ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT STUDY REPORT FOR THE PROPOSED **LILIES OF HEAVEN FUNERAL HOME** ON LR. KIINE/SAGANA/6129 MAKUTANO, MWEA WEST SUB LOCATION, MWEA CONSTITUENCY, KIRINYAGA COUNTY.

GPS LOCATION: Long: 37^0 14'43.84788" E Lat: 0^0 40'53.77764 S Alt: 1274 m.a.s.l

PROJECT PROPONENT	LEAD EXPERTS
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FEBRUARY 2023.

CERTIFICATION

This Environmental Impact Assessment study report was prepared in accordance with the Environmental Management and Coordination Act (EMCA) 1999 and the Environmental Impact Assessment and Audit Regulations 2003 of the National Environmental Management Authority (NEMA). The study and subsequent report for the proposed **Lilies of Heaven Funeral Home** in Kirindahi village, Rukanga sub-location, Makutano location, Mwea West Sub-County in Kirinyaga County was conducted and the project report was prepared by registered Environmental Experts.

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EXECUTIVE SUMMARY

This document is an Environmental and Social Impact Assessment (ESIA) study report for the Proposed ***Lilies of Heaven Funeral Home*** that is to be located at Kirindahi village, Rukanga Sub-location, Makutano Location, Mwea west,Sub-County,on plot number LR.Kiine/Sagana/6129 Makutano along the Nyeri-Makutano-Nairobi Highway, Kirinyaga County.

The proposed funeral home is bordered by a road, 3 homesteads and cultivated pieces of land under maize crops. This report is prepared in accordance with Section 58 to Section 67 and Section 138 of the Environmental Management and Coordination Act (EMCA), 1999 (Cap. 387) that require all projects listed under the second schedule of the Act to undertake environmental assessments and submit it to NEMA for approval and licensing before commencement. The subsidiary legislation to the Act, the Environmental (Impact Assessment and Audit) Regulations, 2003 provides the framework for carrying out ESIAs and EAs in Kenya by NEMA licensed experts. Environmental and Social Impact Assessments (ESIAs) should be followed by annual Environmental Audits (EAs) beginning 12 months from the date of commissioning of operations in order to determine the projects' compliance with regulations and set standards.

The purpose of ESIA is to identify potential positive and negative environmental and social impacts associated with the proposed project and thus provide recommendations on how to take advantage of the positive impacts and how to mitigate the negative environmental impacts.

The objective of the proposed project is to develop a modern Funeral Home for storage of human corpses as they await identification and/or removal for autopsy or disposal by burial, cremation or by any other legal method. The estimated cost of the proposed project is Ksh. 7,500,000. The construction of the proposed project will employ best and modern building technologies and materials that conform to the Kenya Bureau of Standards (KEBS) and internationally accepted standards. The materials will be obtained locally through delivery contracts approved through best procurement practices.

The ESIA team carried out the assessment using a combination of methods including ground survey and questionnaires with the neighbors, project management and other interested people and parties including the area residents and administration. From the public consultation process it was evident that the project has enough public support.

Potential beneficial and adverse environmental and social impacts associated with the proposed

project were identified and discussed. The main positive contribution of the proposed project is the creation of a modern Funeral Home to serve residents of Makutano area and the environs, as well as other areas. Other benefits include capital into the economy, revenue to the government, increased demand for raw materials, creation of employment opportunities, improved aesthetics, optimal use of land and development in the area.

A summary of these potential impacts and a brief description of their mitigation measures has been provided. The study report complies with the requirements of the Environmental Management and Co-ordination Act, (EMCA), 1999 and takes into consideration the Kirinyaga County Government (NCG) by-laws and the applicable international standards. At the end of the report, are recommendations for construction of the proposed ***Lilies of heaven Funeral Home*** which will ensure that environmental impacts are identified and mitigated during all phases of the proposed project and will inform in decision making during preparation of the environmental management,plan(EMP)

LIST OF ABBREVIATIONS AND ACRONYMS

EA	Environmental Audit
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EMP	Environmental Management and Monitoring Plan
ESIA	Environmental and Social Impact Assessment
GOK	Government of Kenya
Ha	Hectare (unit of measuring land area)
Hr. (s)	Hour(s)(A unit of measuring time)
KCG	Kirinyaga County government
KFS	Kenya Forest Service
Km	Kilometer (A unit of measuring distance)
Km2	Square kilometer (unit of measuring area)
Ksh.	Kenya shilling(s) (a unit of measuring currency in Kenya)
KWS	Kenya Wildlife Service
NCA	National Construction Authority
NCLR	National Council for Law Reporting
NEAP	National Environment Action Plan
NEC	National Environmental Council
NEMA	National Environment Management Authority
NMK	National Museums of Kenya
OSHA	Occupational Health and Safety Act
P. O.	Post Office
PPE	Personal Protective Equipment
Reg No.	Registration number
TOR	Terms of Reference

CHAPTER ONE

INTRODUCTION

1.0 Proposed Project

The proposed ***Lilies of Heaven Funeral home*** will be constructed on LR. Kiine/Sagana/6129 Makutano Kirindahi Village, Rukanga sub-location, Makutano location, Mwea West sub-county, Mwea Constituency **.**

The proposed is 2.5 Km from Sagana township along the Nyeri-Makutano-Nairobi Highway, as the following attached google map capture.

The proposed plot site is marked with red.

1.2 Nature of the project;

The proposed ***Lilies of Heaven Funeral Home*** is designed as follows:

a) The building will have the following rooms; Reception area, Cold rooms, Body holding and embalming, VIP Lounge, flowers and caskets shop, directors office,lobby, verandah, washrooms, chapel and viewing, waiting lounge, bed sitters for office workers, Stalls and an entry porch.

b) The working areas; cold room, body preparation and embalming areas will have concrete working tops fitted with sinks and there will be separate flush toilets and bathrooms.

c) There will be passages within the building to provide access into the rooms within the building.

d) Other structures to be constructed at the proposed site are:

i. Four staff quarters;

ii. A concrete fence with a singular gate; and

iii. An incinerator for management of solid wastes.

