workers on hazards & emerging workplace risks • Provision of appropriate PPE • Effective management of waste including hazardous medical waste.
Potential increase in HIV/AIDs infections	• Contractor should undertake HIV/AIDS education & awareness in partnership with the local administration & religious institutions.

Conclusion and Recommendations

The findings of the ESIA based on the disclosed project details and the baseline site assessment indicated that the project is desirable and will support the realization of national and regional development goals. The project design has incorporated good environmental practice by adopting key green building design criteria such as storm water harvesting, use of natural lighting strategies & solar water heating technologies in line with existing national laws and regulations. The project design also specifies high standards for designs of key project elements including the civil works, mechanical systems and electrical systems.

The project is therefore deemed feasible from environmental and social view point when implemented alongside the Environmental Management plan developed for this project. The report recommends that the EAKI project should be approved by NEMA subject to conditions deemed necessary by the Authority to advance sustainable development.

TABLE OF CONTENTS

CERTIFICATION II
NON – TECHNICAL SUMMARY III
TABLE OF CONTENTS VI
ACRONYMS AND ABBREVIATIONS XII
CHAPTER 1 1
1 INTRODUCTION 1
1.1 Project Background 1
1.2 The Proposed Project 2
1.3 Justification for the Project 2
1.4 Project's Objectives 2
1.5 Objectives of ESIA the study 3
1.5.1 General Objective 3
1.5.2 Specific Objectives of the ESIA Study 3
1.6 Terms of Reference (ToR) 4
1.7 Methodology 4
1.7.1 Screening 5
1.7.2 Approaches to undertaking the ESIA 5
1.8 EAKI Design and Construction supervision consortium 6
1.9 Potential Positive Impacts 6
1.10 Potential Negative Impacts 7
1.11 Public Consultations 7
1.12 Constraints and Limitations 7
1.13 Estimated Project Cost 8
1.14 ESIA Study Output 8
CHAPTER 2 1
2 BASELINE INFORMATION 1
2.1 Location of the East Africa Kidney Institute 1
2.1.1 Existing condition and current use of the proposed project site 1
2.1.2 Neighboring facilities 2
2.2 Physical Environment 2
2.2.1 Topography 2
2.2.2 Hydrology 2
2.2.3 Geology 2
2.2.4 Soils 3
2.2.5 Rainfall 3
2.2.6 Climatic seasons 3
2.2.7 Temperature 3
2.3 Biological Environment 3
2.3.1 Fauna 3
2.3.2 Flora 3

2.3.3 Land uses 4
2.4 Socio-Economic Environment 4
2.4.1 Population and Demographics 4
2.4.2 Sewer Systems 4
2.4.3 Existing Infrastructure 5
3 ENVIRONMENTAL POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK 7
3.1 Legal Framework 7
3.2 The Constitution of Kenya 7
3.3 The Environmental Management and Coordination Act, 1999 and Environmental Management Coordination (Amendment) Act 2015 7
3.3.1 Environmental Impact Assessment and Audit Regulations 2003 (Legal Notice No. 101) 9
3.3.2 Environmental Management and Coordination (Water Quality) Regulations, 2006 10
3.3.3 The Environmental Management and Co-Ordination (Water Quality) (Amendment) Regulations, 2012 10
3.3.4 Environmental Management and Coordination (Waste Management) Regulations, 2006 11
3.3.5 The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 12
3.3.6 The Environmental Management and Co-ordination (Controlled Substances) Regulations, 2007 13
3.3.7 The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shore and Sea Shore management) Regulations, 2009 13
3.4 The Environment and Land Court Act, 2011 14
3.5 The Energy Act, 2016 14
3.6 The Water Act No. 43 of 2016 15
3.7 Public Health Act 15
3.8 The County Government Act 2012 16
3.9 The Occupational Safety and Health Act, 2007 17
3.10 The Physical Planning Act, 1996 20
3.11 Acts Related To Land 21
3.11.1 The Land Planning Act (Cap 303) 21
3.11.2 Land Titles Act, Cap 282 21
3.11.3 Registration of Titles Act, Cap 281 21
3.11.4 Registered Land Act, Cap 300 21
3.12 The Penal Code CAP 63 22
3.13 The Workmen's Injury and Benefits Act, 2007 22
3.14 The Employment Act, 2007 22
3.15 Radiation Protection Act, Cap 243 22
3.16 The Traffic Act, Cap 203 23
3.17 The Standards Act Cap 496 23
3.18 The Civil Aviation Act, 2013 23
3.19 National Construction Authority Act 25
3.20 Policy statements relevant to the project 26
3.20.1 Health Care Waste Management Strategic Plan 2015-2020 26

3.20.2 National Infection Prevention and Control Guidelines for Health Care Services in Kenya, 2010 27
3.20.3 Sessional Paper No. 1 of 1992 on Development and Employment in Kenya 27
3.20.4 Sessional Paper No. 2 of 1985 on Unemployment. 27
3.20.5 National Development Plans and Vision 2030 28
3.20.6 Sessional Paper No. 4 of 2004 on Energy 28
3.20.7 National Environmental Action Plan (NEAP). 29
3.21 International Conventions and Treaties 29
3.21.1 WHO National Guidelines on Safe Disposal of Pharmaceutical Waste, 2001 29
3.21.2 World Bank Group (WBG) Guidelines: Environmental, Health, and Safety Guidelines General EHS Guidelines, 2007 30
3.21.3 Convention on Biological Diversity (CBD) 31
3.21.4 Rio Declaration and Agenda 21 31
3.21.5 World Commission on Environment and Development (The Brundtland Commission of 1987) 32
3.22 Institutional Arrangements 32

CHAPTER 4 34

4 PROJECT DESCRIPTION 34
4.1 Nature of the Project 34
4.1.1 Pre-construction activities 35
4.1.2 Site Plan, Location and access 35
4.1.3 Flows 36
4.2 Structural Composition 37
4.2.1 Layout 37
4.2.2 Detail of Key Sanitary Areas 37
4.3 Design criteria 39
4.4 Water treatment and distribution 39
4.5 Drainage network 40
4.6 Irrigation plant 41
4.6.1 Water supply 41
4.6.2 Energy 41
4.7 Construction activities and inputs 41
4.7.1 Input during the Construction 41
4.7.2 Construction activities and timetable 42
4.7.3 Project implementation sequencing 42
4.7.4 Occupation stage 44
4.8 Estimated Project Cost 44

CHAPTER 5 45

5 ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS AND THEIR MITIGATION ... 45
5.1 Description of the existing and anticipated impacts 45
5.1.1 Existing impacts 45
5.1.2 Anticipated impacts 45

5.2 Positive socio-economic and environmental benefits during the Establishment and Operation of the EAKI 48
5.3 Negative Environment Impacts during Construction and Operational Phases .. 48
5.3.1 Air Quality 49
5.3.2 Soil Erosion 49
5.3.3 Solid Wastes Generation 49
5.3.4 Liquid Waste 50
5.3.5 Health Care Solid Waste 51
5.3.6 Excess Noise & Vibrations 52
5.3.7 Increased Water Demand 53
5.3.8 Surface Drainage 54
5.3.9 Surface and Ground Water Hydrology and Water Quality Degradation 54
5.3.10 Oil Leaks and Spills 55
5.4 Socio-Cultural and Socio-Economic Impacts 56
5.4.1 Employment and Income 56
5.4.2 Displacement of the Playground 56
5.4.3 Increased Energy Demands 57
5.4.4 Workplace Accidents 57
5.4.5 Traffic Snarl-up along Ngong Road and Adjoining Roads 58
5.4.6 Site Security 59
5.4.7 Fire Hazards 59
5.4.8 HIV/AIDS 59
5.4.9 Conflict with the stakeholders 60

CHAPTER 6 61

6 PUBLIC / STAKEHOLDERS' ENGAGEMENT IN THE ESIA PROCESS 61
6.1 Introduction 61
6.2 Public Consultation & Disclosure 61
6.3 Objectives of Public Consultation 62
6.4 Public Consultation Methods 63
6.5 Stakeholder engagement 63
6.6 Description of stakeholders 63
6.7 Stakeholders Meetings 63
6.8 Stakeholder concerns 65

CHAPTER 7 68

7 PROJECT NEED AND ANALYSIS OF ALTERNATIVES 68
7.1 Project Alternatives 68
7.1.1 The No-Action Option 68
7.1.2 Alternative Project sites 69
7.1.3 Alternative Construction Materials, Technology and Energy Sources 69
7.1.4 Alternative wastes disposal 69

CHAPTER 8 71

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN 71
8.1 Introduction 71

8.1.1 General 71
8.1.2 Scope and Objectives of the EMP 71
8.1.3 Applicable Legislation 71
8.2 Principles of Environmental Management Plan 72
8.3 Recommendations/Commitments of the EIA 72
8.4 Responsibility 72
8.5 Environmental Awareness 72
8.6 Mitigation 73
8.7 Monitoring 73

CHAPTER 9 90

9 CONCLUSION & RECOMMENDATIONS 90
9.1 Conclusion 90
9.2 Recommendations 90

CHAPTER 10 91

10 REFERENCES 91

11 APPENDICES 93

LIST OF PLATES

Plate 1: Showing the proposed project site (Source: Google Maps) 1
Plate 2: Showing the current condition of proposed project site during rainy seasons 2
Plate 3: Showing some of the trees growing on the proposed project site 4
Plate 4: Artistic impression of the proposed EAKI 34
Plate 5: Site Plan for the proposed project 36
Plate 6: Showing one of the project consultants giving a presentation during the stakeholders meeting on 19th July 2017 at Panafric Hotel Nairobi 64
Plate 7: Showing some of the stakeholders who attended a meeting at EAKIP site on 21st November 2017 64

LIST OF TABLES

Table 1: Key Components of EAKI Building Complex iii
Table 2: Summary of Key Negative Impacts and Proposed Mitigation Measures iv
Table 3: Design and Construction supervision consortium EAKIP 6
Table 4: Shows the main dimensions of the EAKI building Complex 34
Table 5: Shows a summary of the departments and functions divided by floors 36
Table 6: Anticipated Impacts of the project 46
Table 7: List of participants in the 19th July 2017 meeting 65
Table 8: List of participants in the 21st November 2007 meeting 66
Table 9: Planning & Design phase action plan 74
Table 10: Construction phase action plan 76

Table 11: Operational Phase 82
Table 12: Decommissioning Phase 88

ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
BMS	Building Management System
CAT	Computerised Axial Tomography
CDE	County Director of Environment
CoE	Centre of Excellence
CoEs	Centres of Excellence
EA	Environmental Audit
EAKI	East African Kidney Institute
EAKIP	East African Kidney Institute Project
EHS	Environment, Health and Safety
EMCA	Environmental Management and Coordination Act of 1999
EMP	Environmental Management Plan
ERP	Emergency Response Plans
ESIA	Environmental and Social Impact Assessment
FGD	Focus Group Discussion
GoK	Government of Kenya
Ha	Hectare
HIV	Human Immunodeficiency virus
km	kilometre
KMTC	Kenya Medical Training College
KNH	Kenyatta National Hospital
L.R.	Land Registration
MoH	Ministry of Health
NCWSC	Nairobi County Water & Sanitation Company
NEAP	National Environmental Action Plan
NEC	National Environment Council
NEMA	National Environment Management Authority
No.	Number
NCA	National Construction Authority
PACU	Post-Anaesthesia Care Unit
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
RC	Reinforced concrete
SQM	Square Meters
UNEP	United Nations Environment Program
UoN	University of Nairobi
WHO	World Health Organization
WWTP	Wastewater Treatment Plant

CHAPTER 1

1 INTRODUCTION

This Environmental and Social Impact Assessment Study Report is for the Ministry of Health for the proposed research and teaching complex for East African Kidney Institute (EAKI) - a Centre of Excellence (CoE) for kidney related (urological and nephrological) diseases in the East African Region.

The key objective of the East African Kidney Institute project in Nairobi is to develop state of the art health services at the new Hospital, so as to establish the new Hospital as a centre of excellence that will contribute to development of relevant and highly skilled workforce in biomedical sciences to meet East African Community (EAC) immediate labour market needs and support implementation of EAC's 'free' labour market protocols.

Under section 58 Environment Management and coordination Act (EMCA), 1999 and the second schedule (1(c) Major changes in land use) of EMCA, 1999, the proposed project requires an EIA before it can start. Under EMCA, any activity out of character with its surrounding and likely to cause substantial impact to the environment requires an Environmental Impact Assessment (EIA) Report.

Accordingly, the Project Proponent is required to prepare and submit an ESIA report to the NEMA for review and approval before commencing the implementation of the project. The ESIA study findings (ESIA Report) enables NEMA and the lead relevant government authorities to monitor impact within the life span of the project on the immediate environment, so as to enable major stakeholders of the project including the government to manage the environment for the wellbeing of the community and future generations.

1.1 Project Background

The proposed EAKI will be developed by the Government of Kenya which has received financing from the African Development Bank. The EAKI proposed project will be located on Kenyatta National Hospital playground (L.R. No. 209/13978) situated along Ngong Road, the site is jointly owned by the Kenyatta National Hospital, Kenya Medical Training College and University of Nairobi.

The EAKI is part of East Africa's Centre of Excellence for Skills and Tertiary Education in Biomedical Sciences – a network of Centres of Excellence (CoEs) in biomedical sciences and engineering that are being established in the East African Countries, these include: East Africa Biomedical Engineering Institute (EABEI) in Rwanda; East Africa Oncology Institute (EAOI) in Uganda; and East Africa Heart Institute (EAHI) in Tanzania.

To design and supervise the construction of EAKI, the Ministry of Health engaged the services of a consortium of experts lead by Politecnica Ingegneria Architettura of Italy, Envilead Limited (NEMA Reg. No. 6281) is the Environmental and Social Impact Assessment experts in the Politecnica Ingegneria Architettura consortium.

This ESIA study report has been prepared based on the findings of screening and scoping study, field visits and information collected from both primary and secondary sources including the information provided by the Project Proponent.

1.2 The Proposed Project

EAKI is one of the Centres of Excellence for skills and tertiary Education in Biomedical Sciences being established in Kenya, Tanzania, Uganda, and Rwanda.

In phase 1 of the project, African Development Bank will support creation of a network of Centers of Excellence (CoEs) in biomedical sciences and engineering, these include: East Africa Kidney Institute (EAKI) in Kenya; East Africa Biomedical Engineering Institute (EABEI) in Rwanda; East Africa Oncology Institute (EAOI) in Uganda; and East Africa Heart Institute (EAHI) in Tanzania.

The research and teaching complex for EAKI will be a five (5) storey Y – shaped block which will have a hospital wing and a university wing.

EAKI will provide leadership in postgraduate education, training, research services to cater for the ever-increasing needs for urological and nephrological care in the region.

To deliver quality and relevant skills development, research and service delivery, the EAKI will develop higher education programmes and collaborate with 'World Class' institutions in curriculum development, faculty exchange, mentoring, access to resource materials and carry out joint thematic biomedical research and publish it.

1.3 Justification for the Project

The project's main deliverable is to enhance EAC's competitiveness through a highly skilled workforce in biomedical sciences. The project will enable EAC increase its capacity and competitiveness through expanding higher education and specialised service delivery that are demanded by the rapid economic development in East Africa. The project has potential to create jobs for professionals and support services through medical tourism within the EAC as well as from other African regions.

Development of the EAKI in Kenya will greatly reduce foreign dependency and expenditures; especially for Non-Communicable Diseases (NCDs) diagnostics and treatments in Europe, North America and South Asia. Currently, the EAC Governments and households are utilizing an estimated USD 150 million annually for NCDs related services from outside the region. Premature deaths and prolonged disability caused by NCDs have economic impact via lowered productivity and losses in income and capital formation. According to World Bank the rising trends and costs of NCDs will force countries to make choices in creating strategies to address NCDs cost effectively and sustainably.

1.4 Project's Objectives

The objectives of the East African Kidney Institute in Nairobi are:

- Develop state of the art health services at the new Hospital, upgrading its facilities to the latest International Standards.
- Address and cater for the medical and health need of the African population.
- Provide adequate, functional, safe and pleasant working space for all the staff.
- Establish the new Hospital as a centre of excellence.

1.5 Objectives of ESIA the study

1.5.1 General Objective

The general objective of the ESIA study is to carry out a systematic examination of the present environmental situation within the project area to determine whether the proposed East African Institute Project will impact adversely on the physical, biological, social and environmental elements within the project area.

1.5.2 Specific Objectives of the ESIA Study

(i) To highlight environmental issues of the proposed project with a view to guiding policy makers, planners, stakeholders and government agencies to help them in understanding the implications of the proposed project on environmental elements within the project area;
(ii) To review existing legal institutional, and policy framework relevant to the proposed project;
(iii) To find out impacts associated with implementation of the proposed project with a view to suggesting mitigation measures for the negative impacts;
(iv) To asses and give recommendations on the various mitigation measures to be taken to reduce possible negative impacts on the proposed piece of land for development;
(v) Analyse occupational health and safety issues associated with the proposed project;
(vi) To determine the compatibility of the proposed facility with the neighboring land uses and evaluate local environmental conditions.
(vii) Facilitating public open meetings for the stakeholders to air their views.
(viii) Identifying and contacting the project stakeholders to seek their views on the proposed project.
(ix) To assess the relative importance of the impacts of alternative plans, design and sites;
(x) To generate baseline data for monitoring and evaluation of how well the proposed mitigation measures are being implemented during the project operation period;
(xi) To develop an Environmental and Social Management Plan (ESMP) to guide in decision making and for future auditing;
(xii) To raise stakeholder awareness on potential impacts of the project on the environment with a view to making them understand the implication of the project in their environment;
(xiii) To develop an ESIA report in conformity with the EMCA 1999, Environmental (Impact Assessment and Audit) Regulations 2003 and EMCA (amendment) 2015 and legislation under it; and

(xiv) Submission of the final EIA report to NEMA and subsequent follow up to obtain relevant authorization/permit in order for the project to commence.

This Study Report, therefore, details the positive and negative effects of the development on the project environment and recommends appropriate environmental and social measures to minimize any undesirable effects resulting from the project.

1.6 Terms of Reference (ToR)

The following Terms of Reference apply to the project:

(i) Screening and scoping.
(ii) Establishing the suitability of the proposed location for the proposed EAKIP
(iii) Carry out literature review.
(iv) Carry out preliminary fieldwork.
(v) Prepare the TOR for submission to NEMA for consideration and approval.
(vi) Undertake detailed fieldwork.
(vii) Carry out baseline investigations and analyses.
(viii) Hold meetings with the project proponent, other project consultants, relevant regulatory government bodies, and stakeholders.
(ix) Carry out a systematic environmental assessment at the proposed project site and the surrounding area in line with established standards and laws.
(x) Provide a description of the proposed activities throughout the entire implementation process of the project with a special focus on potential impacts to the surrounding environment and facilities.
(xi) Develop an Environmental Management Plan and cost estimates for the proposed project.
(xii) Produce an Environmental and Social Impact Assessment report that contain among other issues potential negative and positive impacts and recommendation of appropriate mitigation measures to minimize or prevent adverse impacts.

1.7 Methodology

The methodology used in the ESIA Study included the following.

- A site reconnaissance and visual survey to determine the baseline information of the project area.
- Comparative study of the project with existing land uses in the neighborhood.
- Reviewing and analysis of the project documents
- Discussion with the proponent and the other consultants
- Assessment of the site to detail the various existing and likely impacts.
- Assessment of health and safety issues
- Seeking public views through interviews and questionnaire administration
- Proposal of mitigation measures to minimize any negative impacts.
- Preparation and submission of study report to NEMA

1.7.1 Screening

Environmental screening was applied at the preliminary stage to determine whether the proposed development required an Environmental Impact Assessment. With reference to the second schedule of EMCA (1999), the proposed project was identified as among those that requires Environmental Impact Assessment so as to ensure that negative impacts from the project are mitigated as the positive ones are upheld.