Details of the design components are shown on the attached approved architectural plans for the proposed building protected under the Copyright Act;

The facilities, utilities and services to serve the proposed project include the following:

Adequate storm drainage channels will be constructed to direct storm water into existing open storm drainage channels along the Nyeri- Makutano highway culverts. Gutters will be installed on the building to harvest rainwater and thus reduce the amount of surface run-off from the site. Water for use at the proposed Funeral Home will be drawn from Rwasco water project that supplies water in area. Rain water will also be harvested from the building for use at the site. These will form major water sources in all the phases of the proposed project.

a) The site will be fenced with a perimeter wall and will be provided with a lockable gate to ensure privacy and enhance security. Security lightingwill be provided at night to enhance security.

b) All effluent from the proposed funeral home will be channeled to a constructed septic tank and waste water discharged into a soak pit. Upon filling with solid effluent, the septic tanks will be disposed by a licensed exhauster company.

c) Different solid wastes from the site will be collected and disposed of by appropriate methods such as incineration, decomposing and collection by private or public recycling

companies and cleaning companies/agents contracted by the Proponent for appropriate disposal.

d) Appropriate fire management equipment such as fire extinguishers, a fire hose reel, and fire alarms among others will be installed through a licensed fire officer at appropriate points inside and outside the proposed building.

e) On completion of the construction, the site will be landscaped with appropriate plants

1.3 Rationale for the EIA project

1.3.1 Purpose of the EIA

The purpose of the environmental impacts assessment project report is to identify the consequences of implementing the project and help in informing decision makers.

1.3.2 Objectives

The objective is to identify the environmental and social impacts of the project and accept the positive impacts while presenting mitigation measures for the negative impacts.

1.3.3 Terms of Reference

For sustainable development, the report needs to meet the objectives of the EIA. Therefore, TOR outlining the expectations of the ESIA was documented by the Proponent and the ESIA team to provide a basis for the assessment. The following was done in order to achieve these objectives:

a) Environmental baseline conditions of the proposed project area were generated.

b) Described the proposed project by giving clear accounts of its location; design; construction and operational activities; material usage; products and by-products including wastes to be generated in all phasesand the methods of their disposal; and likely environmental changes.

c) Obtained views and opinions of the interested and affected persons through consultations and through a public meeting with the local leaders, the neighbors, business operators and the larger area residents in the vicinity of the proposed project.(See Appendix)

d) Established key areas of environmental, health and safety concerns focusing on both the positive and negative effects in relation to how they affect the biophysical, social, economic and cultural components of the environment.

e) Analyzed impacts and recommended mitigation and enhancement measures for the

adverse and positive impacts respectively. The analysis of potential impacts related to the location; design; applicable technologies; and construction and operation activities of the proposed project.

1.3.4 Assessment Methodology

The assessment involved:

a) Project site tours to physically inspect and document existing facilities at the site and natural and socio-economic features of importance.
b) Environmental screening to determine the necessity and level of the ESIA process
c) Undertaking public consultations and carrying out a public meeting with the local leaders, the neighbors, business operators and the larger area residents in the vicinity of the proposed project and desktop studies for documentary review on the nature of the activities of the proposed project, related documents, plans, designs, policy and legislative frameworks as well as the environmental setting of the area amongst other things.

1.3.5 Limitations

i. The main limitation to this assessment is that some of the information was compiled based on responses of the owner and the stakeholders involved. There are difficulties in verification of some of this kind of information. Therefore, the information obtained has been evaluated within the limits of the established scope of work.

1.4 Literature Review on Socio-economic and Environmental Impacts of a Funeral Home.

A funeral home, funeral parlor or mortuary, is a business that **provides burial and funeral services for the dead and their families**.

1.4.1 Social Impacts of Funeral Homes Within Communities

Funeral homes are a Western concept just like many concepts that include nursing homes, home based care and hospitals that are offering modern solutions to social, medical and family issues.
Traditionally many African communities did not bury their dead. The dead were thrown or left in the wild and became food for hyenas. In the book, 'From Hyenas to Tombs in the book FUNERALS IN AFRICA, Explorations of a Social Phenomenon.' "Kikuyu people very rarely buried their dead". In fact, in

describing the internment of an elder in the Agikuyu Guild, one of the groups that made up the Kikuyu (the other being the Ukabi Guild), Prof Mbugua notes, “the funeral was not attended by close family members, including wives or even friends. Agikuyu feared and avoided burials”. In addition, just as they accepted death as a necessary transition to the spirit world, they seem to have been keen to make the most of their time in the flesh.

Today many communities are embracing their dead without fear. Services such as those offered by funeral homes have revolutionized the entire death mystery making it palatable for modern communities.

1. Funeral homes arrange services in accordance with the wishes of surviving friends and family, whether immediate next of kin or an executor so named in a legal will.
2. If the home is easily accessible to the families it reduces, travel costs and arranges for families to visit and put closure with the deceased.
3. Give families ample time to organize themselves and to prepare for burial of their loved ones.
4. The funeral home often takes care of the necessary paperwork, permits, and other details, such as arranging with the cemetery, and providing obituaries to the news media. The funeral business has a history that dates to the age of the Egyptians who mastered the science of preservation.
5. In recent years, many funeral homes have started posting obituaries online and use materials submitted by families to create memorial websites.
6. They reduce the trauma families incur in the event of their deceased. The homes treat the dead bodies with dignity; reconstruct some of those who die fatally. When a body is brought to a funeral home, it is sometimes embalmed to delay decomposition or to make the viewing of the body more pleasant. The procedure typically involves removing sufficient blood material to accommodate the preservative chemicals and dyes, aspirating the internal organs and setting the facial features. Cosmetics are used with the consent of the family to improve the appearance of face and hands for a more natural look. If the face or hands are disfigured by accident, illness or decomposition, the embalmer may utilize restorative techniques to make them presentable for an "open casket" service. If this is not possible, or the family wishes, the funeral home can perform a "closed casket" service. This will reduce posttraumatic effects.
7. They can prepare, and ship the deceased to their burial destination without the presence of their loved ones.
8. They offer other posthumous services such as cremation, and mass burials
9. The said funeral home is located at an ideal location. The human population is minimal and it has a good network linking it with other counties.