1.7.2 Approaches to undertaking the ESIA

This ESIA Project Report has been prepared in accordance with the Environmental (Impact Assessment and Audit) Regulations of 2003. It is also guided by the general principles of green buildings. The study methodology also comprised the following activities:

- Desktop study;
- Field investigations and assessment.

1.7.2.1 Desktop Study

The desktop study involved:

- Initial meetings with project architects and engineers to discuss the proposed project, including activity options under consideration;
- Preparation of a checklist that consisted of a simple catalogue of environmental factors, which were compared with the activities to be performed;
- Collection and review of baseline data, maps, reports and other relevant information on the existing environmental and social conditions of the project area;
- Review of existing legislation, regulation and policies relevant to the proposed project;
- Review of proposed project engineering designs and construction inputs, including anticipated technical processes.

1.7.2.2 Field investigations

Field investigations involved:

- Site walks within the project area and the neighbouring areas that are within the zone influenced by the project;
- Taking photographs of significant aspects to assist in describing the baseline environmental and social conditions of the project area and its influence zone;
- Taking of the site coordinates and the area elevation.
- Interviews with representatives of relevant key regulatory authorities within the project area and interested and affected parties mainly within the project influence zone;
- Obtaining relevant documents from the authorities such as the County Government, and key authorities within the project influence zone.
- Filling in of the questionnaires to facilitate environmental impact data collection
- The aim of the field investigations was to verify information and data collected during the desktop study and to collect any new information that may have been important in the assessment of impacts and design of mitigation measures.

1.7.2.3 Report Preparation

The ESIA study report was prepared and compiled and a draft report discussed with the proponent. Thereafter, findings of the assessment were discussed amongst the proponent, the project lead consultant and the ESIA firm. This was necessary to appreciate the various responsibilities and modalities of implementing the proposed project. The final report was then prepared and submitted to the proponent for endorsement

1.7.2.4 Report Submission

Besides the report, the prerequisite submission forms were prepared and signed by the proponent and the firm. Copies of the report were submitted for consideration as required by law.

1.8 EAKI Design and Construction supervision consortium

The design and construction supervision consortium for EAKI is summarised in the table below:

Table 3: Design and Construction supervision consortium EAKIP

#	DESIGNATION	NAME
1.	Lead Consultant – international	Politecnica Ingegneria Architettura - Italy
2.	Team Leader – local	Britech Limited – Consulting Engineers
3.	Project architects – local	Symbion Consulting
4.	Geo-technical / Civil / Structural Engineers – local	Britech Limited & Matrix Engineering Limited
5.	Mechanical Engineers – local	Geomax Consulting Engineers
6.	Electrical Engineers – local	Geomax Consulting Engineers
7.	Land Surveyors – local	Ramani Land Services
8.	Quantity Surveyors – local	Nderitu Consultants Limited
9.	ESIA Experts – local	Envilead Limited

1.9 Potential Positive Impacts

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

(i) Address and cater for the medical and health need of the African population.
(ii) Creation of both permanent and temporary jobs in Nairobi City County, Kenya and the entire East African Community
(iii) Enhanced land use; the proposed project will put the land into a more productive use than it is now.
(iv) Generation of revenue for both the government and developers
(v) Improve EAC's competitiveness through quality higher education and research capabilities
(vi) Improved access to quality and affordable specialized tertiary education in biomedical sciences in EAC.
(vii) Improved access to timely, affordable and quality specialized biomedical services in the EAC
(viii) Improved security in the area
(ix) Increased stock of skilled professionals in biomedical sciences for the regional labor market

(x) Offer opportunities for training and capacity building
(xi) Provide adequate, functional, safe and pleasant working space for all the staff.
(xii) Reduction of poverty levels
(xiii) Save on costs for patients who travel overseas to seek for treatment; the hospital will be a centre of excellence.
(xiv) The project will lead to the development of state of the art health services at the new Hospital, upgrading its facilities to the latest International Standards.
(xv) Provision of market for building materials
(xvi) Expected economic benefits to both the County and National Governments
(xvii) Development of social amenities

1.10 Potential Negative Impacts

The following are some of the major anticipated negative impacts of the proposed project:

i) Displacement / relocation of the existing football playground
ii) Reduction of tree cover/ de-vegetation
iii) Soil Compaction
iv) Surface and ground water hydrology and water quality degradation
v) Waste generation
vi) Risk of oil spills
vii) Pollution
viii) Dust emissions
ix) Generation of exhaust emissions
x) Increased water demand
xi) Increased energy consumption
xii) Building materials and energy used
xiii) Public and Occupational accidents and hazards during construction
xiv) Ecological change; the project site is currently gazetted as a recreational site
xv) Increased runoff from new impervious areas

1.11 Public Consultations

Public consultations are critical in conducting an effective ESIA. The Kenyan ESIA Regulations of 2003 recommend that the client seeks the views of persons who may be affected by the project. Public consultations consisted of use of the Project Information Document (PID) and guided interviews.

1.12 Constraints and Limitations

The information presented in this report is by and large consistent with the data and information gathered through the various sources and approaches outlined above. However, just as in any studies, the exercise experienced a number of constraints and as a result, there could be some gaps of information in the report as the consultants could not exhaust the collection of all primary data.

The findings and issues advanced in this report reflect the general views and perceptions of some selected people and stakeholders; they may not cover the specific issues from some unique situations or some individuals affected by the project.

1.13 Estimated Project Cost

The estimated project cost is Kenya Shillings Two Billion Two Hundred Million (Kshs. 2,200,000,000).

1.14 ESIA Study Output

The output of the study will be the production of an ESIA Study report for submission to NEMA for review and subsequent issuance of an EIA license for the proposed project.

CHAPTER 2

2 BASELINE INFORMATION

2.1 Location of the East Africa Kidney Institute

The East Africa Kidney Institute (EAKI) will be located on L.R. No. 209/13978 - the Kenyatta Hospital playground which is jointly owned by the Kenyatta National Hospital, Kenya Medical Training College and University of Nairobi, the site is situated along Ngong Road adjacent to the Nairobi Area Traffic Police Headquarters. The EAKIP site is located approximately 2km from the Cental Business District of Nairobi City. The GPS Coordinates of the project site are 1°17'52.9"S and 36°48'24.5"E.

Proposed project site

Plate 1: Showing the proposed project site (Source: Google Maps)

2.1.1 Existing condition and current use of the proposed project site

The site is currently a playground (football pitch) for six (6) football teams; these are KNH Football Club, KNH Staff Football team, KMTC Football team, UoN Medical School Football team; KNH Youth Football Club; and Interdrinamorry Football Club.

Due to poor drainage, the site (football pitch) is unusable during rainy seasons as it is usually flooded. However, during dry seasons, the football pitch is very dusty as the playing surface has only a few patches of grass.

Plate 2: Showing the current condition of proposed project site during rainy seasons

2.1.2 Neighboring facilities

The site is adjacent to the Nairobi Area Traffic Police Headquarters; Nairobi Hospital borders the site on the north – western side across Ngong Road, KNH Mortuary, KMTC and UoN Medical School hostels border the site on the southern side, while KNH borders the site on the eastern side.

2.2 Physical Environment

2.2.1 Topography

The land is relatively flat; highest point is 1730.5m above sea level while the lowest point is at 1728.7 metres above the sea level.

2.2.2 Hydrology

The closest surface water body to the project site is a tributary of Ngong river, which is adjacent to the Nairobi City Mortuary approximately 700 metres from the project site.

2.2.3 Geology

The site is underlain by rocks of the upper, middle and lower Kirichwa tuff series which are characterised by thin grey, brown agglomerate sand welded tuffs.

2.2.4 Soils

The rocks in the Nairobi area mainly comprise a succession of lavas and Pyroclastics of the Cainozoic age and overlying the foundation of folded Precambrian schist's and gneisses of the Mozambique belt (Saggerson, 1991). The crystalline rocks are rarely exposed but occasionally fragments are found as agglomerates derived from former Ngong volcano.

The soil types in the general area include aerosols, ferrasols and vertisols. Aerosols are well drained, porous, low base status that is prone to surface sealing and low moisture storage. Ferrasols are strongly weathered, porous and have high moisture storage and low fertility. Vertisols (black cotton soils) on the other hand are characterized by imperfect drainage, cracking and with high organic matter.

2.2.5 Rainfall

Rainfall type is Bimodal. The average annual rainfall in Nairobi is about 900mm, but the actual amount in any one year may vary from less than 500mm to more than 1500mm. There are two rainy seasons, from mid-March to the end of May (the so-called "Long Rains"), and from mid-October to mid-December (the "Short Rains").

2.2.6 Climatic seasons

Three main seasons have been identified as follows:

- January to March is hot and dry;
- April to June is hot and wet;
- July to October is relatively warm and wet.

This is however slowly changing and has been attributed to climate change.

2.2.7 Temperature

The seasonal changes in temperature are noticeable throughout the year, with the warmest months being from January to April before the main rainy season. It also tends to warm up again in October. The coolest months are between June and August.

The maximum temperature is 30^0C, the minimum temperature is 15^0C, and the mean annual temperature of 24^0C. Mean maximum temperature is 250C and Mean minimum temperature is 13^0C

2.3 Biological Environment

2.3.1 Fauna

The site exists in an already developed neighbourhood and therefore, is devoid of any large animals but Insects and small birds were found to be present.

2.3.2 Flora

A few mature eucalyptus, pines, cypress trees, and grevillea trees grow on the edge of the football pitch (project site), a few of the trees will be cut to pave way for the proposed project.

Plate 3: Showing some of the trees growing on the proposed project site

2.3.3 Land uses

The proposed project site is zoned for recreational use. Neighbouring land uses are mixed use there being: Institutions, hospitals, office use, hotel, petrol station and other commercial uses. The project proponent is required to obtain approvals of change of use from the Nairobi City County prior commencement to construction of the proposed EAKI.

2.4 Socio-Economic Environment

2.4.1 Population and Demographics

Nairobi City County has an estimated population of 3 million people, according to the 2009 census. The area is also the capital city of Kenya and therefore very many businesses are establishing their headquarters here. However, the area does not meet the office demand for most of these businesses and international interest accrued to the area; the demand for more modern office units overstretches the annual provision of the required units. The proposed project will therefore help find solution to the increasing demands as number of businesses keeps on rising as the rest of the commercial areas in Nairobi.

2.4.2 Sewer Systems

The area has a sewer connection therefore the institutions in this area have their waste water and other sewer emissions discharged into the sewer line for treatment. Like other buildings and

institutions, the EAKI will have its sewer discharged into the Nairobi Water and Sewerage Company.

2.4.3 Existing Infrastructure

- Energy Sources:

The project environment generally enjoys good supply of electricity and the proponent of this project is expected to connect to the existing power lines after obtaining a permit from Kenya power (KP). There will be application for connection to the electricity main line of Kenya and the proponent will observe the conditions of supply of energy to the project.

- Water Sources:

The site is serviced by piped water supply connected to the Nairobi City Water and Sewerage Company (NCWSC) service line. It is expected that the project proponent will supplement water supply through use of borehole water. The proponent is required to make the various applications to WARMA so as to get the approvals for borehole drilling.

- Transport and communication: -

Roads: The project area is well served by a good road network which is tarmacked. The site will be accessed via a secondary street along Ngong road.

Communication: The area is well covered by all mobile service providers (Safaricom, Airtel and Telkom Kenya) and Telkom Kenya (Land line).

- Sanitation:

The project area has a sewer line served by the Nairobi City Water and Sewerage Company. Nairobi City has a vast waste management system. The City has a sewerage system that is used to manage the effluent from the city residences, public and private institutions, and commercial sectors. The City has numerous NEMA and NCC licensed garbage collectors whom the proponent will engage to handle the solid waste generated from the site.

- Sewerage

EAKI project area is connected to the Nairobi City Council's Sewage system. The project design has incorporated sewer pipe designs for the disposal of sewage waste. Civil engineering drawings, specifications and applications for the connection to the sewer will be submitted to City Council for approval

- Security

The facility will have a perimeter fence, private security firm be contracted to provide round the clock security for the facility and high security technology such as close circuit surveillance cameras will be put in place to enhance the security of the facility and its occupants.

- Drainage

All rainwater from the building will be harvested, treated and re-used for irrigation of the green sections of the EAKIP.

Drainage channels will be made along the road and the perimeter fence so as to re-direct the storm water to the existing road drainage.

CHAPTER 3

3 ENVIRONMENTAL POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Legal Framework

The proposed EAKI project falls under the provisions of several national laws, policy, and regulations as discussed below:

3.2 The Constitution of Kenya

Article 42 of the Constitution states that every person has the right to a clean and healthy environment, which includes the right: to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and
To have obligations relating to the environment fulfilled under Article 70.

Article 69(2) states that every person has a duty to cooperate with State organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources.

Article 70 (1) states that If a person alleges that a right to a clean and healthy environment recognized and protected under Article 42 has been, is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.

Compliance Status

- The project proponent will be required to comply fully with the above stated articles of the Constitution.

3.3 The Environmental Management and Coordination Act, 1999 and Environmental Management Coordination (Amendment) Act 2015

EMCA, 1999 is an Act of Parliament that provides for the establishment of appropriate legal and institutional framework for the management and protection of the environment was enacted into law as the Environmental Management and Co-ordination Act, 1999 and received Presidential assent on 6th January 2000.

The Environmental Management and Co-ordination (Amendment) Act, 2015 is an Act of Parliament to amend the Environmental Management and Co-ordination Act, 1999, the Act received Presidential assent on 27th May 2015 and commenced on 17th June 2015.

Section 3 subsection 1 of the Act states that every person in Kenya is entitled to a clean and healthy environment in accordance with the Constitution and relevant laws and person.

Sections 3 subsection 2(A) of the Acts, state that every person shall cooperate with state organs to protect and conserve the environment and to ensure the ecological sustainable development and use of natural resources.

Among several other institutions, the Co-ordination (Amendment) Act, 2015 make provision for the establishment of the National Environment Management Authority (NEMA) which has the statutory mandate to supervise and co-ordinate all environmental activities in Kenya. NEMA is ultimately responsible for coordinating the EIA process and issuing, varying or cancelling Environmental Impact Assessment licenses.

Section 3 of the Act outlines the functions of the Cabinet Secretary as follows:

a) be responsible for policy formulation and directions for purposes of this Act;
b) set national goals and objectives and determine policies and priorities for the protection of the environment;
c) promote co-operation among public departments, local authorities, private sector, Non-Governmental Organisations and such other organizations engaged in environmental protection programmes;
d) provide evidence of public participation in the formulation of the policy and the environmental action plan; and
e) perform such other functions as are assigned under this Act.

Section 24 of this Act establishes the National Environment Trust Fund whose object shall be to facilitate research intended to further the requirements of environmental management, capacity building, environmental awards, environmental publications, scholarships and grants.

The National Environment Restoration Fund is also established, under Section 25 of this Act, as a supplementary insurance for the mitigation of environmental degradation where the perpetrator is not identifiable or where exceptional circumstances require the Authority to intervene towards the control or mitigation of environmental degradation.

Section 29 subsection 1 of the Act, gives County Governors power to constitute County Environment Committees.

Section 30 of the Act outlines the functions of the County Environment Committee, which are: (a) responsible for the proper management of the environment within the county for which it is appointed; (b) develop a county strategic environmental action plan every five years; and (c) perform such additional functions as are prescribed by the Act or as may, from to time, be assigned by the Governor by notice in the Gazette.

Section 31 of the Act also establishes the National Environmental Department whose functions include:

a) to investigate—
    i. any allegations or complaints against any person or against the Authority in relation to the condition of the environment in Kenya;
    ii. 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 Council;

b) to prepare and submit to the Council, periodic reports of its activities which report shall form part of the annual report on the state of the environment under section 9(3);
c) undertake public interest litigation on behalf of the citizens in environmental matters; and
d) to perform such other functions and exercise such powers as may be assigned to it by the Council.

Section 58 subsection 2 of the Act directs proponents of any project specified in the Second Schedule to undertake a full Environmental Impact Assessment Study and submit an Environmental Impact Assessment Study Report to the Authority prior to being issued with any licence by the Authority, the Authority may direct that the proponent forego the submission of the environmental impact assessment study report in certain cases.

As a tool for better planning, EIA is undertaken to trigger informed prediction of likely environmental impacts of proposed projects, check compliance with environmental policies and legislative environmental requirements in order to allow for consideration of mitigation measures, check risks and expose them for correction. It provides information for regular monitoring in an elaborate environmental management plan, ensuring that environmental management is optimized at all stages of development through best practice. Policies and laws that relate to EIA aim at promoting sound environmental management.

Several Regulations have been formulated to operationalize EMCA, those regulations which have a direct bearing to the proposed project include:

3.3.1 Environmental Impact Assessment and Audit Regulations 2003 (Legal Notice No. 101)

The regulations govern Environmental Impact Assessment (EIA) studies in Kenya.

Regulation 7 (3) states that a project report shall be prepared by an environmental impact assessment expert registered as such under these Regulations.

Regulation 11 (1) states that an environmental impact assessment study shall be conducted in accordance with terms of reference developed during the scoping exercise by the proponent and approved by the Authority.

Regulation 13 (2) states that every environmental impact assessment study shall be carried out by a lead expert qualified in accordance with the criteria of listing of experts specified in the Fourth Schedule to these Regulations.

Regulation 24 on EIA licensing states that environmental Impact License shall be issued after the authority approves the study report under regulations 23.

Regulation 31 (1) gives categories of development activities likely to have adverse environmental impacts for which an environmental audit study must be carried out, these are: (a) ongoing projects commenced prior to the coming into force of these regulations; or (b) new projects undertaken after completion of an environmental impact assessment study report.

Compliance Status

- This esia study report is a critical step in complying with the Regulations.

3.3.2 Environmental Management and Coordination (Water Quality) Regulations, 2006

These regulations apply to drinking water, water used for industrial purposes, agriculture purposes, fisheries and wildlife and water used for any other purpose. The objective of the water quality regulations is to prevent water pollution by prescribing threshold levels of various elements that are permissible in effluent water. Provides the permissible limits for wastewater discharge to environment i.e. water body, sewer and land. It is thus the benchmark for adoption of wastewater treatment technologies and best practice to avoid water pollution.

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 these Regulations.

Regulation 4 (2) states that no person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution.

Regulation 5 gives standards for all sources of water for domestic uses – the standards are set out in the First Schedule to the Regulations.

Regulation 6 (b) outlaws abstraction of ground water or carrying out of any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of the water, without an environmental impact assessment licence issued in accordance with the provisions of EMCA 2015.

Regulation 6 (c) outlaws cultivation or undertaking of any development activity within full width of a river or stream to a minimum of six metres and a maximum of thirty metres on either side based on the highest recorded flood level.

Compliance Status

- The project proponent will comply with the Regulations.

3.3.3 The Environmental Management and Co-Ordination (Water Quality) (Amendment) Regulations, 2012

The Regulations amends the Environmental Management and Co-ordination (Water Quality) Regulations, 2006 by deleting the Eleventh Schedule and substituting it with a new Schedule.
These regulations apply to water used for a variety of purposes, including water used for domestic purposes, industrial, purposes, agricultural purposes etc. They protect lakes, rivers, streams, springs, wells and other water sources whereby contravening the regulations is an offence that attracts a fine not exceeding five hundred thousand shillings.
Of immediate relevance to the proposed project is Part II Sections 4-6 as well as Part V Section 24.

- Part II Section 4 inhibits acts which directly or indirectly, immediate or subsequently cause water pollution.

- Part II section 6 criminalize discharge of water from sewage treatment works, industry or other point sources into the aquatic environment without a valid effluent discharge license.
- Part V Section 24 prohibits discharge or application of any poison, toxic, noxious or obstructing matter, radioactive wastes, or other pollutants, into water meant for fisheries, wildlife, recreational purposes or any other uses.