1.4.2 Disadvantages

1. These are businesses; come with high costs, and can be a preserve for few but the good thing is that family members can come together and raise funds.
2. In the event of extreme vulnerability some funeral homes come to the aid of these families by reducing costs to what is affordable
3. Funeral homes come with environmental challenges but this home has made all efforts to be environmentally friendly.
4. Sometimes people fail to identify the dead bodies of their kin for collection or collect by their Kin for burial. The home should enter an agreement with the government to include such bodies for mass interment.

CHAPTER TWO.

THE PROJECT DESCRIPTION AND BASELINE INFORMATION.

2.1 NATURE OF THE PROJECT;

The proposed ***Lilies of Heaven Funeral Home*** is designed as follows:

a) The building will have the following rooms; Reception area, Cold rooms, Body holding and embalming, VIP Lounge, flowers and caskets shop, directors' office, lobby, verandah, washrooms, chapel and viewing, waiting lounge, bed sitters for office workers, Stalls and an entry porch.

b) The working areas; cold room and body preparation and embalming areas will have concrete working tops fitted with sinks and there will be separate flush toilets and bathrooms.

c) There will be passages within the building to provide access into the rooms within the building.

d) Other structures to be constructed at the proposed site are:

i. Four bed sitters staff quarters

ii. A concrete fence with 1 gate;

iii. An incinerator

Details of the design components are shown on the attached approved architectural plans for the proposed building protected under the Copyright Act;

The facilities, utilities and services to serve the proposed project include the following:

a) Adequate storm drainage channels will be constructed to direct storm water into existing open storm drainage channels along the Nyeri-Makutano-Nairobi highway. Gutters will be installed on the building to harvest rain water and thus reduce the amount of surface run-off from the site.

b) The site will be connected to piped water from Rwasco Water Project.

c) The site will be fenced with a perimeter wall and will be provided with alockable gate to ensure privacy and enhance security. Security lighting will be provided at night to enhance security.

d) All effluent from the proposed funeral home will be channeled to a septic tank to be constructed at the site and waste water discharged into a soak pit. Pit latrines are constructed within the institution to provide back-up to the in-house sanitary facilities.

e) Different solid wastes from the site will be collected and disposed of by appropriate methods such as incineration, decomposing and collection by private or public recycling companies and cleaning companies/agents contracted by the Proponent for appropriate disposal.

f) Appropriate fire management equipment such as fire extinguishers, a fire hose reel, and fire alarms among others will be installed through a licensed fire officer at appropriate points inside and outside the proposed building.

g) On completion of the construction, the site will be landscaped with appropriate plants.

h) Description of the proposed project activities

The proposed project will have the construction, operation and decommissioning phases if approved and licensed. The Proponent is advised not to continue with any construction works relating to the proposed project until the ESIA report is reviewed and the ESIA license issued. Below is a summary of the main activities under each phase of the proposed project:

Construction

a) Site preparation and mobilization of construction personnel, equipment and construction material

b) Removal of vegetation, rubbish and unwanted and/or old structures from the construction site

c) Excavation and building development

d) Use of machinery, hand tools and equipment and employment of human labour

e) Environmental management

Conditions provided for construction are as indicated in the architectural design.

Construction materials will be purchased locally.

Operation

a) Commissioning the proposed building for use as a funeral home.

b) Cleaning and refrigeration of human bodies

c) Identification, postpartum; management by wrapping or clothing; displaying; viewing and removal of human bodies for autopsy or for disposal by burial, cremation or by other legal methods

d) Health, hygiene, safety and environmental management and monitoring

Decommissioning

a) Demolition or change of use

b) Rehabilitation and/or restoration

All stages of development will employ modern technology.

2.2 BASELINE INFORMATION FOR SAGANA AREA.

2.2.1 Climate

The proposed project area is located in an area with subtropical humid type in character with dry and wet periods. In Sagana, the wet season is mostly cloudy, the dry season is partly cloudy, and it is warm year round. Over the course of the year, the temperature typically varies from *15° C* to *28°C* and is rarely below *13.8°C* or above *31.1^{0}C*. In Sagana, the average percentage of the sky covered by clouds experiences *significant* seasonal variation over the course of the year.

The *clearer* part of the year in Sagana begins around *June 29* and lasts for *3.5 months*, ending around *October 13*. The clearest month of the year in Sagana is *September*, during which on average the sky is *clear*, *mostly clear*, or *partly cloudy 53%* of the time.The *cloudier* part of the year begins around *October 13* and lasts for *8.5 months*, ending around *June 29*.The cloudiest month of the year in Sagana is *April*, during which on average the sky is *overcast* or *mostly cloudy 74%* of the time.

A *wet day* is one with at least *0.04 inches* of liquid or liquid-equivalent precipitation. The chance of wet days in Sagana varies very significantly throughout the year.

The *wetter season* lasts *7.0 months*, from *October 18* to *May 19*, with a greater than *36%* chance of a given day being a wet day. The month with the most wet days in Sagana is *April*, with an average of *17.5 days* with at least *0.04 inches* of precipitation.

The *drier season* lasts *5.0 months*, from *May 19* to *October 18*. The month with the fewest wet days in Sagana is *July*, with an average of *3.6 days* with at least *0.04 inches* of precipitation.

Among wet days, we distinguish between those that experience *rain alone*, *snow alone*, or a *mixture* of the two. The month with the most days of *rain alone* in Sagana is *April*, with an average of *17.5 days*. Based on this categorization, the most common form of precipitation throughout the year is *rain alone*, with a peak probability of *63%* on *April 21*.

Sagana experiences *extreme* seasonal variation in monthly rainfall. Rain falls throughout the year in Sagana. The month with the most rain in Sagana is *April*, with an average rainfall of *5.1 inches*.The month with the least rain in Sagana is *July*, with an average rainfall of *0.5 inches*.

The length of the day in Sagana does not vary substantially over the course of the year, staying within *9 minutes* of *12 hours* throughout. In 2023, the shortest day is *June 21*, with *12 hours, 5 minutes* of daylight; the longest day is *December 22*, with *12 hours, 10 minutes* of daylight.

Topography

For the purposes of this report, the geographical coordinates of Sagana are -0.667 deg latitude, 37.200 deg longitude, and 3,980 ft elevation.

The topography within *2 miles* of Sagana contains *significant* variations in elevation, with a maximum elevation change of *817 feet* and an average elevation above sea level of *3,992 feet*. Within *10 miles* contain *significant* variations in elevation (*2,165 feet*). Within *50 miles* contains *large* variations in elevation (*15,079 feet*).