Compliance Status

- The proponent is proposing to install a waste water treatment plant for treatment of some of the waste water to be used for irrigation purposes.
- Most of the waste water shall therefore be channelled into the sewer line to avoid ground and surface water pollution, and if a pollution incidence occurs the contractor/proponent shall notify the authority immediately.
- The contractor/proponent will handle hazardous substances in a manner that is not likely to cause water pollution.
- The project proponent will be fully comply with the Regulations.

3.3.4 Environmental Management and Coordination (Waste Management) Regulations, 2006

This subsidiary legislation creates rules to govern the handling, transportation, treatment and disposal of various wastes. It defines wastes broadly into industrial, biomedical, hazardous and toxic and stipulates the various ways of handling these waste streams.

Regulation 4 (1) demands that no person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle.

Regulation 4 (2) states that a waste generator shall collect, segregate and dispose such waste in the manner provided for under these Regulations.

Regulation 5(1) states that a waste generator shall minimize the waste.

Regulation 6 requires waste generator to segregate waste by separating hazardous waste from non-hazardous waste and to dispose of such wastes in such facility as shall be provided by the relevant local authority.

Regulations 10 (1) states that any person granted a license under the EMCA, 2015 and any other licence that may be required by the relevant Local Authority to operate a waste disposal site or plant, shall comply with all conditions imposed by the Authority to ensure that such waste disposal site or plant operates in an environmentally sound manner.

Regulations 10 (4) states that a licence to operate a waste disposal site or plant shall be valid for a period of one year from the date of issue and may be renewed for a further period of one year on such terms and conditions as the Authority may deem necessary or impose for purposes of ensuring public health and sound environmental management.

Regulations 10 (5) states that in issuing a waste disposal licence, the Authority shall clearly indicate the disposal operation permitted and identified for the particular waste.

Regulation 11 states that any operator of a disposal site or plant shall apply the relevant provisions on waste treatment under the Local Government Act (County Government Act) and Regulations to ensure that such waste does not present any imminent and substantial danger to the public health, the environment and natural resources.

Regulation 12 states that every licensed owner or operator of a waste disposal site or plant shall carry out an annual environmental audit pursuant to the provisions of EMCA 2015.

Regulation 14(1) demands that every trade or industrial undertaking shall install at its premises anti-pollution equipment for the treatment of waste emanating from such trade or industrial undertaking

Regulation 14(2) states that Anti-pollution equipment installed pursuant to paragraph (1), shall be determined by the best practicable means, environmentally sound practice or other guidelines as NEMA may determine.

Regulation 15 states that no industry shall discharge or dispose of any waste in any state into the environment, unless the waste has been treated in a treatment facility in a manner prescribed by the NEMA in consultation with the relevant lead agency.

The third schedule of the Regulations gives standards for treatment and disposal of wastes. It classifies incinerators in three broad classes: Class 1: Industrial plants burning waste as an additional / alternative fuel; Class 2(A) Commercial Incinerators for the disposal of waste that contains hazardous, potential hazardous and bio-medical waste where the operator exceeds 100 Kg/day; Class 2B: Small Scale Incinerators for Private Use
Incinerators for the disposal of hazardous, potential hazardous and bio-medical waste where the operator does not exceed 100 kg/ day and Class 3: General waste Incinerators – these are for general waste that is non toxic, non hazardous, non medical or does not contain organic halogens, such as selected customs, police, contraband goods, offices waste, commercial waste and industrial wastes) where the operator does not exceed 1 ton/ day.

Compliance Status

- The project proponent has plans to set aside resources for solid waste management.

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

Regulation 3(1) states that except as otherwise provided in these Regulations, no person shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

Regulation 4 (1) states that except as otherwise provided in these Regulations, no person shall-

make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source; Regulation 4(2) states that any person who contravenes the provisions of this Regulation commits an offence.

Regulation 15 states that any person intending to carry out construction, demolition, mining or quarrying work shall carry out an EIA study, during the Environmental Impact Assessment study the following will be investigated:

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

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

Compliance Status

The proponent will be required to comply fully with the Regulations.

3.3.6 The Environmental Management and Co-ordination (Controlled Substances) Regulations, 2007

The regulations regulate the importation and use of Ozone Depleting Substances.

Regulations No. 3 gives a classification of Controlled Substances.

Compliance Status

The proponent will comply fully with the Regulations by not using Ozone Depleting Substances

3.3.7 The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shore and Sea Shore management) Regulations, 2009

Section 14 of the regulations states: Duty of land owners users and occupiers. (1) Every owner, occupier or user of land which is adjacent or contiguous to a wetland shall, with advice from the Authority, have a duty to prevent the degradation or destruction of the wetland, and shall maintain the ecological and other functions of the wetland.

Compliance Status

The proposed project is not neighbouring any wetlands. However, the proponent will be required to comply fully with the Regulations.

3.4 The Environment and Land Court Act, 2011

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

The act states that it's an offence for any person who refuses, fails or neglects to obey an order or direction of the Court given under this Act, commits an offence, and shall, on conviction, be liable to a fine not exceeding twenty million shillings or to imprisonment for a term not exceeding two years, or to both.

Transitional provisions

(1) All proceedings relating to the environment or to the use and occupation and title to land pending before any Court or local tribunal of competent jurisdiction shall continue to be heard and determined by the same court until the Environment and Land Court established under this Act comes into operation or as may be directed by the Chief Justice or the Chief Registrar.

(2) The Chief Justice may, after the Court is established, refer part-heard cases, where appropriate, to the Court.

The Act repeals The Land Disputes Tribunal Act (No.18 of 1990).

Part III of the Act highlights the Jurisdiction of the Court as follows:

1. The Court shall have original and appellate jurisdiction to hear and determine all disputes in accordance with Article 162(2)(b) of the Constitution and with the provisions of this Act or any other law applicable in Kenya relating to environment and land.
2. In exercise of its jurisdiction under Article 162(2)(b) of the Constitution, the Court shall have power to hear and determine disputes—
   a) relating to environmental planning and protection, climate issues, land use planning, title, tenure, boundaries, rates, rents, valuations, mining, minerals and other natural resources;
   b) relating to compulsory acquisition of land;
   c) relating to land administration and management;
   d) relating to public, private and community land and contracts, choses in action or other instruments granting any enforceable interests in land; and
   e) any other dispute relating to environment and land.

Compliance Status

The project proponent abide to all the provisions of this Act

3.5 The Energy Act, 2016

An Act of Parliament to amend and consolidate the law relating to energy, to provide for the establishment, powers and functions of the Energy Regulatory Commission and the Rural Electrification Authority, and for connected purposes. The Energy Act, 2006 is the primary legislation in Kenya that contains provisions for the management of the energy sector.

Section 4 (1) establishes the Energy Regulatory Commission (ERC).

Section 27 (1) (a & b) require that a license or licenses as the case may be, shall be required for the generation, importation or exportation, transmission or distribution of electrical energy; and supply of electrical energy to consumers.

Section 90 of the Act requires a Proponent to seek permission to construct an energy sector related project from the ERC.

Section 98 of the Act requires the Proponent to comply with SHE standards set by the ERC.

Sections 102(h) (m) (v) empowers the Minister responsible for Energy to promulgate regulations for the environmentally sound management of energy sector related facilities and infrastructure.

Part V, Section 103 on Promotion of Renewable Energy and Energy Conservation empowers the Minister to promote development and use of renewable energy technologies.

A number of policy documents have been formulated under this Act, these include:

- Energy (Solar Water Heating) Regulations 2012- Legal Notice 43 of 2012
- Energy Management Regulations 2012- Legal Notice no 102 of 2012

Compliance Status

1. EAKI comply with Legal Notices 43 & 102 to ensure conformity with the Energy Act provisions.
2. EAKI will be required to address provisions raised in the Energy (solar water heating) regulations 2012.

3.6 The Water Act No. 43 of 2016

The legislation provides for the management of water resources at national and county level. Article 40(4) provides and application for a permit to which shall be subject to public consultation and, where applicable EIA in accordance with the requirements of the EMCA. 108(1) sewage & effluent management to avoid environmental pollution.

Compliance Status

- A permit will be required from WRMA for any water borehole construction works and an abstraction licence
- The proponent will comply fully with the Act.

3.7 Public Health Act

The act makes it the duty of every local authority (in the capacity of "health" authority) to take all lawful, necessary and reasonably practicable measures to safeguard and promote public health (s.13). Part IX of the act deals with sanitation and housing, and is of most significance for the control of polluting discharges. S.116 imposes a duty on every local authority to maintain its district in a clean and sanitary condition, to prevent nuisances and prosecute those responsible for nuisances. Nuisances include drains and sewers for the discharge of pollutants into watercourses and lakes. The Public Health (Drainage and Latrine) Rules made under s.126 of the Act, makes more specific provision for drainage. The Rules –

Require the drainage of new buildings;

- Prohibit the drainage of surface water into foul water sewers;
- Prohibit the discharge into sewers of matter which may interface with the free flow of the sewage or injure the sewer;
- Empower the local authority to prohibit the discharge of injurious matter into sewers;
- Impose a requirement for permits to be obtained from the local authority before the making of sewer connections or the construction of sewage treatment works.

Compliance Status

The proponent will comply fully with the Act.

3.8 The County Government Act 2012

A County Government shall be responsible for:

- county legislation in accordance with Article 185 of the Constitution;
- exercising executive functions in accordance with Article 183 of the Constitution;
- functions provided for in Article 186 and assigned in the Fourth Schedule of the
- any other function that may be transferred to county governments from the national government under Article 187 of the Constitution;
- any functions agreed upon with other county governments under Article 189 (2) of the Constitution; and
- establishment and staffing of its public service as contemplated under Article 235 of the Constitution.

Part 2 of the 4th Schedule of the Constitution of Kenya has spelt out the functions of county governments as follows:

i. Agriculture, including: crop and animal husbandry; livestock sale yards; county abattoirs; plant and animal disease control; and fisheries.
ii. County health services, including, in particular: county health facilities and pharmacies; ambulance services; promotion of primary health care; licensing and control of undertakings that sell food to the public; veterinary services (excluding regulation of the

profession); cemeteries, funeral parlours and crematoria; and refuse removal, refuse dumps and solid waste disposal.

iii. Control of air pollution, noise pollution, other public nuisances and outdoor advertising
iv. Cultural activities, public entertainment and public amenities, betting, casinos and other forms of gambling; racing; liquor licensing; cinemas; video shows and hiring; libraries; museums; sports and cultural activities and facilities; and county parks, beaches and recreation facilities
v. County transport, including county roads; street lighting; traffic and parking; public road transport; and ferries and harbours, excluding the regulation of international and national shipping and matters related thereto.
vi. Animal control and welfare, including licensing of dogs; and facilities for the accommodation, care and burial of animals
vii. Trade development and regulation, including markets; trade licenses (excluding regulation of professions); fair trading practices; local tourism; and cooperative societies.
viii. County planning and development, including statistics; land survey and mapping; boundaries and fencing; housing; and electricity and gas reticulation and energy regulation
ix. Pre-primary education, village polytechnics, home craft centres and childcare facilities.
x. Implementation of specific national government policies on natural resources and environmental conservation, including soil and water conservation; and forestry
xi. County public works and services, including storm water management systems in built-up areas; and water and sanitation services.
xii. Fire fighting services and disaster management
xiii. Control of drugs and pornography

Compliance Status

The proponent will comply fully with the Act.

3.9 The Occupational Safety and Health Act, 2007

This act was signed into law in October 2007 to repeal and replace the Factories and Other Places of Work Act Cap 514. It came into force on December 20, 2007. The Act makes provision for safety and health of workers in all workplaces in Kenya. All rules made under the previous Act (the Factories and Other Places of Work Act) remain in force under the new Act.

The Act requires developers to notify the Director of Occupational Health and Safety of their intended development before commencement. The act also sets minimum standards that are to be maintained in such workplaces to safeguard health, safety and welfare of workers. These are all aimed at elimination of hazards from workplaces. The act further requires all workplaces to display the abstract of the act for all workers to read and remind themselves on how to protect themselves from hazards.

The Act also makes it mandatory for occupiers or employers to provide personal protective equipment and all practicable means to prevent injury to health of workers who are exposed to any potentially harmful substances or conditions.

Section 9(1) demands that every occupier shall establish a safety and health committee at the workplace in accordance with regulations prescribed by the Minister if:
There are twenty or more persons employed at the workplace; or
The Director directs the establishment of such a committee at any other workplace.

The Act further requires all workplaces to have stocked first aid boxes under the charge of trained first aid attendants. The Factories (Building Operations and Works of Engineering Construction) Rules of 1984 are more specific on standards and requirements for the construction works.

The said Act requires that before any premises are occupied or used a certificate of registration should be obtained from the chief inspector. The occupier must keep a general register with provision for health, safety and welfare of workers on site. For safety fencing of the premise and dangerous parts must be done. There should be provision for clean and sanitary working conditions. More so there must be also provision of wholesome drinking water.

The act requires proponents to keep a general register at the workplace to record accidents or occupational diseases.

Part VI of the Act gives the requirements for occupational health provisions which include cleanliness, ventilation, overcrowding, etc. This part of the Act will apply to energy sector projects during the operational phase.
Part VIII of the Act contains provisions for general safety of a workplace especially fire safety.
Part XI of the Act contains Special Provisions on the management of health, safety and welfare. These include work permit systems, PPE requirements and medical surveillance.
Part XIII of the Act stipulates the fines and penalties associated with non-compliance of the Act.

The Regulations / Subsidiary legislation under OSHA are:

- Fire Risk Reduction Rules, 2007 (Legal Notice No. 59)

These rules were promulgated by the Minister for Labour on April 16th 2007 and apply to all workplaces.

Rule 5 requires Proponents to ensure that fire resistant materials are used for construction of new projects.

Rule 6 requires that all flammable materials be stored in appropriately designed receptacles.

Rule 17 requires a Proponent to clearly delineate fire escape exits. The regulation provides for the minimum standards to be applied in marking out all fire escape exits.

Rules 20 – 23 requires a Proponent to have trained firefighting teams within their premises.

Compliance Status

The proponent will comply fully with the Regulations.

Medical Examination Rules 2005 (Legal Notice No. 24)

These rules provide for Occupiers to mandatorily undertake pre-employment, periodic and termination medical evaluations of workers whose occupations are stipulated in the Second Schedule of the Act and the First Schedule of the Regulation. The workers are to undergo medical evaluations by a designated health practitioner (DHP) duly registered by the DOSHS.

Compliance Status

The proponent will comply fully with the Regulations.

The Safety and Health Committee Rules 2004 (Legal Notice No. 31)

Require that an Occupier to have a workplace Safety and Health (S&H) Committee if there are a minimum of 20 persons employed in the work place, alternatively, for a workplace of less than 20 staff, a workplace Safety and Health representative should be nominated.

Compliance Status

The proponent will comply fully with the Act.

Noise Prevention and Control Rules 2005 (Legal Notice No.25)

These rules were promulgated for work related noise exposures on March 10th 2005 and apply to workplaces in Kenya.
The regulation sets the permissible level for noise in any workplace as follows:

- 90 dB(A) over an 8-hour TWA period over 24-hours; and
- 140 dB (A) peak sound level at any given time.

Also, the regulation sets community noise levels emanating from a workplace as follows:

- 50 dB(A) during the day; and
- 45 dB (A) at night.

Compliance Status

The proponent will comply fully with the Regulations.

Hazardous Substances Rules, 2007(Legal Notice No. 60)

The Rules state that the Proponent shall ensure that where chemicals come into contact with employees, the exposure limits set out in the First Schedule of the Regulations are not exceeded.

Where employees may be exposed to two or more chemicals in the workplace the Proponent shall work out the combined exposure using the narrative given in the Second Schedule of the Regulations.

Compliance Status

The proponent will comply fully with the Regulations.

3.10 The Physical Planning Act, 1996

Section 24 of the Physical Planning Act gives provision for the development of local physical development plans for guiding and co-coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council, and for specific control of the use and development of land.

Section 29 of the Physical Planning Act gives councils power to prohibit and control the use of land, building, and subdivision of land, in the interest of proper and orderly development of its area. The same section also allows them to approve all development applications and grant development permissions as well as to ensure the proper execution and implications of approved Physical Development Plans.

Section 30 states that any person who carries out development within an area of a local authority without development permission shall be guilty of an offence and the development shall be invalid. The act also gives the local authority power to compel the developer to restore the land on which such development has taken place to its original condition within a period of ninety days. If no action is taken, then the council will restore the land and recover the cost incurred thereto from the developer. At the same time, sub-section 5, re-enforce it further that, no licensing authority shall grant under any written law, a license for commercial use for which no development permission had been granted by the respective local authority.

Section 36 states that if in connection with development application a local authority is of the opinion that, the proposed activity will have injurious impact on the environment, the applicant shall be required to submit together with the application, an Environmental Impact Assessment report. The environmental impact assessment report must be approved by the National Environmental Management Authority (NEMA) and followed by annual environmental audits as spelled out by EMCA 1999.

Section 38 states that if the local authority finds out that the development activity is not complying to all laid down regulations, the local authority may serve an enforcement notice specifying the conditions of the development permissions alleged to have been contravened and compel the developer to restore the land to its original conditions.

Compliance Status

- To build the EAKI facilities, the proponent will need to apply for change of user from the Nairobi City County since the site is currently demarcated as recreational ground

- The proponent will be required to comply fully with the Act.

3.11 Acts Related To Land

3.11.1 The Land Planning Act (Cap 303)

Section 9 of the subsidiary legislation (the development and use of land Regulations 1961) under which it require that before the local Authority to submit any plans to then minister for approval, steps should be taken as may be necessary to acquire the owners of any land affected by such plans. Particulars of comments and objections made by the landowners should be submitted, which intends to reduce conflict of interest with other socio economic activities.

3.11.2 Land Titles Act, Cap 282

This Act makes provision for the removal of doubts that have arisen in regard to titles to land and to establish a Land Registration Court. Specific provisions include guidelines on adjudication of claims, and registration of documents after certificate of ownership is granted.

The above Act is also accompanied by subsidiary legislation, that is:

The Land Titles Rules;
The Land Titles (Fees; Custody of Documents) Rules;
The Land Titles (Fees; Land Registration Court) Rules;
The Land Titles (Survey Fees) Rules; and
The Land Titles (Registration Fees) Rules, 1994.

3.11.3 Registration of Titles Act, Cap 281

This Act provides for the transfer of land by registration of titles. Parts within the Act elaborate on mechanisms of bringing lands under the Act, grants, transfers and transmissions of land, registration of titles, and mode and effect of registration, transfers, leases, charges, powers of Attorney, and rectification of titles, among others.

3.11.4 Registered Land Act, Cap 300

The above Act makes further and better provides for the registration of title to land, and provides for the regulation of dealings in land so registered, and for purposes connected therewith.

The Act further elaborates on the organization and administration of the Act, the effect of registration, title deeds, certificates of lease and searches, instruments and agents, transmissions and trusts, restraints on disposition, rectification and indemnity, and decisions of registrars and appeals.

Compliance Status

- The proponent will be required to comply fully with these Acts

3.12 The Penal Code CAP 63

Chapter XVII on "Nuisances and offences against health and convenience" contained in the penal code strictly prohibits the release of foul air into the environment which affects the health of the persons. It states "Any person who voluntarily vitiates the atmosphere in any place so as to make it noxious to the health of persons in general dwelling or carrying on business in the neighbourhood or passing along a public way is guilty of a misdemeanour"
Waste disposal and other project related activities shall be carried out in such a manner as to conform to the provisions of the code. It is the responsibility of the contracted licensed waste handler to ensure that all kinds of wastes are disposed appropriately as per the legal provisions. Quite apart from fear of health hazards, the general public is very sensitive about the visual impact of anatomical waste. In no circumstances is it acceptable to dispose of anatomical waste inappropriately, such as on a landfill or together with other bio medical solid wastes.