The area within *2 miles* of Sagana is covered by *cropland* (*54%*), *trees* (*26%*), and *grassland* (*19%*), within *10 miles* by *cropland* (*61%*) and *trees*(*33%*), and within *50 miles* by *cropland* (*40%*) and *trees* (*37%*

The proposed funeral home is located within a ground that is gently flat and graduates to a gradient towards the west. The ground landscape gently rises northwards into Mt. Kenya with a topography of less than 20%.

2.2.3 Land use

The average farm size per house hold is 2 acres. Most farmers have cultivated about 0.5 acres and left with indigenous vegetation the 2 acres. The crops grown are maize and beans with some farmers planting bananas and sweet potatoes.

2.2.4 Water source

The area receives water from Rwasco water project, There are other sources of water from river sagana which is only 400 meters from the proposed site, river Rwamutha among others. The water is stored in tanks for equitable sharing. It is not treated. The proponent can also get water from the water supply at nearby rivers.

2.2.5 Communication and Population

The area is easily accessible via a tarmac road from Nyeri –Makutano-Nairobi Tarmac road. The administrative town is Kerugoya and Kutus, the County Headquarters.

2.2.6 Socio- Economic Conditions

The area residents get their income from agricultural produce, i.e maize and beans, and the livestock. Farmers sell their produce either through middlemen or at Sagana town.

CHAPTER THREE

3.0 RELEVANT POLICY, LEGAL AND LEGISLATIVE FRAMEWORK

This chapter will cover some of the relevant regulations, standards and policies and the local and national levels governing environmental quality, health and safety and protection of sensitive ecosystems.
Some of the pertinent legislations that will be considered relevant for the study include:

3.1 Environment Management and Co-ordination Act, 1999

The main objective of the EMCA, 1999 (Amended 2015) is to provide for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya. The Act further aims to improve the legal and administrative coordination of the diverse sectoral initiatives in the field of environment so as to enhance the national capacity for its effective management.

3.1.1 The Environmental (Impact Assessment and Audit) Regulations 2003

On June 13th 2003, the Minister of Environment, Natural Resources and Wildlife promulgated the Environment (Impact Assessment and Audit) regulations 2003 (EIA/EA Regulations) under section 147 of the EMCA. These regulations provide the framework for carrying out EIAs and EAs in Kenya.

Body storage facilities as an activity listed on section 8 of the second schedule of the main Act, as an activity that requires a full EIA study before commencement. This necessitates the need for the EIA report.

3.1.2 The Environmental Management and Co-ordination (Water quality) Regulations 2006

The regulations set stringent controls to protect sources of water for domestic use. Section 4(1&2) 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” and 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”. Section 5 of the regulation states that: - “All sources of water for domestic uses shall comply with the standards set out in the first schedule to the regulation”.
The regulations also prohibit abstraction of groundwater or carrying out any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of water, without an environmental impact assessment license issued in accordance with the provision of the Act in section 6.

3.1.3 The Environmental Management and Co-ordination (Waste Management) Regulations 2006

These regulations are described in legal Notice No. 121 of the Kenya Gazette supplement No. 69, 2006. They offer legal provisions on handling of a variety of wastes emanating from various projects and activities. These regulations outline requirements for handling, storing, transporting and treatment of all waste categories as provided.

3.2 Physical Planning Act (Cap 286)

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

Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development permission granted by the respect local authority.

All the development should follow these stipulated procedures laid down by this Act before the project commencement

3.3 Land Planning Act (Cap 303)

Section 9 of the subsidiary legislation (The Development and Use of Land Regulations, 1961) under this Act requires that before the local authorities submit any plans to then Minister (Now Cabinet Secretary) 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. This intended to reduce conflict with the interest such as settlement and other social and economic activities.

3.4 Water Act, 2016

Part II, section 18, of the Water Act 2016 provides for national monitoring and information system on water resources. Following on this, sub-section 3 allows the Water Resources Management Authority (WRA) to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may require to be kept by a facility operator and the information there of furnished to the authority.

Section 73 of the Act allows a person with a license (licensee) to supply water to make regulations for the purposes of protecting against degradation of water resources. Section 75 and sub-section 1 allows the

licensee to construct and maintain drains sewers and other works for intercepting, treating or disposing of any foul of arising or flowing upon land for preventing pollution of water sources within his / her jurisdiction.

Section 76 states that no person shall discharge any trade effluent from trade premises into sewers of a licensee without the consent shall be issued on conditions including payment of rates for the discharge as may be provided under section 77 of the same Act.

3.5 Penal Code Act (Cap 63)

Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same act says persons / institution is dwelling or business premises in the neighborhood or those passing along public way, commit an offence.

3.6 Agriculture Act (Cap 318)

The Agricultural Act cap 318 of the laws of Kenya seeks to promote and maintain a stable Agriculture to provide for the conservation of the soil and its fertility and to stimulate the development of Agricultural land in accordance with the accepted practices of good land management.

3.7 Work Injury Benefits Act, 2007

This Act provides for all employees, including employees employed by the Government, other than the armed forces, in the same way and to the same extent as if the Government were a private employer compensation for injuries and diseases obtained/ acquired in course of employment.

3.8 Public Health Act

The acts provide the impetus for a healthy environment and outlines regulations on waste management, pollution control and Human health. By providing guidelines of water quality, size of rooms, basic hygiene and the optimal sanitation standards. The Act therefore provides for the necessary legal guidelines regulating measures aimed at effective control and management of the said issues.

3.9 Occupational Safety and Health Act, 2007

This is an Act of Parliament to provide for the safety, health and welfare of the workers and all persons lawfully present at workplaces, to provide for the establishment of the National council for Occupational

safety and health and also for connected purposes. It applies to all workplaces where any person is at work, whether temporary or permanently. During all the phases the project management must adhere to the requirements of this act.

3.10 The Kenya Roads Board Act

This is the main legal instrument that governs the management of the road network in Kenya.

There will be need for consultation with the KENHA before the alteration of some registered roads as well as the establishment of other access roads for canals, drains or other associated physical structures within the project area.