Compliance Status

- The proponent will comply fully with the Act.

3.13 The Workmen's Injury and Benefits Act, 2007

This Act provides for compensation to employees for work-related injuries and diseases contracted in the course of their employment and for connected purposes. Key sections of the Act include the obligations of employers; right to compensation; reporting of accidents; compensation; occupational diseases; medical aid; appeals; and miscellaneous provisions. Schedules provided in the Act outline the degree of disablement; occupational diseases; and dependant's compensation. In case of any accidents or incidents during the project cycle, this Act will guide the course of action to be taken.

Compliance Status

- The proponent will comply fully with the Act.

3.14 The Employment Act, 2007

This Act declares and defines the fundamental rights of employees; minimum terms and conditions of employment; to provide basic conditions of employment of employees; and to regulate the employment of children, among other rights. Key sections of the Act elaborate on the employment relationship; protection of wages; rights and duties in employment; termination and dismissal and protection of children, among others. This Act will guide the management of workers, especially during the construction period. The act declares that: Priority will be given to local community in terms of employment opportunities.

Compliance Status

- The proponent will comply fully with the Act.

3.15 Radiation Protection Act, Cap 243

The Radiation Protection Act, Chapter 243, aims to control the import, export, possession and use of radioactive substances and irradiating apparatus. Under this Act in section 9, a license is

required to handle any radioactive substances or irradiating apparatus from the National Radiation Protection Board. Handling here includes the method of disposing of radioactive waste products, transportation of radioactive materials, storage, use and maximum working hours that employees are expected to work with radioactive materials. Under this Act also, institutions generating this category of waste shall be expected to apply for a license from the same board.

Compliance Status

- The provisions of this act will guide the proponent on the use of radiation and its control.
- The proponent will comply fully with the Act.

3.16 The Traffic Act, Cap 203

This Act consolidates the law relating to traffic on roads. Key sections include registration and licensing of vehicles; driving licenses; driving and other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers of vehicles other than motor vehicles and other road users; and miscellaneous provisions as to roads, among others.

Compliance Status

Vehicles will be used to transport humans and equipment during the entire project life, and their registration and licensing will be required to follow the above Act.

3.17 The Standards Act Cap 496

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

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

Compliance Status

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

3.18 The Civil Aviation Act, 2013

An Act of Parliament to repeal the Civil Aviation Act, to provide for the control, regulation and orderly development of civil aviation in Kenya; and for connected purposes.

Section 4(1) there is established an authority to be known as the Kenya Civil Aviation Authority.

Section 6 outlines the objectives of the KCAA, which are: to economically and efficiently plan, develop and manage civil aviation, regulate and operate a safe civil aviation system in Kenya in accordance with the provisions of this Act.

Section 7 states the functions of the KCAA, which are:

Section 7(1), KCAA shall be responsible for:

a) the licensing of air services;
b) the provision of air navigation services;
c) the establishment and maintenance of a system for the registration and the marking of civil aircraft;
d) securing sound development of the civil aviation industry in Kenya;
e) advising the Government on matters concerning civil aviation;
f) the co-ordination and direction of search and rescue services;
g) the facilitation and provision of all the necessary support for the aircraft accident and incident investigations conducted by the chief investigator;
h) carrying out investigations on incidents that are not classified as accidents and serious incidents;
i) the safety, security, economic and technical regulation of civil aviation;
j) dealing with incidents of unlawful interference with aviation security;
k) the establishment, co-ordination and maintenance of State Safety Security Programmes;
l) the certification of aircraft operators;
m) enforcement of approved technical standards of aircraft;
n) the licensing and monitoring of aeronautical personnel;
o) the provision of technical services for the design, installation, and modification of electronic, radio and other equipment used in the provision of air navigation services;
p) ensuring the integrity of the systems, equipment and facilities of the Authority;
q) the issuance and dissemination of the publications referred to in this Act;
r) the production of accurate, timely comprehensive and relevant air transport information for planning and decision making purposes;
s) the approval, certification and licensing of aircraft maintenance organisations and regulation of aviation training institutions in Kenya;
t) the establishment, management and operation of training institutions for the purposes of the Authority;
u) the registration of rights and interests in aircraft;
v) the planning, development and formulation of the airspace master plan for the safe and efficient utilization of Kenyan airspace;
w) the establishment, co-ordination and maintenance of state aviation safety and security programmes;
x) licensing and certification of aerodromes, regulated agents and air navigation service providers;
y) performing economic oversight of air services, protecting consumer rights, environment and ensuring fair trading practices;
z) giving effect to the Chicago Convention and other international agreements relating to civil aviation to which Kenya is party to; and
aa) the performance of such other functions as may, from time to time, be conferred on it by the Cabinet Secretary or by any other written law.

Compliance Status

- The EAKIP site is adjacent to the KNH Heliport (helicopter landing area), accordingly, the Proponent need get an authorization / approval from the Kenya Civil Aviation Authority.

3.19 National Construction Authority Act

An Act of Parliament to provide for the establishment, powers and functions of the National Construction Authority and for connected purposes

Section 5 spells out the functions of the authority in respect to oversight & coordination of the development of the construction industry by:

(a) promote and stimulate the development, improvement and expansion of the construction industry;
(b) advise and make recommendations to the Minister on matters affecting or connected with the construction industry;
(c) undertake or commission research into any matter relating to the construction industry;
(d) prescribe the qualifications or other attributes required for registration as a contractor under this Act;
(e) assist in the exportation of construction services connected to the construction industry;
(f) provide consultancy and advisory services with respect to the construction industry;
(g) promote and ensure quality assurance in the construction industry;
(h) encourage the standardisation and improvement of construction techniques and materials;
(i) initiate and maintain a construction industry information system;
(j) provide, promote, review and co-ordinate training programmes organized by public and private accredited training centers for skilled construction workers and construction site supervisors;
(k) accredit and register contractors and regulate their professional undertakings;
(l) accredit and certify skilled construction workers and construction site supervisors;
(m) develop and publish a code of conduct for the construction industry; and
(n) do all other things that may be necessary for the better carrying out of its functions under the Act.

Section 15 of the Act demands registration of contractors with NCA

(1) A person shall not carry on the business of a contractor unless the person is registered by the Board under this Act.
(2) A person seeking registration under subsection (1) shall, in the case of a firm, be eligible for registration if at least one of the partners or directors of the firm possesses such technical qualifications, skills or experience as the Board may from time to time prescribe.
(3) Any person who contravenes subsection (1) commits an offence and shall be liable on conviction to a fine not exceeding one million shillings, or to imprisonment for a term not exceeding three years or to both, and in the case of a continuing offence, to a fine not exceeding one hundred thousand shillings for every day or part thereof during which the offence continues.

Section 17 of the Act outlines the process of application for registration of contractors
(1) A person or firm may apply to the Board for registration as a contractor for purposes of this Act.

Section 18 of the Act outlines the process of registration of foreign contractors
(1) The Board may accredit a firm incorporated outside Kenya to carry out construction works in Kenya for a prescribed period where the firm meets the conditions prescribed by the Board and satisfies the Board that the firm—
(a) intends to be present in Kenya only for the purpose of carrying out the specific works for which it has been contracted, for which, the sum payable is not less than the sum prescribed by the Board for the class of works in respect of which registration is sought;
(b) has a certificate of compliance from the Registrar of Companies showing that it is, or immediately prior to entering Kenya, was, trading as a contractor in the capacity which satisfies the Board with respect to its suitability to serve the public as a qualified contractor; and
(c) has lodged an affidavit with the Board to the effect that, once the contracted works are completed and the period of defects liability or maintenance has elapsed, it shall wind up business and shall not engage itself in the construction business within Kenya.

Compliance Status

- The proponent will comply with the Act by ensuring that the site and project contractors are registered and certified by NCA.

3.20 Policy statements relevant to the project

Introduction

Kenya has instituted macro-economic policies that address various issues pertaining to, economic growth, population, gender, education, environment, water, sanitation, poverty alleviation and security. Among the important government documents that discuss these issues are:

3.20.1 Health Care Waste Management Strategic Plan 2015-2020

The National Health Care Waste Management Plan of Action is a document intended for use by health managers and programme officers across the health sector (including those in the private health sector). The purpose of developing this plan was to provide a tool that gives health managers guidance in planning, implementing and monitoring the activities of health care waste management in health facilities.
This plan describes the situation of health care waste management on the basis of a survey which was conducted in order to document the situation of waste management in Kenya. A holistic approach has been recommended to include, clear delineation of responsibilities, occupational health and safety programmes, waste minimization and segregation. This document is designed to provide viable options to address the challenges encountered in planning for health care waste management in Kenya.

3.20.2 National Infection Prevention and Control Guidelines for Health Care Services in Kenya, 2010

These guidelines were formulated by the Ministry of Medical Services and Ministry of Public Health and Sanitation to provide comprehensive and standardized information regarding the prevention and control of transmissible infections.
These guidelines are intended to act as a central reference for all health care facilities and healthcare workers.
Additionally, these guidelines are intended to provide administrators and Health Care Workers with the necessary information and procedures to implement Infection Prevention Control (IPC) core activities effectively within their work environment in order to protect themselves and others from the transmission of infections. They provide information on the following topics:

- The infrastructure, equipment, and supplies that are necessary to implement standard and
- additional (transmission-based) precautions for IPC
- Procedures for cleaning, disinfecting, and reprocessing reusable equipment
- Managing health care waste
- Protecting health care workers from transmissible infections
- IPC practices in special situations

3.20.3 Sessional Paper No. 1 of 1992 on Development and Employment in Kenya

This paper observes that employment and development issues should not be handled in isolation. Emphasis is thus placed on the need for mutual trust and co-operation between the private and public sectors and the need for creating a favorable environment for both local and foreign proponents. It further notes that decisions to save or invest by private sector can be significantly affected by the government policies. As well, the Government acknowledges that implementation of programmes such as this one, which raise the productivity in rural areas need to be accelerated.

3.20.4 Sessional Paper No. 2 of 1985 on Unemployment.

This Sessional paper is a response by the Kenya Government to the 1982/1983 report of the Presidential Committee on Unemployment. The Committee was appointed to investigate the problem of unemployment and to recommend both short and long term strategies for its alleviation. Specifically, the committee was required to:

- Consider and recommend measures which would disperse employment opportunities to the areas of greatest need,
- Promote labour- intensive methods of production, reduce the growth of the labour force and its migration to urban areas, and improve the relevance of technical training and education with a view to alleviating the school-leaver problem,
- Initiate and expand programmes with a high employment content and at a low cost, and
- Suggest measures, which would enhance the contribution of the public and private sector institutions to trigger employment creation.

The report identifies several major factors, which account for the unemployment situation in Kenya and these include population growth, slow economic growth, job selectivity, seasonal employment, technology and rural-urban imbalance.

3.20.5 National Development Plans and Vision 2030

The Government of Kenya is committed to the restoration of economic performance that will lead to sustainable long-term growth consistent with national development objectives. Two of these objectives are to reduce the current poverty levels by half by the year 2015 and to achieve a 'Newly Industrialized Country' (NIC) status by the year 2030 by promoting more private sector investments initiative.

The macroeconomic framework recognizes the challenges currently facing the country, and that there is thus an urgent need to:

- Revamp growth,
- Raise productivity;
- Encourage private sector investment, alleviate unemployment, and
- Reduce poverty drastically.

According to the National Development Plan (2002 – 2008), targets increased production by all sectors of the economy and advocates for Private Sector Initiatives (PSI) so as to achieve local self-sufficiency and export. When all these are supported and done in an organized and environmentally friendly way, then illegal practices such as vandalism of infrastructural facilities, say water and power supplies will cease.

Development of water resources constitutes key component of the national Vision 2030. The implementation of the ideals of Vision 2030 has been concretized in the Kenya Vision 2030: First Medium Term Plan (MTP) 2008-2012. The MTP 2008-2012 constitutes the first phase in the implementation of the Vision 2030 whose aim is to "transform our country into a modern, globally competitive, middle income country, offering a high quality of life for all citizens by the year 2030". The MTP 2008-2012 lay emphasis on projects geared towards national healing and reconciliation as well as rapid economic reconstruction to reverse the damage and setbacks the country suffered in the aftermath of the 2007 General elections. The Government is now implementing the second Medium Term Plan (MTP) 2013-2017 with the goal of accelerating the attainment of Vision 2030.

3.20.6 Sessional Paper No. 4 of 2004 on Energy

The proponent should incorporate some conservation measures on electricity consumption as espoused by this Sessional Paper. The paper refers to measures on energy conservation and efficiency and aims at reducing energy consumption without sacrificing productivity or increasing

costs. Energy conservation and efficiencies measures have the potential to scale down capital investments needed to provide additional supplies and reduce overall response use. The facility shall be operated with this policy in mind.

3.20.7 National Environmental Action Plan (NEAP).

The purpose of the National Environmental Action Plan (NEAP) is to promote and facilitate the coordination of strategies and measures to protect and manage the environment into plans and programmes for the social and economic development of Kenya. The Environmental Management and Coordination Act, 1999, established the NEAP to address the protection and management of the environment at district, provincial and national levels. The NEAP is to be reviewed every five years and will be subject to consideration and approval by the National Assembly. The NEAP will identify and recommend policies and legislative approaches for preventing, controlling or mitigating specific as well as general adverse impacts on the environment. As regards, the District and Provincial Environmental Committees are required to prepare Action Plans every five years and all development activities are supposed to be conducted in accordance with these Action Plans and in consistent with the Act.

3.21 International Conventions and Treaties

Conventions are legally binding bilateral, regional or international agreements that binding to the states that are parties thereto. Kenya has ratified some of the most important conventions on the environment and is bound by the same.

3.21.1 WHO National Guidelines on Safe Disposal of Pharmaceutical Waste, 2001

The provisions of these guidelines describe a series of steps that need to be followed in order to dispose waste and or expired pharmaceuticals. The steps required include identification of pharmaceutical waste, sorting of pharmaceutical waste by category, filling the relevant forms to seek authority from the authorities in charge of disposing such waste. Upon obtaining all the relevant approvals, the disposal of the pharmaceutical waste shall be effected under the supervision of the local pharmaceutical waste disposal team or the Waste Management Team

The recommended methods for disposing of unwanted pharmaceuticals include:

- The use of either medium temperatures incineration at a minimum of 850°C or high temperature incineration exceeding 1200°C with two chamber incinerator for solids, semisolids and powders for controlled substances e.g. anti-neoplastics.
- Engineered sanitary landfill to be used for disposal of expired or unwanted pharmaceuticals.
- Sewer disposal for diluted liquids, syrups, intravenous fluids, small quantities of diluted disinfectants and antiseptics.

These guidelines are relevant in informing the generator of pharmaceutical wastes on safe disposal methods.

The proponent shall however contract a licensed waste handler who disposes the pharmaceutical wastes in the manner provided by the Kenya legal framework and the best international practice and guidelines.

3.21.2 World Bank Group (WBG) Guidelines: Environmental, Health, and Safety Guidelines General EHS Guidelines, 2007

The Environment, Health and Safety (EHS) Guidelines contain performance levels and measures for development of industrial projects that are considered to be achievable in new facilities at reasonable costs by existing technology.

Under these guidelines, the World Bank has several guidelines many of which are applicable to various components of the proposed project namely:

- EHS Guidelines - Air Emissions and Ambient Air Quality
- EHS Guidelines - Waste Management
- EHS Guidelines - Health Care Facilities
- EHS Guidelines - Hazardous Materials Management
- EHS Guidelines - Construction and Decommissioning

a) WBG EHS Guidelines: Air emissions and ambient air quality

These guidelines are meant for all types of projects with "significant'' emissions, sources of air emissions, and potential for significant impacts to ambient air quality to prevent or minimize impacts by ensuring that emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards. They require the application of national legislated standard, or in their absence, the current WHO Air Quality Guidelines, or other internationally recognized sources. Kenya currently has Environmental Management and Coordination (Air Quality) Regulations, 2014 applicable to this project.

In this project, there will be fugitive air emissions which are expected during construction and operation phases of the project. These guidelines are useful as they give control and monitoring measures.

b) WBG EHS Guidelines: Waste Management

The guidance applies to the management of non-hazardous and hazardous waste. This project is will be a major generator of both hazardous and non-hazardous waste. These guidelines provide categories of various wastes and a summary of treatment and disposal options. These guidelines provide good guidance on waste on-site handling, collection, treatment and disposal for both the proponent and the contractors during construction and operation phases respectively. This report greatly adopts the guidance while formulating the environmental management plan.

WBG EHS Guidelines: Noise

This section addresses impacts of noise beyond the property boundary of the facilities. These guidelines are applicable during construction phase whereby construction equipment and activities are expected to emit noise. Our local regulations, EMCA (Noise and Excessive Vibration Pollution Control) Regulations, 2009 give permissible levels during construction works. The proponent

therefore has adequate guidance to ensure noise levels are maintained as low as reasonably practicable.

c) WBG EHS Guidelines: Occupational Safety and Health

These guidelines guide employers and supervisors in fulfilling their obligation to implement all reasonable precautions to protect the health and safety of workers. The guidelines provide guidance and examples of reasonable precautions to implement in managing principal risks to occupational health and safety. Although the focus is placed on the operational phase of projects, much of the guidance also applies to construction and decommissioning activities. The guidelines also describe how facility operation workplace design should be undertaken to prevent occupational health and safety risks and hazards. The guidelines also give examples of internationally published exposure guidelines which may be used to measure occupational health and safety performance examples, to include the Threshold Limit Value, occupational exposure guidelines and Biological Exposure Indices published by American Conference of Governmental Industrial Hygienists , the Pocket Guide to Chemical Hazards published by the United States National Institute for Occupational Health and Safety ,Permissible Exposure Limits published by the Occupational Safety and Health Administration of the United States, Indicative Occupational Exposure Limit Values.

d) WBG EHS Guidelines: Construction and decommissioning

These provide additional and specific guidance on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities.

e) WHO: Safety in Healthcare Laboratories, 1997

This is a manual intended for healthcare laboratories workers and those responsible for laboratory administration and planning. It provides key guidelines for health and safety in the laboratory activities. It offers a pragmatic approach to problems encountered in routine practice. These guidelines will be useful during operation phase of the project

3.21.3 Convention on Biological Diversity (CBD)

The CBD is one of the outcomes of the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. The CBD establishes a global legally binding framework for the conservation of biodiversity, the sustainable use of it components and the fair and equitable sharing of benefits arising out of utilization of genetic resources. The provisions of this convention should be taken into account in the conservation of various species of plants, animals and the variety of ecosystems in the project area.

3.21.4 Rio Declaration and Agenda 21

The Rio Declaration and Agenda 2, the action plan for the 21st century are two non legally binding instruments adopted by the 1992 United Nations Conference on the Environment and Development (UNCED). While the Rio Declaration contains general principles and objectives, Agenda 21 contains detailed guidance on their practical implementation. Principle 4 of the Rio Declaration provides that in order to achieve sustainable development environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. Principle 25 accentuates this by stating that peace, development and environmental protection are interdependent and indivisible.

In an effort to control levels of air pollutants from industries sources, the Geneva Convention on long-range trans-boundary air pollution was signed. Other conventions include the convention on the law of the sea (1994). Conventions on nuclear accidents (Notification Assistance) 1986; the Montréal Protocol on substances that deplete the ozone layer, the Biological and toxin weapons etc

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

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

The concept of EIA is embodied in many multilateral environmental agreements. Principle 17 of the Rio Declaration provides that environmental impact assessment as a national instrument shall be undertaken for proposed activities that are likely to have a significant impact on the environment and are subject to a decision of a competent national authority.

3.22 Institutional Arrangements

At present, there are over 20 institutions and departments that deal with environmental issues in Kenya. Some of the key institutions include: the Ministry of Health; the Ministry of Labour, Department of Occupational Health and Safety; the Ministry of livestock and Fisheries Development, Fisheries Department; the Kenya Agricultural Research Institute (KARI)); the Ministry of Water and Irrigation and the Ministry of Tourism and Wildlife, Kenya Wildlife Service (KWS).

Others are the Ministry of Environment and Natural Resources, Forestry Department; Kenya Marine and Fisheries Research Institute (KMFRI); the Kenya Forestry Research Institute (KEFRI]; the National Museums of Kenya (NMK); the Regional Development Authorities and the Public Universities. In addition to the said departments, the Ministry of Environment and Natural Resources through the National Environment Management Authority (NEMA) is responsible for the overall environmental management and coordination.

There are also local and International NGOs involved in environmental issues in Kenya. Some of the main international agencies involved in environmental issues in the Country include: the United Nations Environment Programmes (UNEP), the International Union for the Conservation of Nature and Natural Resources (IUCN) and the Environmental Liaison Center International (ELCI). The regional and local NGOs actively involved in environmental matters in the Kenyan Country include: the East African Wildlife society (EAWS), the Green Belt Movement, the Forest Action Network (FAN), the African Water Network (AWN), the Wildlife Clubs of Kenya (WCK) and the Rural Water and Sanitation Organization (WATERSAN) among others.

CHAPTER 4

4 PROJECT DESCRIPTION

4.1 Nature of the Project

The proposed project will involve construction of the East African Kidney Institute (EAKI) in Nairobi. The facility is intended to be a Centre of Excellence in Nephrology and Urology diseases providing treatment in kidney disorders and promoting research and teaching in the same area of specialization. The proposed facility will be connected with KNH, UoN and KMTC to realize a complete integration of health in the area

The EAKI Building Complex will be a five (5) levels building rising up to 24.4 meters at its highest point. The building will be Y shaped comprising of 3 interconnected blocks as shown in the plate 4 below. Two long blocks will form the East African Institute Hospital while the shorter block will house the research and teaching University.

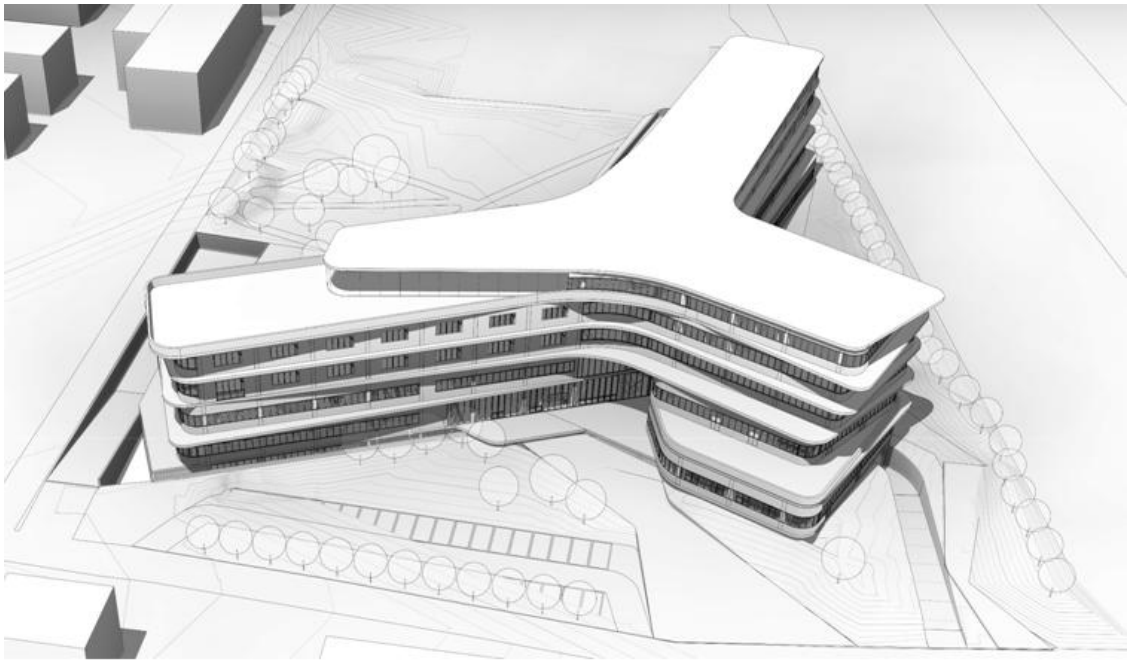

Plate 4: Artistic impression of the proposed EAKI

The main dimensions of the proposed EAKI Building complex are summarised in the table below:

Table 4: Shows the main dimensions of the EAKI building Complex

SOLUTION Y	SQUARE METER
Building - Hospital Departments	15,372
Building – Internal Technical Rooms	377

Building – Underground Parking	2,121
External Technical areas	512
Roof Technical Area	350
External Work (landscape, roads, utilities, fence, parking for 40 cars, etc.)	
Potable Water Tanks	
Power Generator Set	
Total Gross Building Surface	18,731

4.1.1 Pre-construction activities

The proposed project will first entail subdivision of the project plot (L.R. No.209/13978) into two plots, one plot (the upper section) will be retained for recreational use, while the proposed project will be build on the lower plot - on which the existing football pitch is located. Change of user of the project plot (the lower plot) will be secured from the Nairobi City County before the construction activities start.

Once subdivision of the plot is done, the project proponent will construct a modern standard artificial turf football pitch on the plot retained for recreational use, he will also rehabilitate the volleyball and netball pitches on the plot.

Thereafter, the project proponent will then proceed to establish the proposed EAKI on the lower section of the site.

4.1.2 Site Plan, Location and access

The access to the site will be through a secondary street which branches from Ngong Road – direct opposite 5th Ngong Avenue, which allows an easy entrance to the Hospital, without inducing any traffic congestion on the road system. This entrance will be for use by visitors, students and suppliers. Currently, access to the Nairobi Area Traffic police headquarters is through this secondary street.

The site plan for the proposed project is presented below:

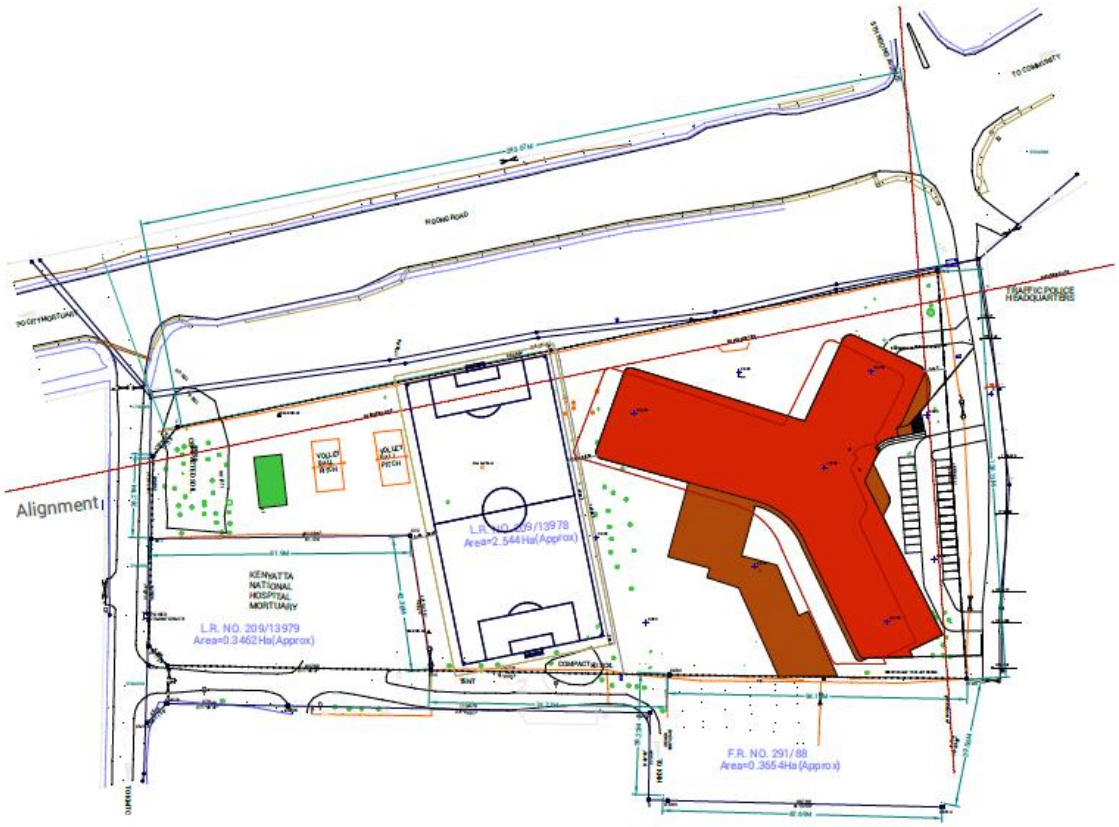

Plate 5: Site Plan for the proposed project

4.1.3 Flows

The building will be organized to have different floors and areas for inpatients and outpatients: this is a primary choice to ensure comfort and functionality to the Centre: patients who need dialysis treatments will often come to the hospital from home and stay in the centre for two or three hours while inpatients in the wards departments will have other needs linked to urology and kidney problems.

Table 5: Shows a summary of the departments and functions divided by floors

Floor (elevations)	Departments
Lower Ground Floor (-2.50 m)	Refectory; Laboratories; Kitchen; Storages Rooms; an Office; Morgue, Laundry; Parking Spaces; Pharmacy; Storage areas. Several Technical Functions are located in the external area of the basement, these are: CED Room; BCM; Electrical General Board; UPS; Water Treatment Plant; Fire Fighting Pump; MT/BT; E.G.; Medical Gases Room; Plant Room; Temporal Waste Storage Cubicles; Heating and Cooling Plant; Water Storage Tanks; Ecological Area

Floor (elevations)	Departments
Ground Floor (+2.00 m)	Cafeteria; 45 Dialysis Points; 4 Dialysis Critical Care Beds; 4 Dialysis Arm Chairs; MRI; CAT; X-Ray, Brachytherapy; Ultrasound; Examination Rooms; Two Shops; Clinics; Laboratories; Radiology; Reception Area; Staff Changing Area; Technical; Circulation Area; Lecture Rooms; Translation Rooms; Storage Areas.
First Floor (+6.90 m)	Critical Area; Surgical Theatres; Laboratory; Utoradiology Lithotripsy; Uroradiology; P.A.C.U.; Circulation Area; Temporal Deceased Holding Room; Offices; Multimedia Room; Library.
Second Floor (+11.80 m)	12 – six (6) bed Wards; 2 – four (4) bed Wards; 2 – one (1) bed Wards; Library; Technical; Terrace; Circulation Area; Staff Offices; Staff Changing Rooms; Boardroom; Library.
Third Floor (+16.00 m)	12 – four (4) bed Wards; 3 – two (2) bed Wards; Wards; Staff Offices & Changing Rooms; Seminar Rooms; Technical; & Circulation Area
Fourth Floor (+20.20 m)	1 – four (4) bed Ward; 7 – two (2) bed Wards; 6 – one (1) bed Wards; Offices; Staff Changing Rooms; Seminar Rooms; Video Conferencing Room, Roof Technical Area.
Rooftop (+24.40 m)	Water Reservoir 36 M^3 , Solar Water Heaters, Faraday Cage & Lightening Arrestors

4.2 Structural Composition

4.2.1 Layout

The layout of the new hospital will reflect a proper functional organization of spaces and correct location of facilities and equipment as support to a high level and efficient care of the patients.

4.2.2 Detail of Key Sanitary Areas

4.2.2.1 Lower ground floor (basement)

This floor comprises of: a Refectory; Laboratories; Kitchen; Storages rooms; an office; Morgue, Laundry; Parking spaces; Pharmacy; Storage.

At the same level, Several Technical Functions are located in the external area of the basement, these are: CED Room; BCM; Electrical General Board; UPS; Water Treatment Plant; Fire Fighting Pump; MT/BT; E.G.; Medical Gases Room; Plant Room; Temporal Secure Waste Storage Cubicles; Heating and Cooling Plant; Water Storage Tanks; Ecological Area.

4.2.2.2 Ground floor

Refer to annexed architectural plans

This floor comprise of:

- Clinics

The total number of examination rooms on this floor is 10. The dimensions of these rooms are about 12.00m^2 to guarantee easy movement of doctor, nurse and patient.

The different ambulatories are located to facilitate integration and multi-disciplinary diagnostic interventions, and to reduce organization and management costs, providing common support services.

- Dialysis Area

The project organizes this area in approximately 1000 sqm with 45 Dialysis Points; 4 Dialysis Critical Care Beds; 4 Dialysis Arm Chairs. In this department there are surgical examination rooms, peritoneal training rooms, maintenance kidney areas.

- Laboratories

An analysis laboratory department is located on this floor. There are 2 laboratories with 30 sqm for each, ancillary area, office and technical rooms.

- Radiology

At the ground floor is located the Diagnostic by imaging department. It guarantees adequate spaces for activities which make use of ionizing and non-ionizing radiations and other techniques of image construction for diagnosis.

The rooms have been located in a progressive order in accord of the length of the exams to optimize the surface of the waiting areas and to avoid people to go into the department unnecessarily.

- Diagnostic room

The department of diagnostic by imaging will be equipped with the necessary equipment to carry out radiographs of the different organs and apparatuses, with the possibility to carry out stratigraphies.

The facilities of the department are:

- 1 Ultrasound
- 1 X-Ray scanner
- 1 Computed Tomography (CT) scanner
- 1 Nuclear Magnetic Resonance (NMR) / Magnetic Resonance Imaging (MRI)

This area is organized with large entrance to guarantee easy access of the radiological equipment.

4.2.2.3 First floor

Refer to annexed architectural plans

This floor comprises of:

- Surgical Theatres

It includes several independent surgery areas, with common general support services. The operating rooms are about 38 sqm. A door opposite to the patients entrance consent the discharge of dirty material along a “dirty” route that connects with the sub-sterilization or with the dedicated lift. In the centre of the surgical department are also located the recovery area, the anaesthetics store, the main equipment store and the Post Anesthesia Care Unit (PACU) area. The entrance of the staff becomes by dedicated staff changing rooms organized by process. The sequence of three locals (clean white coat room, clogs room and dirty white coat room) permits to guarantee hygienic and sanitary procedure. There is a dedicated room for the entrance of the clean lingerie coming from suppliers. The design provision organizes this area in 1000 sqm and 4 theatres.

4.2.2.4 Second, third and fourth floor

Refer to annexed architectural plans

- Wards

The project layout foresees the following organization: 12 rooms with 6 beds, 15 rooms with 4 beds, 10 rooms with 2 beds and 8 rooms with 1 bed. Each one of these rooms will foresee an exclusive toilet. The ward space has been organized in four nucleuses, with staff and logistic services, located in a barycentric position to allow the staff the control of visitor’s access and the flows of inpatients and goods. The spaces organisation guarantee care and privacy of the patients while still maintaining the possibility of social relations.

4.3 Design criteria

The design criteria and characteristics of the proposed development will include the following among others: -

- All works to be carried out in accordance with the local authority‘s regulations
- All drainage passing under buildings and drive areas to be of PVC pipes encased in concrete while open drains will be used for storm water
- All sanitary work to be in accordance with MoH rules and regulations and County Government of Mombasa requirements
- All reinforced concrete (RC) works to be to structure engineer‘s details

4.4 Water treatment and distribution

The water treatment plant is located in the basement and is mainly constituted by:

- Potable (first class) water reservoir net capacity 180 m^3 underground
- Potable (first class) water reservoir net capacity 36 m^3 rooftop
- First class water reservoir disinfection system

- Primary sanitary water pumping station located close to the reservoir filling water to the storage in the technical room. Water pumping station is powered by diesel electric generator in order to guarantee the continuity of service.
- Reverse Osmosis plant (RO)
- RO filling pumping station
- HDPE tanks
- Potable water pumping station to the building
- Water Softeners
- Filters and accessories

The water distribution is made by stainless steel and/or multilayer plastic pipes up to the local distribution manifold and then by multilayer plastic pipes for final connection to sanitary devices. Each connection shall be provided with ball valve on the manifold.

4.5 Drainage network

Waste water coming from various parts of the building will be collected to the following separated circuits:

- Wastewater from toilets and similar (so called “black” water) and Wastewater from basins, shower trays and bath tubes (so called “gray” water).
- Rain water from roofs
- Wastewater from Kitchen that will be managed independently by using a grease separator upstream to the connection to sewage network
- Wastewater from parking areas will be managed independently by using a oil separator upstream to the connection to sewage network

Waste water from parking areas will be collected and treated by means of a system which will separate oils; cleaned water will be connected to the final pit in the building then pumped to the public network.

Drainage system will use plastic welded piping of the sound-absorbing type and the drainage columns will be equipped with inspections at every floor and at the bottom.

Several pumping systems are located at the lower levels allowing the sewage transfer to the local public sewage network. This solution allows a total redundancy of sewage pumping systems.

The connection from the final pits to public sewage network is made by sloped plastic pipes.

Rain water from roofs will be collected in the second-class water reservoir allowing not potable use (irrigation, external area washings, etc.). At the same time a grey waste water treatment plant shall

be provided to increase the water recovery mixing this water with rain water in the same underground tank. The tank capacity shall be 150 m3.

Water will be properly treated in order to supply WC flush of the hospital; a chlorine disinfection of the water stored in the tank shall be provided.

4.6 Irrigation plant

For the irrigation of external green areas, a manual irrigation plant will be installed. The plant mainly constitutes the following

- Pumping system
- Manual valves and connections fittings inside underground PVC boxes
- Underground HDPE pipes connecting pumping system and underground boxes

The irrigation plant will mainly use the water that has been recycled; i.e. rain water and gray water.

The irrigation plant pressure will be controlled by means of the pumping system provided with pressure switches adjustable by operator.

4.6.1 Water supply

The water supply in the area is mainly from the Nairobi Water and Sewerage Company Therefore, the proposed development in the site will be supplied by the water from this same source. Due to high demand of this resource, the project proponent has plans to sink a borehole on the site.

4.6.2 Energy

The Power supply in the area seems adequate capacity is available. A standby generator will also be used for all parts of the hospital, as supply can be unreliable at times. Uninterruptible Power Supply (UPS) will also be installed at the EAKI. External Security lighting will majorly be powered by solar power.

Solar energy will be used to pre-heat water prior feeding it to the boiler.

4.7 Construction activities and inputs

4.7.1 Input during the Construction

Typical inputs which will be used in construction phase are land, water, labour and construction materials such as building sand, aggregates, natural and hand cut construction stones, timber for making structural formwork and interior design, tiles for floors, precast units for drains, PVC pipes for sewer and water reticulation, paints, electrical wiring and fitting, barbed wires, wire mesh, water tanks and aluminium gutters. Window casement and glass, spades, pick axes, and other hand held tools will also be needed.

4.7.2 Construction activities and timetable

The construction activities shall begin from the time NEMA issues license to the EIA study report for the proposed activities.

4.7.3 Project implementation sequencing

Construction stage

This will involve the following:-

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

This will involve the transportation of machinery and deployment of the workers to the construction site. The machinery will be used for ground breaking and transportation of materials from the sources to the site. The major plant and machinery that will be used include mixers, welding machines and transmission machines. The contractor will also mobilize human workforce.

b) Acquisition and transportation of building materials

The contractor shall source for 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 different 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.

c) Site clearance, excavation and land filling works

The site will be cleared to pave way for the construction works. This shall however be limited to the specified areas so as to reduce vegetation disturbance. Excavation will be carried out to prepare the site for construction of foundations, pavements, and drainage systems. This may involve the use of earthmoving machinery such as tractors and bulldozers.

d) 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 licenses the project activities. The contractor will then be supplied with all the approved documents including the ESIA report.