CHAPTER FOUR

4.0 ENVIRONMENTAL ISSUES

4.1 ISSUES DURING CONSTRUCTION AND OPERATIONAL PHASE

4.1.1 Loss of vegetation and bio-diversity

The land on which the proposed project is to be constructed currently is bare with a few scattered trees and grass was been used for agriculture before. The change in land use will lead to an insignificant loss of vegetation biodiversity. The proposed project will carry out land scaping thus incorporating the planting of numerous species of trees, grass and flowers. These provide sanctuary to different bird and insect's species. The vegetation cover at the site is currently below 10% of shrubs and grasses. The implementation of the project will result in the removal of the vegetation cover and its replacement with buildings and other facilities. The removal of vegetation will lead to destruction of animal habitats.

4.1.2 Noise

Noise is an unwanted or undesired sound. Extremely high noise levels may cause rapture of the basilar membrane with resultant severe hearing loss. High-frequency noise will produce more damage than low frequency noise. However, the longer the duration of exposure, the greater the potential hazard. Noise that is continuous for more than 5 hours a day at a level of 85 to 90 decibels or more is injurious to hearing.

4.1.3 Ground water

The construction areas of the project will not excavate lands to depths greater than 4 meters. Chemical waste will be handled through constructed effluent collection soakpits that will be constructed using impermeable materials.

4.1.4 Soil erosion

The construction activities in the project site may cause minimal soil erosion. Proposed project site will establish an elaborate drainage system lined with an impervious surface to reduce soil erosion. This will therefore significantly reduce surface run-off from the site thus minimizing

erosion of soil from proposed project site.

4.1.5 Human health and occupational safety

Human health and occupational safety may be threatened where adequate facilities and equipments do not exist to support the population within an area, project or locality. Adequate measures will also be put in place to not only protect the workers from exposure to occupational risks and hazards but also to empower the workers with relevant information on personal and workplace environment, health and safety.

4.1.6 Water pollution

The issue may arise during the operation phase of the project. Water pollutants may arise mainly from leakages of formaldehyde used to clean dead bodies. The proponent will use laid down procedures to prevent any chemical spillages.

4.1.7 Waste disposal

Waste products if not recycled or properly disposed off may be costly to the safety of the environment. The proposed project will have an elaborate waste management strategy to manage and minimize wastes as proposed in the EIA report.

4.1.7.1 Effluent (Waste Water)

4:1.7.1:1 Constituents of Waste Water

Wastewater is return water after domestic and industrial use.

The constituents of wastewater can be classified into two main categories:

Organic and Inorganic wastes.

(i) Organic wastes These come mainly from domestic wastewater although industries also contribute a substantial amount.

Some of these organic wastes are from vegetable and fruit packaging, oils and fat , dairy processing, meat packaging, tanning, paper, synthetic detergents, and fiber wood among others.

(ii) Inorganic wastes

Apart from organic wastes domestic wastewater contains inorganic compounds. Industries are a source of these wastes too. Some industries may introduce inorganic substances such as chromium, mercury, cyanide and copper, which are very toxic to aquatic life.

There are however other major types of wastes that do not fit either in the organic and inorganic classification. These are heat (thermal) and radioactive wastes as mentioned earlier, where waters with temperatures exceeding the required values may come from cooling processes used by industry and from thermal power stations generating electricity. Radioactive materials are usually controlled at their source, but could come from hospitals or research laboratories.

Wastewater if not treated properly causes problems in the receiving waters.

Some of the problems include Oxygen depletion resulting in deaths of aquatic organisms and adverse effect on human health. Adverse effect on clarity and colour affects the popularity of the water for recreation. Waste discharges may also contain toxic substances, such as heavy metals (lead, mercury, cadmium and chromium) or cyanide, which may affect the use of the receiving water for domestic use or aquatic life.

Plant effluents chlorinated for disinfection purposes may have to be dechlorinated to protect receiving waters from toxic effects or residual chlorine.

This guideline serves to assist the WSPs: [Wastewater stabilization ponds]

• Determine the effluent quality as it is released into the environment;

• Check on the operational efficiency of the wastewater treatment system; and

• Assist WSPs in the monitoring of industrial effluent in their areas.

Once a wastewater treatment system has been commissioned, a routine monitoring and evaluation programme should be established so that its performance could be verified and the actual quality of its effluent established, Compliance with the established discharge standards is then determined. The results of such a monitoring programme could give early warning on treatment works that have failed to meet their

requirements and thus prepare for remedial measures to avoid pollution of the receiving water body. The evaluation of wastewater treatment performance and behaviour, although a much more complex procedure than the routine monitoring of effluent quality, is nonetheless extremely useful as it provides information on how under loaded or overloaded the system is, and thus by how much, if any, the loading on the system can be safely increased as the service area expands, or whether expansion of the treatment facilities is required. It also indicates how the design of future installations might be improved to take account of local conditions.

4:1.7.1:2 Sewer Use Ordinance Section 76(1) of the Water Act prohibits any trade premises from discharging any trade effluent without the consent of the license authority.

In this regard all dischargers of trade effluent will be required to obtain a Sewer Use Ordinance (SUO) permit the application of which shall be made to the licensee and shall state the following: -

The nature and composition of the trade effluent;

b) The maximum quantity of the effluent which is proposed to discharge on any one day;

c) The highest rate at which it is proposed to discharge the effluent;

d) Daily effluent fluctuations; and

e) Any other information required by the licensee It is the responsibility of the industrialist to routinely monitor the quality of effluent being discharged to ensure that it is in accordance with the requirements of schedule

The WSP shall from time to time with or without notice monitor the effluent being discharged by the industries to ensure compliance with the standards. In cases where the effluent does not meet these standards then it is the responsibility of the operator to pre-treat the effluent before discharge.

This approach is in line with the "polluter pays principle" developed by NEMA.

4:1.7.1:3 Types of Monitoring Programs

A monitoring program will involve some surveillance mechanisms that include: self-monitoring, scheduled monitoring, unscheduled monitoring and demand monitoring.

Self-monitoring will be undertaken by the industrialist in accordance with the requirements of the SOU permit whereas the others are a responsibility of the WSP.

4:1.7.1:3:1 Self-Monitoring Since the WSP may not be able to perform all the various monitoring functions required for industrial contributors, a program of self-monitoring should be implemented. Using this format, each major contributor is required to do its own sampling and analysis. The monitoring frequencies should be listed in the SOU permit as the minimum self-monitoring frequencies that must be performed to meet the requirements of the permit.