The construction of the building walls, foundations, floors, pavements, drainage systems among other components of the 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.

e) Structural Steel Works

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

f) Electrical work

Electrical work during construction of the premises will include installation of solar cells, electrical gadgets and appliances including electrical cables, lighting apparatus, sockets etc. A diesel powered generator will also be installed to provide power during emergency times. In addition, there will be other activities involving the use of electricity such as welding and metal cutting.

g) Plumbing

Installation of pipe work for water supply and distribution will be carried out within the building and associated facilities. In addition, pipe work will be done to connect sewage from the EAKI building to the Nairobi Water and Sewerage Company system for disposal of liquid wastes. Storm water and that from the kitchen will be directed to a treatment system on the lower ground floor for treatment. This water will eventually be used for irrigation and toilet flushing purposes.

Plumbing activities will include metal and plastic cutting, the use of adhesives, metal grinding and wall drilling among others.

h) Fire protection

A hose reel fire protection system will be provided to cover all the buildings area. The system will comprise of hydrant water storage tanks, distribution of pipe works and fire hose reels. Portable fire extinguishers will also be provided at convenient spots. Additional provision will be made for special hazards and high-risk areas.

All the fire fighting connection fittings, in general, and particularly those ones to be directly utilized by fire brigade, must comply with local standards and regulations, and must be agreed with the contractor and fire brigade during construction phase.

i) Landscaping

To improve the aesthetic value or visual quality of the site once construction ceases, the proponent will carry out landscaping. This will include establishment of flower gardens, grass lawns which will involve replenishment of the top soil. It is noteworthy that the proponent will use plant species that are available locally preferably indigenous ones for landscaping.

Also, the material from the earthworks shall be used to create features in open areas, road reserves and greens. The recycled water shall be used in this stage especially during the dry seasons for irrigation purposes.

4.7.4 Occupation stage

This stage shall involve operation and managing the building and associated facilities as in accordance with established rules and procedures. The completed building area will be under the security guard.

4.8 Estimated Project Cost

The estimated project cost is Kenya Shillings Two Billion Two Hundred Million (Kshs. 2,200,000,000)

CHAPTER 5

5 ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS AND THEIR MITIGATION

5.1 Description of the existing and anticipated impacts

5.1.1 Existing impacts

The impact identified at the time of the study is minimal.

5.1.2 Anticipated impacts

The anticipated impacts of the proposed project on the environmental elements are both positive and negative. The magnitude of each impact is described in terms of being Major negative, minor negative, major positive, minor positive or Neutral impact.

On the basis of information gathered during both the desktop and field study, the potential impacts of the proposed project are as tabulated in table below.

Table 6: Anticipated Impacts of the project

Environmental & Social Components	Nature of Impacts (Positive/ Negative)	Project Phase	Positive	Negative	Neutral
Bio-Physical Environment					
Land Resources	Altered topography and landscape	Preconstruction & Construction		(-)	
	Loss of vegetation	Construction			
	Soil Contamination	Construction & Operation		(-)	
	Soil Erosion	Preconstruction & Construction		(-)	
	Generation of Solid and Liquid Waste	Construction & Operation		(-)	
Solid Waste	A significant amount of solid waste will be generated through the clearing of vegetation, excavation & construction debris during construction phase. Significant amount of solid waste will be produced during the operational phase.	Construction & Operation		(-)	
Ambient Air Quality, noise pollution and excess vibrations	Noise pollution generated by construction activities, construction machinery and vehicles. Deposition of airborne road dust and airborne emissions from vehicles and Construction equipment through construction activities. Some operational phase activities such as standby generators will affect air quality and noise levels.	Construction & Operation		(-)	
Flora and Fauna	Change in landscape	Construction		(-)	

Environmental & Social Components	Nature of Impacts (Positive/ Negative)	Project Phase	Positive	Negative	Neutral
	Disturbance to the natural drainage system Flora destruction Loss of or disturbance to natural habitats				
Ecosystem interference	The hospital building may affect groundwater quality & quantity	Operation		(-)	
Socio-Economic Environment					
Health and Safety Occupational hazards:- Risks to construction workers and general public Occupational hazards:- Risks to hospital staff and general public	Dust and airborne emissions from vehicles and construction equipment Exposure to infectious body fluids and tissues Exposure to hazardous health care waste	Construction & Operation		(-)	
	Prevent illegal entry by unauthorised persons into the facility's compound	Operation	(++)		
Conflict with the Community	Conflict may arise with the community especially if they have not been consulted	Construction & Operation	(++)		
Employment Opportunities	These will be provided during construction and operational phases of the development thus improving living standards of the employees	Construction & Operation			

5.2 Positive socio-economic and environmental benefits during the Establishment and Operation of the EAKI

The proposed project will have a significant positive boost to the East African Community. The potential positive impacts of the project will include:

- Address and cater for the medical and health need of the African population.
- Enhanced land use
- Improve EAC's competitiveness through quality higher education and research capabilities
- Improved access to quality and affordable specialized tertiary education in biomedical sciences in EAC.
- Improved access to timely, affordable and quality specialized biomedical services in the EAC
- Increased stock of skilled professionals in biomedical sciences for the regional labor market
- Offer opportunities for training and capacity building
- Provide adequate, functional, safe and pleasant working space for all the staff.
- Reduction of poverty levels
- Save on costs for patients who travel overseas to seek for treatment; the hospital will be a centre of excellence.
- The project will lead to the development of state of the art health services at the new Hospital, upgrading its facilities to the latest International Standards.
- Increase in revenue to the central government through payment of relevant taxes, rates and fees to the government and the local authority.
- It will ensure an increased safety and security in the area due to the anticipated increase in population in the area.
- Open up the area in terms of business opportunities due to the anticipated population growth.
- Creating of employment opportunities for skilled and semi-skilled labourers during construction phase and operational phases of the proposed development. These jobs will be available for the residents of Nairobi City County, Kenya and the entire East African Community.

5.3 Negative Environment Impacts during Construction and Operational Phases

The issues that are seen as likely to negatively affect the biophysical and human environment include the following:-

5.3.1 Air Quality

Construction phase

Dust is likely to be generated due to excavation activities, during construction and deliveries of sand and other building materials. There may be air pollution due to combustion of fossil fuels expected from construction machinery.

Potential mitigation measures during construction phase

- The proponent will ensure that plant and equipment which will be acquired for on site preparation of pre-cast materials and concrete mixing will utilize the latest technology to have minimum emission.
- Provision of full protective gear for workers. Workers shall also be sensitized on hazards encountered in such work environment and shall undergo regular health check-ups.
- Watering access roads and the site to suppress dust
- Covering truck loads using tarpaulins
- Personnel will be provided with dust masks to avoid inhalation of the same.
- Buildings under construction will be covered with adequate screens to contain dust.
- Stock piles to be covered with tarpaulins

Operational phase

Apart from the standby generators, during operational phase air quality is not likely to be affected.

5.3.2 Soil Erosion

Construction Phase

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.

Operational phase

The project will not have much effect on the soil.

5.3.3 Solid Wastes Generation

Construction Phase

A significant amount of solid waste will be generated in this phase through the clearing and excavation of the project site. The other activities that will generate related solid wastes include stones, wood, broken glasses, containers, rods of metal, sharp objects (nails) etc. The proponent should take the initiative of removal of the solid waste which is expected to be generated during this phase of the development.

Operational phase

The project is expected to generate enormous amounts of solid waste during its operation phase. The bulk of the solid waste generated during the operation of the project will consist of medical waste, paper, glass and organic wastes. Such wastes can be injurious to the environment through blockage of drainage systems, choking of water bodies and negative impacts on animal health. Some of these waste materials especially the plastic/polythene is not biodegradable 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.

Potential mitigation measures for solid wastes generation

- Express condition shall be put in the contract that before the contractor is issued with a completion certificate; he will clear the site of all debris and restore it to a state acceptable to the supervising architect and environmental consultant.
- Materials from excavation of the ground and foundation works shall be reused for earthworks and landscaping.
- Bins/ receptacles shall be placed at strategic locations within the site as collection centres to facilitate sorting of the various types of wastes.
- The contractor and proponent shall work hand in hand with private solid waste handlers to facilitate sound waste management.
- The wastes shall be properly segregated and separated to encourage recycling of some useful waste materials i.e. some demolished stone and concrete materials can be used as backfills.
- Use of an integrated solid waste management system through a hierarchy options i.e. source reduction, recycling, composting and reuse shall be encouraged. This will facilitate proper handling of solid waste during operation stage.
- The non-biodegradable sewage-based solids (sludge) from the WWTP shall be removed periodically for incineration

5.3.4 Liquid Waste

During construction stage it is expected that uncontaminated wastewater shall arise from the proposed activities which shall be sprinkled on the working areas to reduce dust generation by the construction machinery while contaminated waste water shall be channelled into a conservancy tank to prevent water and soil pollution.

Wastewater during operational stage shall be managed through connection to the waste water treatment plant which shall be installed at the lowest point of the site. Recycled water shall be treated above the NEMA treated effluent standards and utilized for gardening, flushing, car wash, fire suppression and general external works.

Oil interceptors shall also be installed so as to avoid clogging of the drainages by grease.

The mitigation measures may include:

- Liquid Waste Management and Disposal
- Human Excrement from ablution blocks: The facility will be served by the existing sewer line, managed by the NCWSC.
- Pre-treatment of process Wastewater

5.3.5 Health Care Solid Waste

The main categories of Biomedical Waste as per EMCA (Waste Management) Regulations, 2006, include:

- Infections Waste: Waste suspected to contain pathogens, this include laboratory cultures, waste from isolation wards, tissues (swabs), materials, or equipment that have been in contact with tubing's, catheters, IGS toxins, live or attenuated vaccines, soiled plaster costs and other materials contaminated with blood infected patients, excreta.
- Pathological waste: Human and animal tissues or fluids, this include body parts blood and other body fluids.
- Sharps: Sharp waste, needles, infusion sets, scalpels, knives, blades, broken glass that may cause puncture and cuts. This includes both used and unused sharps.
- Pharmaceutical waste: Waste containing pharmaceutical such as expired pharmaceuticals or pharmaceuticals no longer needed; items contaminated by or containing pharmaceuticals (bottles, boxes).
- Genotoxic Waste: Waste containing substances with genotoxic properties such as waste containing cytostatic drug (often used in cancer therapy), genotoxic chemicals.
- Chemical waste: Waste containing chemical substances such as laboratory reagents; film developer, disinfectants,(disinfectants) that are expired or no longer needed solvents
- Waste with high content of heavy metals: Batteries, broken thermometers, blood-pressures gauges, etc.
- Pressurized containers: Gas cylinders, gas cartridges, aerosol cans.

- Radioactive waste: Waste containing radioactive substances e.g. unused liquids from radiotherapy or laboratory research, contaminated glassware, packages, or absorbent paper, urine and excreta from patients treated or tested with unsealed radionuclides, sealed sources.
- General solid waste: Waste generated from offices, kitchens, packaging material from stores.
- Microorganisms: Any biological entity, cellular or non-cellular capable of replication or of transferring genetic material

These constitute a grave risk, if they are not properly treated or disposed, or are allowed to mix with other municipal waste. See below Health Care Solid Waste Management and Disposal guidelines Adopted from World Bank Group, Environmental, Health, and Safety Guidelines for Health Facilities, 2007.

Where potentially hazardous substances are being disposed of, a chain of custody document should be kept with the environmental register as proof of final disposal.

Mitigation measures

- Waste segregation measures shall be employed to minimize entry of solid waste into the waste water stream, including procedures and mechanisms for separate collection of urine, faeces, blood, and vomit from patients treated with genotoxic drugs to avoid their entry into the wastewater stream.
- Chemical waste should first be neutralised with appropriate reagents and then flushed into the sewer system.
- Regular monitoring of pre-treated contaminated process water shall be done quarterly by subjective a sample to accredited laboratory analysis and such results shared with the sewer line providers (NCWSC)
- Sharp tools and human tissue should be collected in a different container and be incinerated
- The treated effluent being discharged to the sewer line should conform to the limits as provided for under Environmental Management Co-ordination (Water Quality) Regulations, 2006; Standards for effluent discharge into public sewers-Schedule five

5.3.6 Excess Noise & Vibrations

Construction phase

This phase of the development may have the most negative impacts due to the noise and vibrations in the project site. A number of measures may be undertaken by the developer to reduce the impact of noise on the neighbours as well as the workers involved in the project. This is

temporary, however, and the aim at this point is to make the increase in noise as small as possible until this phase is complete.

Operation Phase

Apart from the standby generators, this phase is not likely to cause noise pollution as no industrial activities will be permitted.

Proposed mitigation measures

- Equipment to be used should be selected on the basis of the noise minimization during acquisition.
- Equipment should also be properly maintained while in use during the construction phase.
- The equipment to be used should be located far away from the receivers and also so as to prevent interference, the proponent should ensure that construction is done during the day.
- The proponent should also monitor noise levels during construction and install appropriate noise barriers and acoustic screens.
- Buffer zones of undeveloped land should be maintained between the project area and the neighbours.
- Construction activities should only take place between 0800Hrs – 1700Hrs so as not to disturb the immediate neighbours.

5.3.7 Increased Water Demand

Construction Phase

This phase of the development might place a strain on an already limited supply through the construction of the Hospital Building and other infrastructural works proposed for the development. This may create additional demand to the water supply within the project vicinity.

Operational phase

The operation phase of the proposed development shall not place a strain on the water availability in the area.

Potential mitigation measures

- Provision of adequate water storage facilities.
- Provision of notices and information signs within the project site to notify on why and need to conserve water resource.
- Installation of water closets & fixtures with low volume cisterns and high pressure
- Water meters shall be installed to determine the water consumption rate.

- Rainwater harvesting.
- Treatment and re-use of some of the waste water.

5.3.8 Surface Drainage

Construction phase

The Clearance of land and excavation works will lead to increased soil erosion at the project site and release of sediments into the drainage systems.

Operational phase

The hospital built up areas and pavements may lead to increased volume and velocity of storm water or run-off flowing across the area covered by the buildings. This can lead to increased amounts of storm water entering the drainage systems, resulting in overflow and damage to such systems.

Potential mitigation measures

- Terracing and levelling the project site to reduce run-off velocity and increase infiltration of rainwater into the soil
- Drainage channels shall be installed in all areas that generate or receive surface water. The channels will be covered with gratings or other suitably approved materials to prevent occurrence of accidents and dirt entry that may compromise flow of run-off.
- The channels shall be designed with regard to peak volumes.
- Harvesting of rainwater.

5.3.9 Surface and Ground Water Hydrology and Water Quality Degradation

Construction Phase

Generally, construction activities can result to minimal degradation of the underground water due to changes in water quality, quantity, and flow rates; increases in pollutant inputs; and changes in species composition as a result of disturbance. Construction activities are also a major source of suspended sediments that enter wetlands through runoff.

Operational phase

The non-potable water from wastewater treatment plant and storm water might be a source of pollutants during this phase. The effluent rich in nitrogen and phosphorus can lead to algal blooms in estuaries. Algal blooms deplete dissolved oxygen, leading to mortality of organisms.

Also, after the driveways, buildings, and parking lots are constructed, the amount of impervious surface shall increase which prevents rainfall from percolating into the soil. Rainfall can carry sediments; organic matter; heavy metals; hydrocarbons; road salts; and debris into the stream.

Increased salinity, turbidity, and toxicity; and decreased dissolved oxygen can affect aquatic life and, therefore, the food web.

Potential mitigation measures

- Proper construction of the WWTP to meet the standards required by the Nairobi City County
- Construction of separate storm water and waste water drainage system
- Routine check-ups and monitoring of the WWTP to avoid leakage and blockage
- Quarterly monitoring of the quality of the treated waste water as per the NEMA Water Quality standards

5.3.10 Oil Leaks and Spills

It is important to note that oil/grease spills are prevalent in construction sites and in most areas that make use of petroleum products. Such products contain detrimental elements to the environment. They contain such heavy metals as mercury, lead, and sulphur among others.

Though this may not be common at the site, it is wise to control and observe the little that could occur especially during maintenance of the involved machinery.

During operational phase, Oil leakages will not occur or the occurrence maybe minimal.

Potential Mitigation Measures

- During construction phase, all machinery must be keenly observed not to leak oils on the ground. This can be done through regular maintenance of the machinery.
- Maintenance must be carried out in a designated area (protected service bays) and where oils are completely restrained from contaminating the ground. Such areas should be covered to avoid storm water from carrying away oils into the soil or water systems.
- Waste water/ wash water from these areas should be properly disposed.
- All oil products and materials should be stored in site stores or in the contractor‘s yard. They should be handled appropriately to avoid spills and leaks.
- Every construction tool, equipment and machines (for drilling, etc) shall be well set and adequately maintained.
- Staff should ensure that there are no spills of oils and fuels at the site.

- Waste water from kitchen and car parking areas must be channeled through oil interceptors before release into the public sewer.

5.4 Socio-Cultural and Socio-Economic Impacts

5.4.1 Employment and Income

Any available jobs will provide an immediate positive impact on the employment and income situation at the level of the project area as well as at the county and national levels. Operation phase of the development will provide the most benefits in terms of sustained employment and increase in income. The construction phase will employ specific vehicles and equipment in order to clear vegetation, landscaping, grading and levelling and the cutting of access roads for these vehicles and labourers to access the site. This means that many skilled workers will be necessary to operate front-end loaders, excavators, bulldozers and backhoes and other vehicles. In addition to this semi-skilled labourers will still be necessary for other tasks. This phase of the development will therefore have a short-term major positive impact on the employment and income at the local level.

Proposed mitigation measures

- The proponent /contractor should encourage recruitment of labour from the local communities for semiskilled labour. For skilled labour, this will depend on how much is available locally and the shortfall shall be supplemented by artisans from outside.
- Where possible, women shall be offered equal employment opportunities as men

5.4.2 Displacement of the Playground

The proposed project site is currently registered as a recreation area.

The area is a football pitch for six football teams / clubs: KNH Football Club; KNH Staff Football team; KNH Youth Football Club; UoN Medical School Football team; KMTC Football team; and Interdrinamorry Football Team.

The development of the proposed project on the proposed site will leave the six teams with no alternative playground.

Proposed Mitigation measures

- The proponent should inform the concerned and affected parties of the said EAKI project and the impact it will have on the training ground
- The proponent will subdivide the plot into two; one plot will be retained for recreational purposes and the other plot used for the proposed project. The proponent will apply and

secure a change of user from the Nairobi City County prior to commencement of construction of the proposed EAKI.

- The proponent will construct a modern standard football pitch (with artificial turf playing surface) on the plot retained for recreational purpose.
- The project proponent will ensure that the new a modern standard football pitch is ready for use prior to construction of the EAKI building.

5.4.3 Increased Energy Demands

The construction and operational phases of the development will impact slightly on the electricity supply in the area as the demand will increase.

Proposed mitigation measures

- All electrical appliances should be switched off when not in use during construction and operation phases
- Use of energy conserving electric fittings for general lighting during operational phase
- Invest in alternative energy sources such as standby generators.
- Harnessing solar energy for street lighting and water pre-heating.

5.4.4 Workplace Accidents

Workers at the site may be exposed to various workplace accidents during construction and operation phases. These include being hit by falling objects and falling off from elevated heights among others. During operation period, accidents may include exposure to infectious tissues and medical waste, exposed electrical parts or falls on slippery floor.