The permittee may choose to perform monitoring at a greater frequency than specified in the permit, if so desire.

4:1.7.1:3:2 Scheduled Monitoring. Scheduled monitoring involves the systematic sampling and inspection by the WSP in accordance with a predetermined schedule. Scheduled monitoring will serve to check for compliance with the ordinance, determine surcharge, user charge, and compliance with WASREB's requirements.

4:1.7.1:3: 3 Unscheduled Monitoring

Unscheduled monitoring is instituted by the WSP to provide a less formal type of surveillance. Similarly, the WSB can undertake unscheduled monitoring to check wastewater effluent compliance by the various WSPs. Such unscheduled surveillance can be used to randomly survey the entire system over an extended period of time.

4:1.7.1:3:4 Demand Monitoring. The WSP conducts demand monitoring when an upset or other disruption of system operation occurs. Such occurrences as explosive or corrosive materials in the sewer, operating difficulties (blockages or plugging in the system), and obvious violation of permit or pre-treatment requirements would require demand monitoring.

4:1.7.1:4 Sampling Points Samples are usually collected at the following points, and a specific designation for each sampling point should be used and marked clearly on the plant, on the sampling bucket and on the bottle.

• **Influent (raw sewage)** - at a convenient point after screening and detritus removal, but before primary settling, therefore often termed as "screened sewage";

Effluent from primary settling tanks - a point at the lowest end of the effluent channel to allow thorough mixing;

• **Effluent from trickling filters** - (for settleable solids tests only);

• **Effluent from aeration channels -** in case of an activated sludge plant, where a grab sample of mixed liquor is taken;

• **Effluent of humus tank or final clarifier -** taken from effluent channel if possible;

• **Sand filter effluent -** from effluent channel or sump;

• **Final effluent to stream** - which can be from maturation ponds or from river, from grass plots or from reed-beds; and • Receiving stream - above and below point of discharge, if necessary. A specific plant may not have all the sampling points mentioned, but sophisticated works may have even more. The points must be arranged so that a uniform and true picture of the performance of each unit of the plant is obtained. Some WSPs may develop an internal sampling plan or organizational planner to keep them organized and to plan the compliance self-monitoring events. The key to gathering defensible data is to organize and plan a compliance self-monitoring event. A sampling plan should be documented in written form, be user-friendly to the sampling staff and include but not limited to the following items:

• Monitoring point(s) description;

• Sampling methods and protocols;

• Flow monitoring and calibration;

• pH monitoring and calibration;

• Parameters for analyses;

• Appropriate sample containers, preservatives and storage; and

• Sample identification and chain unit should develop specification of custody procedures.

4:1.7.2 Sample Collection

There are four main methods of sampling, that is; the grab (or spot) sample, composite samples over short periods of time, composite sample over 24 hours, and composite samples over 24 hours in relation to flow. When sampling, care is taken that the sample is taken from the body of the water (flowing or stagnant) and not just from the surface. The grab sample is normally not representative and can only give a rough idea of the effluent quality at the time of sampling. The composite sample over a short period is better than the grab sample and is more or less representative of the sewage or effluent quality over that period. The composite sample over 24 hours requires that sampling shifts be arranged over the day. The even-sized samples collected hourly or half-hourly and the main sample made up from this after thorough stirring. Composite samples in relation to flow can only be collected if the works has a flow meter and recorder. Samples are best collected separately at intervals of one hour over the sampling period.

4:1.7.3 Sample Analysis: All laboratories generating water and effluent data must have a recognized certification. Such certification shall be for the test method and the analyte(s) being measured. The laboratories shall ensure that proficiency tests are performed in each matrix/analyte combination (where available) for which certification is sought. In this regard a WSP is not obliged to install and maintain a laboratory capable of carrying out all the required tests. If certain tests are outsourced it is the WSP's obligation to verify that the chosen laboratory is certified and has adequate capacity in terms of trained personnel, and equipment and can maintain an adequate quality assurance system. The WSP should indicate in the sampling schedule which laboratories it uses for the analysis of the different parameters.

4:1.7.4 Monitoring for compliance

Each WSP must analyse the results of its water and effluent testing in order to ensure compliance with the Kenya Standards as set out in schedules 1-7. Compliance for both potable water and effluent will be looked at in two ways: • Number of tests conducted against number of samples planned according to guideline and • Number of samples within norm against number of samples tested. It is the responsibility of the licensee to ensure that the WSPs comply with the requirements of this guideline. If it is deemed necessary the WSB or WASREB may take a sample to carry out an independent analysis of the sample.

4.1.7.5 Reporting System

4.1.7.5.1 Reporting by Industries

The industrialists must submit the following reports to the WSP and copies to the WSB: a) Sample schedules for self-monitoring and b) Monthly and annual report on effluent.

4.1.7.5.2 Reporting by WSP The WSPs must submit the following reports to the Water Services Board and copies to WASREB:

a) Sample schedules for both potable water and effluent; and

b) WSP's monthly and annual report on Water Quality and Effluent monitoring according to Schedule 8 and 10, which includes a summary explanation highlighting the problem areas (noncompliance) and the corrective measures taken. For each water or sewage treatment works a sample schedule is required and a WSP monthly and annual report on water quality and effluent testing has to be submitted for each treatment work.

4.1.7.5.3 Reporting by WSB. WSBs will submit quarterly and annual reports based on the reports submitted by the WSPs which also includes their specific monitoring records. The report should provide a regional summary of the water and effluent quality in the region. In addition, corrective actions taken for the problematic areas highlighted in the WSP monthly reports should be indicated.

4.1.7.5.4 Publication of Results

Since the stakeholders have a right to be informed about water and effluent quality, WASREB as the regulator will publish the results in its annual Water Services Sub-sector performance report Schedule

4.1.8 Air quality

Air pollution may be caused by gas emissions from construction equipments and dust in the area of construction. The impact will be localized and low.

4.1.9 Aesthetics

There will be a temporary interference with the aesthetics of the area concerned during construction activities. This however will be reversible. More flowers and aesthetical plants will be planted.