Potential mitigation measures

Occurrences of accidents may be prevented by observing the following:

- Ensuring that the operational manuals are available and accessible for every equipment/machinery used at the site.
- Proper maintenance of all machinery and equipment to prevent premature failure or possible accidents
- Ensuring all electrical equipment and machinery are properly grounded
- Only properly trained employees to operate equipment or machinery and proper instructions in their safe operation is provided.
- Workers to wear personal protective equipment (PPE)
- Contractor to ensure provision of a first aid kit and a trained first aider should always be on site

- Temporary physical barrier around excavated areas and the construction site
- Proper display of warning signs at the site
- In case of slippery floors, signage should be displayed at strategic places e.g. at the entrance to warn the public during operation phase
- Fire escapes should always be clear during operation phase
- Provision of safe working area with adequate and well-equipped First Aid kits which are well manned by trained personnel who should always be maintained on site at all times during the whole period of construction should be ensured.
- The proponent shall ensure that the contractor adheres to the rules set by the authorities for the protection of his workmen such as the wearing of PPEs.
- Adequate washing facilities and barrier creams should be provided for the workers' hygiene and protection.
- The capacity of the workers on safety concerns should be built by way of awareness and sensitization sessions for the workers on safe working practices which should be held prior to the commencement of the construction phase.
- Emergency Response Plans (ERPs) should be well understood and communicated to all the concerned parties including the local inhabitants of the area.
- Provision and regular servicing of fire fighting equipment during construction and operation phases.
- Proper management of waste.

5.4.5 Traffic Snarl-up along Ngong Road and Adjoining Roads

Automobile traffic will be impacted during the construction. The heavy commercial vehicles to the construction site through Ngong Road will cause traffic snarl up along Ngong Road, which may have a widespread impact to all adjoining roads.

Proposed Mitigation Measures

- Construction activities that might substantially disrupt traffic such as delivery of construction materials should not be performed during peak travel periods to the maximum extent practicable.
- It is recommended that to further mitigate the negative impacts due to traffic, the contractor and the proponent are expected to adhere to Nairobi City County Government Traffic By-Laws and Kenya Traffic Laws.
- Signage and barricades should be used as part of the typical construction traffic controls.
- Warning signs should be used as appropriate to provide notice of road hazards and other pertinent information to motorists and the general public.

5.4.6 Site Security

Security of the site and those working within it is of utmost significance and those operating within the facility must be assured of their security at all times. Security lapses that may lead to injury of occupants of the building and loss of personal property should be taken care of.

Potential mitigation measures

- The management shall strategically install lighting as well as security alarms and backup systems including surveillance of the area on a 24 hours basis.
- Security guards shall guard the property in a 24-hour basis and document any suspicious movement within the facility and its environs.
- The site shall also be enclosed using a perimeter wall
- Increase security survey, this will improve the general security of the area.
- Institute a monitoring and repair mechanisms for the entire fencing to ensure its integrity at all times.
- Access to the site shall be adequately monitored – site fenced off from unauthorized intrusions and warning signs and barricades should be properly displayed and strictly adhered to.

5.4.7 Fire Hazards

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

Potential mitigation measures

In this regard, the design of the project has provided and recommended implementation of fire fighting measures and control facilities. These include the following:

- Installation of an automatic fire detection and alarm system for the building
- Provision of fire fighting equipment and hydrant points
- Display fire evacuation procedures and emergency at the buildings
- Regular maintenance of fire electrical and first aid equipment
- Provision of sufficient emergency exit points and marked fire assembly points
- Adequate fire extinguishers shall be available and distributed strategically within the project area in order to manage emergency fire outbreaks.

5.4.8 HIV/AIDS

The proposed development will lead to migration of people from outside the local area in search of employment opportunities both during construction and operational phases.

During operational phase, the development will attract a new population into the area. Therefore, this increase of people in the project areas may lead to increased incidences of sexually transmitted diseases which may exacerbate HIV/AIDS situation among the locals.

Potential Mitigation Measures

- Conduct awareness campaigns on HIV/AIDS among the workers and the locals. This can be undertaken by the various NGOs and government agencies in the County.
- Erection of billboards to sensitize locals on the need to practice safe sex to help in the fight against HIV/AIDS
- Ensure minimal or no interactions between the students and the Site Workers.

5.4.9 Conflict with the stakeholders

Projects of such magnitude usually attract public uproar (especially from the neighbouring residents and community) if they are not made to own the project. Conflicts usually arise mostly from the foreseen negative impacts.

Potential Mitigation measures

- Consultations with the project neighbours
- Give priority to the neighbouring communities in providing employment opportunities
- Where possible offer women equal opportunities as men.

CHAPTER 6

6 PUBLIC / STAKEHOLDERS' ENGAGEMENT IN THE ESIA PROCESS

6.1 Introduction

Public consultation is a key component of an ESIA process, its goal is to inform the local population, statutory bodies and local organizations and interested parties about the proposed project / activity.

6.2 Public Consultation & Disclosure

Public consultation is necessary for gathering environmental data, understanding likely impacts, determining community and individual preferences, selecting project alternatives and designing viable and sustainable mitigation and compensation plans.

Public consultation in the ESIA process is undertaken during the project design, implementation and initial operation. The aim is to disseminate information to interested and affected parties (stakeholders), solicit their views and consult on sensitive issues.

Inadequate public consultation can result in significant information gaps, which could mislead environmental planners undertaking an environmental assessment. Lack of attention to communication and consultation processes can generate individual, community, or regional opposition to a project. This can ultimately be a cause of substantial delays, increased costs, and unsatisfactory compromise solutions, which could have been avoided through earlier consultation. Participation is therefore a process through which different stakeholders influence and share their views regarding development initiatives and the decisions and resources that affect them.

The Environmental Management and Coordination Act (1999) as well as the Environmental Impact Assessment and Audit Regulations (2003) set out the minimum requirements for stakeholder consultation and engagement. Further details of the legal and regulatory requirements that apply to the project are provided in Chapter 3 of this report.

The NEMA procedures and standards for conducting EIAs require stakeholder consultation to be conducted as part of the environmental assessment process. Public consultation was undertaken to disseminate information to interested and affected parties (stakeholders), to solicit their views, concerns and consult on sensitive issues.

The public consultation and disclosure programme was designed and implemented so as to foster community awareness of the proposed project, and to provide opportunities for community input and involvement. Careful attention was made to the various national and international principles/policies/guidelines (as previously noted) as they relate to consultation.

6.3 Objectives of Public Consultation

Public consultations with interested and affected parties (IAPs) were conducted with the following aims:

- Disclosure of the planned activities of the proposed EAKI project and impacts identified through the Environmental and Social Impact Assessment;
- Provide an opportunity to record comments / opinions of affected persons / interested parties, and where possible to address these issues within the ESIA;
- To establish if the local people foresee any positive or negative environmental effects from the project and if so, how they would wish the perceived negative impacts to be addressed.
- To find out if there are issues or places of cultural/or religious importance to the local communities that could be negatively impacted upon by the proposed project and its infrastructure.
- Provide opportunity for information exchange and answer questions regarding the proposed project;
- Discuss and address areas of concern / confusion; and identify grievances from interested and affected people;
- To give stakeholders an opportunity to present their views, concerns and issues regarding the proposed development;
- Harnessing local expertise, needs and knowledge from interested and affected people;
- To receive suggestions from stakeholders on how potential negative impacts can be mitigated; and
- Respond to grievances and enquiries of affected people
- Provide clear and accurate information about the project to the stakeholders;
- Obtain the main concerns and perceptions of the stakeholders and their representatives regarding the project;
- Obtain opinions and suggestions from the stakeholders on their preferred mitigation measures;
- Identify local opinion leaders with whom further dialogue can be continued in subsequent stages of the project.

Typically, the Agenda for consultations was:

- Presentation of the proposed EAKI project;
- Obtaining from the respondents their environmental and socio-economic concerns, and perceptions as well as suggestions/comments regarding the proposed project.

Significant impacts are defined, not necessarily in order of importance, as being those which:

- Are subject to legislative control;
- Relate to protected areas or to historically and culturally important areas;

- Are of public concern and importance;
- Are determined as such by technically competent specialists;
- Trigger subsequent secondary impacts;
- Elevate the risk to life threatening circumstances; and
- Affect sensitive environmental factors and parameters.

6.4 Public Consultation Methods

Public consultations were carried out through the following modes:

- Placing of adverts in the mass media to seek the public's views about the change of use of the proposed piece of land from residential to commercial use
- Informal and formal interviews;
- Public hearings – holding at least one (1) public meeting in the area;
- Placing of advertisements in the mass media (placing a notice in the Kenya Gazette, placing advertisements twice weekly for two consecutive weeks in a national circulating newspaper); and
- Uploading a soft copy of the ESIA Study Report on NEMA's website for public access and review.

6.5 Stakeholder engagement

The public consultation and disclosure programme was designed and implemented so as to foster community awareness of the proposed project, and to provide opportunities for community input and involvement. Careful attention was made to the various national and international principles/policies/guidelines (as previously noted) as they relate to consultation.

6.6 Description of stakeholders

The consultation programme was developed and implemented taking into account the various areas of influence.

6.7 Stakeholders Meetings

Typically, the agenda for stakeholders' consultations was:

- presentation of the proposed project;
- Obtaining from the respondents their environmental and socio-economic concerns, and perceptions as well as suggestions/comments regarding the proposed project.

We held stakeholders' meetings on 19th July 2017 at Panafric Hotel and 21st November 2017 at the EAKIP site.

The meeting of 19th July 2017 at Panafric Hotel was attended by representatives from the State Department of Public Works, Ministry of Health, KNH, KMTC, and UoN. The major aim of the

meeting was for the consultants to receive comments / input from the stakeholders on the various project design options.

Plate 6: Showing one of the project consultants giving a presentation during the stakeholders meeting on 19th July 2017 at Panafric Hotel Nairobi

The meeting of 21st November 2017 at the EAKIP site was for the officials / representatives of the various clubs / teams that use the KNH playground.

Plate 7: Showing some of the stakeholders who attended a meeting at EAKIP site on 21st November 2017

6.8 Stakeholder concerns

a) Stakeholders Meeting of 19th July 2017

The table below gives the names, positions and institutions of the participant of the 19th July 2017 meeting.

Table 7: List of participants in the 19th July 2017 meeting

NO.	NAME AND POSITION	INSTITUTION
1.	Eng. Peter Scott - Kenya Team Leader	Britech consulting Engineers
2.	Fred Aronya- ESIA Consultant	Envilead Limited
3.	Wycliffe Abiero – Land surveyor	Ramani land service Limited
4.	Felex Wambua - Civil Engineer	Britech ltd
5.	Malick Isiaho -Civil Engineer	Britech ltd
6.	Christopher Kiboi Nderitu- Quantity surveyor	Nderitu consultanting Limited
7.	Geoge M. Njoroge- MEP	Geomax Consulting Engineers
8.	Geoge Yagomba - Architect	symbion
9.	Geoge Munene -Architect	symbion
10.	Oscar ogunde - Architect	symbion
11.	Arch. Robinson Manguru - Project Manager	Kenyatta National Hospital
12.	Chrispine Nyanjare	Britech Limited
13.	Eng. J. M. Muthuuri	SDPW
14.	Caroline Musango	KMTC
15.	Dr. Leah Bii	KMTC
16.	Jebichi Maswan	KMTC
17.	Catherine Kinuia	EAKIP
18.	Kyengo Martin - Architect	State department of public works
19.	Pauline Munene – Quantity Surveyor	State department of public works
20.	Mathew Ochieng Otieno - Structural engineer	Matrix Engineering consultants
21.	Daniel K Muriuki Arch	SDPW
22.	Lorna Atieno Otieno	Matrix Engineering consultants
23.	Stephene Gitonga Engineer	State department of public works
24.	Gitonga G. W. Mechanical Engineer	State department of public works
25.	Harrison Kuria Mech. Engineer	State department of public works
26.	David M. Waititu, Project Manager	EACE - MoH
27.	Tommaso Conti	Politecnica
28.	Alessandro Uras	Politecnica
29.	Claudia Romero	Politecnica
30.	Marcello Gusso	Politecnica
31.	Prof. P. Mungai Ngugi	EAKI UoN
32.	Eng. Giovanni Romiti - Project Director	Politecnica

Key issues raised during the meeting were:

1. There is need to reduce Noise pollution by having a raised artificial hill – by re-use of stripped /excavated soil on the Ngong road side
2. Security – build a light fence / wall around the facility, manned access gates for delivery trucks, staff, patients and visitors.
3. Solar water heating incorporated in the design.
4. One participant was concerned about provision of toilet / sanitary facilities within the wards (self contained!); he suggested that shared restrooms (sanitary facilities) should be provided. He was also concerned that the suggested location of restrooms (sanitary facilities) will limit the amount of natural lighting inside the wards.
5. Need to provide a balcony for each ward or a shared balcony
6. Why is there separate piping for gray / grey and green waste waters when the two end up in the same waste water treatment plant? There is need to have separate treatment for the two and recycle gray / grey water (e.g. flushing toilets, etc).
7. Need to provide for Oxygen plant on the design as this may be effective.
8. Need to provide a sprinkler water system (fire fighting) to the semi-underground parking area
9. Need to make provision for radiology and nuclear medicine in the design.

b) Stakeholders Meeting of 21st November 2017

The table below shows those who attended the meeting.

Table 8: List of participants in the 21st November 2007 meeting

NO.	NAME AND POSITION	INSTITUTION
33.	David M. Waititu, Project Manager	EAKIP/EACE – MoH
34.	Arch. Daniel K. Muriuki	State department of public works (SDPW)
35.	Arch. Robinson Manguru - Project Manager	Kenyatta National Hospital
36.	Fred Aronya - ESIA Consultant (Meeting Facilitator / Chairman)	Envilead Limited – Politecnica Consortium
37.	Julius A. Tebei - ESIA Consultant (Secretary)	Envilead Limited – Politecnica Consortium
38.	George Makambi – Official / Representative	KNH Football Club
39.	Antony Abuya – Sports Representative	University of Nairobi
40.	Benson Obiri - Representative	KNH Youth Football Club
41.	Atina Hillary - Representative	Volleyball Team University of Nairobi
42.	Jeremy Ochiel - Representative	KMTC Football Team
43.	Owen Makokha - Representative	KMTC Football Team
44.	Patric Muhuri - Representative	KNH Staff Football Team
45.	Simon Sasia - Official / Representative	KNH Interdrinamorry Football Club
46.	Banyu Kinaro – Coach	KNH Interdrinamorry Football Club

47.	Elias Ochieng - Foreman	KNH

The primary stakeholders with relation to the project are the current users of the existing playgrounds (football pitch, netball & volleyball pitches) that would be affected with the modification or absence of these facilities.

The concerns raised by this group were as follows:

- Displacement of football teams from current football pitch which they have been using for over 30 years;
- Timing of the football pitch relocation;
- Size and quality of the new football pitch to be put up;
- Improvement in infrastructure around the new football pitch; and
- Improvement of existing volleyball court.

Evidence of stakeholders' consultation is appended at the end of this report.

CHAPTER 7

7 PROJECT NEED AND ANALYSIS OF ALTERNATIVES

Introduction

We will consider alternatives permeating through the proposed project, in all cases, the most environmentally responsive options have been proposed to be pursued. The project engineers have been tasked with the responsibility of "designing in" the environmentally viable options of the project. The options are discussed below.

7.1 Project Alternatives

7.1.1 The No-Action Option

The main alternative we will consider in the first instance is whether the proposed project should be developed or whether the status quo should be maintained. Presently, the site is underutilized with a very dusty (sunny seasons) and muddy (rainy seasons) football pitch. The field next to this site will be developed to an artificial one that will be in turn perfect for football training and exercising. It is critical to evaluate the implication of the "no option" alternative. If the option is upheld, the social and economic benefits envisaged to be generated by the project will be lost. It will translate to the perpetuation of the status quo which the project aims to change.

The 'No Project Option' is the least preferred from the socio-economic and partly environmental perspective, since if the project is not undertaken:

- There will be lack of professionals in the neurology and nephrology field in the East African region.
- There will be inadequate capacity in the hospital to handle increasing number of kidney patients in the East African region.
- The economic benefits, especially during construction will not be realized.
- The government will lose a lot since there will no generation of revenues.
- No employment opportunities for the East African communities during operation phase.
- Discouragement to African Development Bank to produce this level of standard and other affordable developments in the near future.

From the analysis above, it becomes apparent that the No Project Alternative is not the appropriate alternative to Kenyans, the Government of Kenya and the entire East African Community. This alternative describes a situation where the proposed development fails to be implemented. In case this happens, positive impacts associated with the proposed development will not accrue to the stakeholders, the Kenyan Government, contractors and suppliers of materials. However, from an environmental conservation perspective, this alternative will be beneficial in the sense that any potential negative impacts associated with the project will be avoided.

The —No Action Alternative should not be adopted, as we need to encourage development so long as it is undertaken on a sustainable basis as per the environmental management plan developed in this report. In addition, adopting the no action alternative will mean that the existing shortfall in specialist in the field of nephrology and urology will continue to prevail unabated. This is not viable since the African Development Bank had already committed finances and to the development of this project. Construction of these facilities will create employment, both skilled and semi skilled. If the project is stopped then the trickle-down of financial resources will not be felt in this area. In this respect, the —No project alternative‖ is deemed inappropriate.

7.1.2 Alternative Project sites

There is no other alternative site available to the proponent for the proposed development. The site is co-owned by the Kenyatta National Hospital, University of Nairobi and the Kenya Medical Training College. The site is the best for the proposed project since all the three institutions will equally benefit from the East African Kidney Institute. The current location is ideal as it is in close proximity to other related structures (i.e. KNH, KMTC and UoN). The proposed site also blends well with the neighboring institutions in the area. Assuming the project will be given a positive response after (say relocation) by the relevant Authorities including NEMA, it (project) would have been delayed for a long period before implementation.

The other consequence of this option is that it would discourage both donors and foreign/local investors especially in the building sector. In consideration of the above concerns and assessment of the current proposed site, relocation is not a viable option.

7.1.3 Alternative Construction Materials, Technology and Energy Sources

There is a wide range of construction and furnishing materials which can be sourced locally and internationally. In this construction, certified raw materials/equipments and modern technology will be used. The concrete walls will be made using locally sourced stones, cement, sand (washed and clean), metal bars and fittings that meet the Kenya Bureau of Standards requirements.

The project proponent has already put into consideration other sources of energy and will not only heavily rely on the Kenya Power Company for its energy. Alternative sources of energy such as solar energy will be utilized and electrical appliances that save energy will be given first priority. Other sources of energy already put into consideration include a standby automatic diesel generator and designs for use of the natural light.

7.1.4 Alternative wastes disposal

There are plans to recycle the kitchen water. This water will be collected and treated together with that of the ready. The project proponent plans to use this water for irrigation purposes on its grounds. The designs of the EAKI comprises of a huge ecologic area for storage on site and triage

of waste solids. Up to 4 containers can be located in this area. In addition to this, two small dumpsters for glass gathering will be placed there too.

Certified firms will be contracted to manage solid waste.

CHAPTER 8

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

8.1 Introduction

8.1.1 General

We will develop an Environmental Management Plan (EMP) for the project. The EMP is the key outcome of the Environmental Impact Assessment (EIA) process for the proposed East African Kidney Institute. In real meaning, the EMP is a mechanism to meet the recommended environmental and social mitigation measures. The EMP is an instrument that will allow the MoH, developers and other key stakeholders to integrate environmental components during implementation, operation and decommissioning phases of the project.

8.1.2 Scope and Objectives of the EMP

The Environmental Management Plan will focus on mitigating the impacts identified during the environmental assessment. It is an instrument that will allow MoH, developers, beneficiary communities and other key stakeholders to integrate environmental components during the various phases of the project. This plan is meant to establish measures and procedures to control the analyzed impacts and monitor their progress. It will achieve the following in the long run:

(i) Provide the National Environment Management Authority (NEMA) with a tool to make ease the evaluation of the objectives at different phases of the project, taking into account the Kenyan environmental legislation;

(ii) Provide clear and mandatory instructions to the proponent, beneficiary communities and other key stakeholders with regard to their environmental responsibilities in all phases of project;

(iii) Ensure continuous compliance of EAKI, beneficiary communities and other key stakeholders with Kenyan legislation and policies regarding the environment;

(iv) Assure the regulators and interested and affected parties the satisfaction of their demands in relation to environmental and social performance.