4.1.10 Accidents

These will be reduced with the development and implementation of the developed health and safety policy,

4.2 POTENTIAL NEGATIVE ENVIRONMENTAL IMPACTS AND THEIR MITIGATION MEASURES

Since there can be no development without environmental and social impacts,the following mitigation measures were suggested for the efficient and effective construction of the project. Since some may be experienced during and after the construction or implementation phase, the proposed ***Lilies of Heaven Funeral Home*** will need to conduct an annual EA assessment to ensure that the suggested mitigation measures are put in place and followed to the letter.

Table 2: Potential Adverse Environmental and Social Impacts and the Proposed Mitigation Measures for the Proposed ***Lilies of Heaven Funeral Home***

Potential Adverse Environmental and social Impacts	**Proposed Mitigation Measures**
Environmental degradation due to construction activities such as vegetation clearing, excavation and compaction	Demarcate the project area to be affected by the construction works to prevent the effects of construction from spilling over into other areas. Rehabilitate all areas inadvertently affected by the proposed project construction Re-establish vegetation in some or parts of the disturbed areas through implementation of a well-designed landscaping program
Usage of construction materials	Evaluate the project to ensure that the design optimizes the use of materials and materials to be sourced locally. Construction material must be tested and approved by the relevant department at the Public Works office

Noise and Vibrations	Provide workers in noisy environments with ear muffs Place noisy equipment in enclosures and away from sensitive environments. Keep all machinery in good condition to reduce noise generation. Maintain reasonable working durations whenever possible to reduce the number of complaints concerning noise. Operate shorter shift period for workers who come in direct contact with high concentrations of noise
Degradation of Air quality	Suppress dust by water spraying before sweeping and on dusty grounds. Dispose waste regularly and appropriately to avoid wastes decomposing at collection areas. Embalm all bodies before storage in order to prevent them from rotting. Store only enough bodies to the capacity of the mortuary to prevent congestion. Put in place rules to prevent bodies overstaying in the mortuary in order to give room for new bodies. Follow relevant legal procedures to remove and appropriately dispose all unclaimed. Check the refrigeration system daily to detect and repair any malfunctioning which could lead to rotting of bodies. Spray the mortuary with appropriate smell deodorizers in order to counteract foul smell.
Storm water	Install gutters to harvest rainwater from the roof of the building and water tanks to store the harvested water. Construct a drainage system to direct storm water into roadside drains
Additional road traffic and safety implications	Provide adequate signage of the site. Designate a parking space for off-loading and loading of materials

Solid wastes including excavated soil	Use excavated soil in filling of site and potholes on access roads. Install dustbins for temporary holding of solid wastes. Separate solid wastes at the source into recyclable and non-recyclable. Regularly collect and dispose wastes to avoid accumulation. Cover solid waste collection areas to prevent habitation by scavenging animals
Fire and accident occurrence	Declare places with flammable materials as "NO SMOKING ZONES" and display clear notices of the same. Install fire extinguishers and other fire suppression equipment appropriately through a licensed fire officer. Mark 'FIRE EXITS' from the buildings and establish 'FIRE ASSEMBLY POINTS' at specific points outsidethe building. Regularly inspect the fire-fighting equipment and make it available on the site. Provide enough parking space for emergency vehicles Train workers on fire drills and first aid
Sewerage and Waste water and sanitary conveniences	Regularly check all drainage pipes to fix leakages,remove blockages and prevent back-flooding. Treat wastewater and sewerage before they are disposed. Monitor wastewater every month to ensure that such waste is disposed in accordance with controlled discharge standards

Water usage	Provide every water supply pipe with a tap to act as a stop valve Use water wisely. Conduct regular maintenance of pipes and taps to fix leakages. Use larger water storage tanks to cope with periodic shortages. Maximize on other sources of water for some uses such as harvested rainwater Install a water meter for monitoring water use at the site
Excessive energy consumption	Install energy efficient lighting such as fluorescent tubes and energy saving bulbs Switch off lighting during the day and all other electrical equipment when they are not in use. Provide a meter for monitoring energy consumption
Infectious waste	Put in place distinctive protocols for the classification and segregation of infectious diseases materials. Treat waste that is deemed potentially infectious prior to disposal by several different technologies that either disinfect or sterilize them
Impacts on occupational and public health and safety	Provide workers with appropriate protective gear. Ensure machines and equipment to be used at the site are periodically checked by qualified personnel as outlined in the Occupational Health and Safety Act (OSHA), 2007. Put in place appropriate warning signs, directions and procedures as outlined in the report. Ensure the building has ventilation openings above doors and windows to each room to prevent any chances of suffocation during the full operation of the building
Bad Odour	The proponent should apply chemical neutralizers that permanently remove all organic odors on contact.

Table 4.2 : Summary of impacts analysis matrix

Impacts	Project Phase (C,O& D)	Magnitude	Mitigation Measures
Positive Impacts			
Employment Opportunities	C,O,D	+3	No negative impacts
Improved Infrastructure	C,O	+2	
	O	+3	
	O	+3	
	O	+3	
	O	+2	
	D	+1	
Negative Impacts			
Vegetation Loss	C	-2	- Avoid cutting down indigenous trees. - Spray water on excavated areas. - All bare areas to be landscaped after construction. - Avoid spillage of loose soil to the road where it will be disturbed and blown away by traffic and wind.

Noise Pollution	C	- 1	- Maintain plant and equipment. - Construction should be carried out only during the daytime. - Workers to wear ear muffs if working under noisy conditions to management to ensure that noises from the resident is kept under reasonable levels.
Traffic and Transport	C,O,D	- 2	- Proper signage to be put in place to notify neighbours of the activities and the presence of heavy machinery to direct traffic. - Presence of board directing patrons to the work site. - Any work that disturbs normal traffic signal operations shall be co-ordinated with relevant authorities.
Ecological consideration (Flora and Fauna)			- Demarcate the project area to be affected by the construction works to present the effects of the construction from spilling even into other areas. - Fence the demarcated areas. - The flora and fauna should be restored after construction by maintaining the introduced plants.
Soil Erosion and Compaction			- Provide soil conversation structures on the areas prone to soil erosion to reduce impact of erosion. - There should be designated pathways and drive ways for movement within the compound to avoid unnecessary compaction.
Solid Waste			Collect and appropriately dispose all solid wastes including excavated soils and materials that will not have been used up from the site daily, or regularly as appropriate through an integrated solid waste management system that comprises of recycling , reuse, combustion , decomposition of organic matters and sanitary land filing in order to prevent accumulation at the sites.