8.1.3 Applicable Legislation

The developed EMP will be in line with legislation applicable to the project. International normative instruments concerning the environment, as well as international best practice have also been considered.

8.2 Principles of Environmental Management Plan

The project should be implemented taking into account the need to minimize potential negative impacts and maximize its potential positive impacts on the biophysical and socio-economic environment as well as health and safety of workers and the public .This commitment must be made at various levels, from the senior management level of the proponent to the levels of all parties involved in the implementation of the project.

8.3 Recommendations/Commitments of the EIA

The EIA document contains a series of recommendations related to mitigation measures, monitoring and management. A key role of the EMP is to put them all in a single framework. For each identified impact in the EIA, the EMP provides in a tabular format the following:

(i) A list of mitigation measures (activities) that NIB and other key stakeholders will implement in accordance with each phase and activity of the project, to ensure that the mitigation objectives are met in full;

(ii) The role and responsibility of each of the stakeholders to ensure full implementation of mitigation measures; and

(iii) The timetable of implementation/monitoring activities.

8.4 Responsibility

The proponent assumes full responsibility for implementing and monitoring the required measures to mitigate or enhance the environmental impacts. The effectiveness of mitigation measures should be evaluated by the proponent and the contractor.

8.5 Environmental Awareness

The proponent will be sensitive to the needs of the environment so as not to degrade (or degrade to a minimum) the existing environmental conditions. It is the proponent's primary responsibility to ensure that all parties that are directly involved in the construction and operation phases of the project, including managers and employees are aware about the need to prevent or minimize environmental degradation. The awareness activities should be guided by the following issues:

(i) Prevention of pollution of surface water and groundwater;

(ii) Prevention of air quality degradation;

(iii) Prevention of increased noise levels;

(iv) Prevention/reduction of social and economic disruptions;

(v) Prevention of risks to health and safety of workers and the general public.

8.6 Mitigation

All activities related to the lifecycle of the project will be subjected to appropriate mitigation measures to ensure that negative impacts are properly mitigated and managed. Mitigation involves identifying the best options to be adopted to minimize or eliminate negative impacts, highlighting the benefits associated with the proposed project and the protection of public and individual rights. Practical measures are therefore sought to reduce adverse impacts or enhance beneficial impacts of the project.

8.7 Monitoring

The key objectives of monitoring are:

(i) To ensure that the EMP is implemented;

(ii) To evaluate the effectiveness of the mitigation measures;

(iii) To verify predicted impacts;

(iv) To provide feedback to licensing authorities.

Table 9: Planning & Design phase action plan

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
1.1 PERMIT & LICENCES							
1.1.1	To ensure compliance with Kenyan environmental legislative requirements	Apply & obtain all environmental permits & licenses required for the EAKI project including the following where applicable: o NEMA EIA license for all project components o NCA project registration certificate o WRMA borehole drilling permits o WRMA license for ground water abstraction o NEMA waste licenses o NCC Change of use of land o NCC Development approval o ERC compliance certificate	Contractor	After project approval	EMCA Cap 387		1,000,000/=
1.1.2	To minimize HIV/AIDs transmissions by employees on project site	Education & awareness training to contractor & employees at the site	NACC	Prior to commencement of construction	NASCOP guidelines	HIV & AIDS prevention & control Act 2006	750,000/=
1.2 RECRUITMENT OF WORKERS							
1.2.1	To ensure employment	Develop an suitable appropriate employment	Proponent &	Prior to	Employment	Employment	300,000/=

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
	of local persons	policy in partnership with local administration & religious institutions	Contractors	commencement of construction	policy	Act 2007	
		Communicate the recruitment policy to the general public & stakeholders	Contractor	Prior to commencement of construction	Employment policy	Employment Act 2007	
		Undertake a skills audit & develop a database of available skills in the area	Contractor	Prior to commencement of construction	Database of available local skills	Employment Act 2007	
1.2.2	To promote the use of local service providers	Develop a database of local service providers	Contractor	Prior to commencement of construction	Database of service providers in the local community	Employment Act 2007	30,000
1.2.3	To manage & control the immigration of job seekers to the EAKI project area	Develop a recruitment policy & communicate this to the general public	Contractor	Prior to commencement of construction	Recruitment Policy & communication strategy	Employment Act 2007	1.2.1 above

Table 10: Construction phase action plan

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
2.1 EMPLOYMENT OF WORKERS							
2.1.1	To promote the employment of local persons	Recruitment of local workers undertaken devoid of discrimination & in accordance with contractor's recruitment policy	Contractor	On commencement of construction activities	Database of available local skills	Employment Act 2007	1.2.1 above
2.1.2	To promote the use of local service providers	Local procurement of goods & services should be undertaken whenever practicable & cost effective to the project	Contractor	On commencement of construction activities	Database of service providers in the local community	Employment Act 2007	
2.2 SLOPE STABILISATION & SOIL PROTECTION							
2.2.1	To ensure soil conservation in the EAKI project site	All excavation works must e properly backfilled & compacted	Contractor	Continued from planning phase	Feasibility report	EMCA (1999)	2,000,000
		Rip compacted areas to reduce runoff & improve revegetation where necessary					
		The subgrade excavation & filling of side slopes should be protected to	Contractor	Continued from planning	Feasibility report	EMCA (1999)	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
		control water erosion caused by excavation		phase			
2.3 CONSTRUCTION WASTE MANAGEMENT							
2.3.1	To prevent the contamination of soils & water resources due to inappropriate handling & disposal of waste	Construction camp should have bins for collection of waste	Contractor	On site establishment	Bins for separation of waste at contractors laydown areas	EMCA(Waste management regulations 2006)	
		Construction camp should have appropriate sanitation facilities	Contractor	On site establishment	Convenient sites for toilet setup	EMCA(Waste management regulations 2006)	
		Potentially contaminated effluent(by oils &lubricants) should be captured using oil water separators	Contractor	On site establishment	Waste receptacles at laydown areas	EMCA(Waste management regulations 2006)	
		Soils contaminated with hydrocarbons should be bio remediated or disposed of as hazardous waste	Contractor	On site establishment	Bio-remediation facilities	EMCA(Waste management regulations 2006)	
		Hazardous & general waste should be separated & removed from site for disposal at licensed waste m facilities as approved by NEMA	Contractor	As required	Database of affected sites	EMCA(Waste management regulations 2006)	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
		Adoption of integrated solid waste mngt system through a hierarchy of options: o source reduction o Recycling o Composting & reuse o Combustion o Sanitary land filling	Contractor	Throughout the construction stage	Clear instructions & awareness	EMCA(Waste management regulations 2006)	
2.4:POLLUTION CONTROL MANAGEMENT							
2.4.1	To contain spillages of hazardous chemicals	All hazardous chemicals including hydrocarbons such as fuel, oils & greases should be contained in bunded areas with sufficient capacity to contain the quantity stored in the bunded area	Contractor	On site establishment	Database of affected sites	EMCA (Controlled substances regulations 2007)	
		Hazardous chemicals including hydrocarbons are to be handled over impervious surfaces	Contractor	On site establishment	Impervious surfaces including concrete slabs, drip trays e.t.c	EMCA (Controlled substances regulations 2007)	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
		Proper storage of liquids on site, such as oil, diesel & solvents should be assured as well as containment plans for accidental oil spill	Contractor	On site establishment	Database of affected sites	EMCA (Controlled substances regulations 2007)	
		Proper maintenance of construction vehicles & equipment	Contractor	On site establishment	Impervious surfaces including concrete slabs, drip trays e.t.c	EMCA (Controlled substances regulations 2007)	
2.5 AIR QUALITY & DUST MANAGMENT							
2.5.1	To minimize the entrainment of dust during construction	Regular surface wetting should be implemented during dusty operations especially during the dry season	Contractor	On commencement of construction activities	Minimum of 50% control efficiency to be obtained	EMCA(Air quality regulations 2014)	400,000
		Strict on-site speed controls to be enforced	Contractor	On commencement of construction activities	Minimum of 50% control efficiency to be obtained	EMCA(Air quality regulations 2014)	
2.6 NOISE & VIBRATION							

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
2.6.1	To minimize disturbance due to noise & vibration	All generators & heavy-duty equipment are to be insulated to minimize the ambient noise levels	Contractor	Throughout construction phase	Clear instructions & awareness campaign	EMCA (Noise & vibration control regulations 2009)	
		Load & offloading of materials must be careful so as to reduce noise disturbance to neighbouring sensitive receptors	Contractor	Throughout construction phase	Clear instructions & awareness campaign	EMCA (Noise & vibration control regulations 2009)	
		Strict measures should be undertaken to minimize loud noise in sensitive areas (hospital, educational institutions & residential areas)	Contractor	Throughout construction phase	Clear instructions & awareness campaign	EMCA (Noise & vibration control regulations 2009)	
2.7 OCCUPATIONAL HEALTH & SAFETY							
2.7.1	To ensure healthy & secure environment at the EAKI site for all the construction workers	Management must ensure that First Aid Kits are provided at strategic locations at all construction points	Contractor	Throughout construction phase	Occupational health & safety policy	OSHA, 2007	4,000,000
		All vehicles & construction equipment should be under control of competent personnel	Contractor	Throughout construction phase	Occupational health & safety policy	OSHA, 2007	
		Adequate equipment for emergency response should be provided at the	Contractor	Throughout construction	Occupational health & safety	OSHA, 2007	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
		construction site to deal with emergencies		phase	policy		
2.7.2	To establish a proper accident & emergency response strategy	The construction company shall establish an emergency leading group, accident scene command group, an accident treatment group, a guard & defense group, a medical aid group, an environmental monitoring group, a logistics group, an accident investigation team	Contractor	Throughout construction phase	Occupational health & safety policy	OSHA,2007	
2.8 PUBLIC HEALTH							
2.8.1	To promote awareness on issues related to STIs & HIV/AIDS	Continuation of awareness program on risks associated with STIs & HIV/AIDS will be undertaken at project site	Contractor/ EAPI/ MoH	Continuation from planning phase HIV/AIDs	Community Awareness Program	Public Health Act 1986, National HIV/AIDs policy	See 1.1.2 above
		Development & implementation of an awareness program on risks associate with STIs & HIV/AIDs for construction workforce	Contractor/ EAPI/ MoH	Continuation from planning phase HIV/AIDs	Community Awareness Program	Public Health Act 1986, National HIV/AIDs policy	
		The use of preventive measures like condoms by availing condom dispensers to construction staff will be	Contractor/ EAPI/MoH	On commencement of	National HIV/AIDs policy	Public Health Act 1986, National	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
		undertaken		construction activities		HIV/AIDs policy	

Table 11: Operational Phase

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
3.1 BIOMEDICAL WASTE MANAGEMENT							
3.1.1	To prevent biological & physical hazards associated with the handling of medical waste	Develop waste management system complete with training program for in-house waste handlers	EAKI/Public health officer	On commissioning of facility	Documented waste management policy	EMCA(Waste management regulations 2006)	3,500,000
		Adopt waste minimization practices	EAKI	On commissioning of facility	Training manuals for waste handlers	EMCA(Waste management regulations 2006)	
		Segregate waste at point of generation	EAKI	On commissioning of facility	Waste receptacles at points of segregation	EMCA(Waste management regulations 2006)	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
		Waste containers to be labelled/color-coded depending on waste category	EAKI/ Public health officer	On commissioning of facility		EMCA(Waste management regulations 2006)	
		Contract a NEMA licensed waste contractor for offsite waste disposal	EAKI/ CDE	On commissioning of facility		EMCA(Waste management regulations 2006)	
		Maintain logs of solid waste quantities	EAKI	On commissioning of facility		EMCA(Waste management regulations 2006)	
		Preventive maintenance of on-site incinerator	EAKI	On commissioning of facility			
3.2 WASTEWATER MANAGEMENT							
3.2.1	To minimize wastewater generation & encourage onsite recycling	Preventive maintenance of WWTP to avoid downtime in operation	EAKI	On commissioning of facility	WWTP maintenance program	EMCA(Water quality regulations)	1,300,000/=
		Automate monitoring of quality of treated water to be integrated into the BMS	EAKI	On commissioning of facility	Integration of environmental parameters into BMS	EMCA(Water quality regulations)	
3.2.2	To avoid pollution of ground & water	Periodic removal of sludge from WWTP	EAKI	Periodic	WWTP maintenance	EMCA(Waste	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
	by sludge from WWTP	for incineration			program	regulations	
3.2.3	To prevent pollution of ground & water source by oils & greases.	Encourage off-site recycling of sludge from grease traps and OWS	EAKI	Periodic	OWS & grease trap cleaning program	EMCA(Waste regulations	
3.3 INCREASED ENERGY DEMAND							
3.3.1	To optimize energy usage	Installation of energy efficient fixtures such as LED lighting, solar tubes.	EAKI	Project design	Schematic designs	Energy Act	250,000/=
3.3.2	To promote use of renewable energy sources	Intensive utilization of solar resources for heating & lighting within & around the facility	EAKI	Project design	Schematic designs	Energy Act	
3.3.3	To promote a culture of energy conservation at EAKI facility	Training of staff on use & optimization of the BMS	EAKI	On project commissioning	Project handover notes	Energy Act	
		Conducting periodic energy audits to identify areas for improvement	EAKI/ ERC	Periodically	BMS energy records	Energy Act	
3.4 INCREASED WATER DEMAND							
3.4.1	To optimize water use at the facility	Develop water management system complete with training program for staff sensitization	EAKI	On project commissioning	Bench marking of water consumption	Water Act 2016	1,900,000/=

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
		Install water saving fixtures such as dual flush toilets, automatic shut-off taps, and low volume high pressure shower heads.	EAKI	Project design	Detailed Schematic designs	Water Act 2016	
		Monitor water use through sub-metering at key departments	EAKI	On project commissioning	BMS integration with water utility	Water Act 2016	
3.4.2	To promote a culture of water conservation	Avoid use of portable water for irrigation & vehicle washing purposes	EAKI	On project commissioning	Plumbing & drainage drawings	Water Act 2016 EMCA	
		Use of indigenous vegetation in landscaping to minimize water requirements		Rehabilitation & landscaping	Landscaping schematics	EMCA	
3.5 INCREASED TRAFFIC VOLUME							
3.5.1	To optimize traffic flow within EAKI & adjacent access roads	Designate vehicle registration & checkpoints inside the premise to avert unnecessary traffic snarl up along adjacent road caused by vehicle waiting to access the hospital.	EAKI/KURA	Project design	Traffic survey	Traffic Act	500,000/=
		Prioritize access & circulation area for public transport within the facility	EAK/ KURA	Project design	Traffic survey	Traffic Act	
3.6 INCREASED STORM WATER & SURFACE RUNOFF							

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
3.6.1	To manage storm water in a sustainable manner	Harvest rain from roof for non-portable uses such as cleaning, flushing fire fighting & landscaping	EAKI	Continuous	Plumbing & reservoirs water	Water Act 2016	
3.7 OCCUPATIONAL HEALTH & SAFETY INCIDENCES							
3.7.1	To promote a healthy, safe & conducive working environment for employees	Conduct statutory trainings under OSHA 2007 & subsidiary regulations: o Basic first aid o Fire safety training o Occupational Safety & Health committee training	EAKI	Periodic	Safety policy	OSHA 2007	1,000,000/=
		Conduct statutory assessments through licensed advisors & auditors: o Risk assessment o Fire safety audits o OSH audits	EAKI/ Safety Advisor	Periodic	Safety policy	OSHA 2007	
3.8 ENVIRONMENTAL MONITORING							
3.8.1	To monitor & document the impact of EAKI on	Undertake regular monitoring according to the environmental monitoring	EAKI	Continuous	Compliant BMS	EMCA	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Ref guideline/Std	Estimated cost (Ksh)
	the environment						
3.9 ENVIRONMENTAL AUDIT							
3.9.1	To ensure compliance & enforcement of the ESMP planning & design at pre-project phases	Undertake annual environmental audit (EA)	Third party consultants in collaboration with EAKI	Annually	NEMA approved ESIA report & licensing conditions	EMCA	

Table 12: Decommissioning Phase

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Guideline/ Standard	Estimated cost (Ksh)
4.1 PLANNING							
4.1.1	To promote the success of environmental restoration of construction	A detailed closure & rehabilitation plan is to be completed for the site to be decommissioned aimed at minimizing identified environmental risks	Contractor/ EAKI	Prior to start of rehabilitation	Closure & rehabilitation	ESIA	
4.2 WASTEWATER MANAGEMENT							
4.2.1	To ensure safe & appropriate disposal of waste generated during decommissioning	All waste is to be checked for contamination with hazardous material	Contractor/ EAKI/CDE	Prior to start of rehabilitation	Closure & rehabilitation	ESIA/EMCA	1,300,000/=
		Waste material are to be separated into salvageable (scrap metal) & non-salvageable materials	Contractor/ EAKI/CDE	Prior to start of rehabilitation	Closure & rehabilitation	ESIA/EMCA	
		Salvageable waste is to be removed from site for recycling	Contractor/ EAKI/CDE	Prior to start of rehabilitation	Closure & rehabilitation	ESIA/EMCA	
		General waste (not contaminated with hazardous substances) is to be disposed at a general waste disposal facility	Contractor/ EAKI/CDE	Prior to start of rehabilitation	Closure & rehabilitation	ESIA/EMCA	
		Hazardous waste is to be disposed off at hazardous waste facility	Contractor/ EAKI/CDE	Prior to start of rehabilitation	Closure & rehabilitation	ESIA/EMCA	

REF No.	Objective	Mitigation Action	Responsibility	Time frame	Requirements for Implementation	Guideline/ Standard	Estimated cost (Ksh)
4.3 REHABILITATION							
4.3.1	To facilitate successful restoration of land capability of infrastructure areas	All infrastructure are to be demolished & removed	Contractor/ EAKI/CDE	During rehabilitation	Closure & rehabilitation	ESIA/EMCA	
		All demolished material & a footprint area is to be checked for contamination with hazardous substances & hazardous material to be removed & disposed of as hazardous waste	Contractor/ EAKI/CDE	During rehabilitation	Closure & rehabilitation	ESIA/EMCA	

CHAPTER 9

9 CONCLUSION & RECOMMENDATIONS

9.1 Conclusion

The proposed project is a timely undertaking. It will have multiple positive impacts on renal treatment and research within the country and the East African region. The design of the project needs to meet all the requirements of planning and regulatory bodies and secure all necessary approvals for its take off. The environmental and social examination as contained in this report has no objection in its implementation.

The likely negative impacts of the project have been considered at all the stages of the project establishment and management cycle namely- construction/establishment, operation and decommissioning. The necessary mitigation measures have been proposed. The measures are contained in this report. The ESIA team has implored on the proponent to implement the project subject to the proposed mitigation measures. In doing this, the proponent shall be guided by environmental experts and other relevant professionals. This will enable the unforeseen impacts to be identified at whatever stage of the project and appropriate mitigation measures swiftly implemented in the course of implementation of the project.

9.2 Recommendations

The following are recommended for implementation:

i. Project proponent should subdivide the project plot into two plots, one plot will be retained for recreational purpose while the other plot will be used for the proposed project – by applying for a change of use of the land from the current recreational to institutional use;
ii. Prior to the commencement of construction activities for the EAKIP, the project proponent should construct a modern standard football pitch on the plot which will be retained for recreational purpose.
iii. EAKI should implement a robust waste management system meeting NEMA and WHO standards; and
iv. EAKI should install a Building Management System (BMS) which will have parameters for monitoring of water & energy resource use

CHAPTER 10

10 REFERENCES

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11 APPENDICES

Appendix 1 Current EIA/EA Practicing License for the ESIA Experts

Appendix 2 Copies of Land Ownership Documents

Appendix 3 Evidence of stakeholders' participation in the ESIA process

Appendix 4 Copy of architectural drawings for the project