Compliance with legislations			- Conduct inspections and self audits for application of relevant permits and licences from respective authorities and renew them as required. - Certificate of a workplace, the construction site pursuant to OSHA, 2007. - Document and keep records of all environmental and health matters accordance with Section 68(3) of EMCA, 1991 and OSHA . - Register construction site with NCA in accordance with NCA requirements.
Water Usage			- Install meter to monitor water consumption. - Recycle and reuse water wisely by ensuring that taps are not running when not in use. - Conduct regular checks, inspections and maintenance of pipes, taps and storage tanks to fix leakages. - Construct or install bigger storage facilities to be able to cope with potential water stresses in the supply.
Energy Consumption			- Install meters to monitor energy consumption and clearly mark distribution board switches to indicate respective circuit. - Switch off electrical appliance including lights when they are not in use. - Weather proof all lighting and power points and install lighting arrestors. - Install emergency power generators. - Install alternatives emergency sources such as solar panels and automatics generators not only for power backup but also to reduce dependency on electricity.
Safety, Healthy Hygiene and Sanitary Conveniences.			- Provide workers with appropriate PPE such as aprons, ear muffs, nose masks and gloves. - Maintain First Aid Kits at the site in easily accessible areas.

			- Indicate dangerous spots at the sites. - Install safeguard machinery, equipment, PPE, appliance and tools, appropriately and carry out regular maintenance services in accordance with their manufacturer's safety data information. - Train workers in emergence management at least once before the construction workers. - Make distinction in all stores in such a way that non-fuel or poisonous materials are stored separately.

4.2 2. IMPACTS OF OPERATION PHASE

	Project	Magnitude	Mitigation Measures
Negative Impacts			
Rain water Run-off	C	-2	Carry out periodic checks maintenance of all drainage channels to remove obstructions
Air quality			Suppress dust by sprinkling water on all dusty groundsurfaces Provide adequate ventilation in the rooms in the facility by providing ventilation boxes Embalm bodies before storage in order to prevent them from rotting Spray the mortuary with appropriate smell deodorizers in order to counteract foul smell Provide all workers in areas where air quality is compromised with PPEs. Inspect the refrigeration system daily to detect and repair any malfunctioning

			which could lead to rotting of bodies Dispose wastes regularly and appropriately to prevent wastes from decomposing at collection areas Provide all workers in areas where air quality is compromised, with appropriate PPEs. Maintain all internal roads to reduce fugitive dust and provide for the smooth movement of vehicles
Noise Pollution	C	- 1	- Maintain plant and equipment. - Construction should be carried out only during the daytime. - Workers to wear ear muffs if working under noisy conditions to management to ensure that noises from the resident is kept under reasonable levels.
Traffic and Transport			- Proper signage to be put in place to notify neighbours of the activities and the presence of heavy machinery to direct traffic. - Presence of board directing patrons to the work site. - Any work that disturbs normal traffic signal operations shall be co-ordinated with relevant authorities.
Soil Erosion and Compaction			- There should be designated pathways and drive ways for movement within the compound to avoid unnecessary compaction.
Solid Waste			Collect and appropriately dispose all solid wastes including excavated soils and materials that will not have been used up from the site daily, or regularly

			as appropriate through an integrated solid waste management system that comprises of recycling , reuse, combustion , decomposition of organic matters and sanitary land filing in order to prevent accumulation at the sites.
Waste Water and Sewerage and Sanitary Convenience			- Provide lockable washrooms for the construction workers and separate them based on genders into ladies and gents. - Properly use and clear sanitary facilities daily.
Compliance with legislations			- Conduct inspections and self audits for application of relevant permits and licences from respective authorities and renew them as required. - Certificate of a workplace, the construction site pursuant to OSHA, 2007. - Document and keep records of all environmental and health matters accordance with Section 68(3) of EMCA, 1991 and OSHA . - Register construction site with NCA in accordance with NCA requirements.
Water Usage			- Install meter to monitor water consumption. - Recycle and reuse water wisely by ensuring that taps are not running when not in use. - Conduct regular checks, inspections and maintenance of pipes, taps and storage contagious and tanks to fix leakages. - Construct or install bigger storage facilities to be able to cope with potential water stresses in the supply.
Energy Consumption			- Install meters to monitor energy consumption and clearly mark distribution board switches to indicate respective circuit. - Switch off electrical appliance including lights when they are not in use. - Weather proof all lighting and power points and install lighting arrestors. - Install emergency power generators.

			- Install alternatives emergency sources such as solar panels and automatics generators not only for power backup but also to reduce dependency on electricity.
Safety, Healthy Hygiene and Sanitary Conveniences.			- Provide workers with appropriate PPE such as aprons, ear muffs, nose masks and gloves. - Maintain First Aid Kits at the site in easily accessible areas. - Indicate dangerous spots at the sites. - Install safeguard machinery, equipment, PPE, appliance and tools, appropriately and carryout regular maintenance services in accordance with their manufacturer's safety data information. - Train workers in emergence management at least once before the construction workers. - Make distinction in all stores in such a way flat non-fuel or poisonous materials are stored separately.

Scale

0 => No impacts -2 => Medium negative impacts +1 High Positive Impacts +3 Significant Positive impacts

-1=> Low negative impacts -3 =>Significant negative impacts +2 Medium Positive impacts

CHAPTER FIVE

5.1 PROJECT ALTERNATIVES

5.1.1 The proposed alternatives

This ESIA report; based on sound desktop and field studies made by the ESIA team for submission to NEMA. The findings and recommendations were suggested based on the proposed site materials and technologies to be used during the project implementation.

5.1.2 Alternative to site

A change of site alternative will require that the project be constructed in a different location. This will necessitate that the proponent purchases a new parcel of land. This will result in an increase in time and resources such as; unpredictability of acquiring financial resources and time; needed to complete the transactions. The proposed site was chosen as it is very convenient for construction of the proposed ***Lilies of Heaven Funeral Home*** and the proponent already owns the plot. Furthermore, there is no guarantee that an appropriate land will be at a reasonable cost within the project area considering the improved developments within the project area.

5.1.3 Alternative to technology

The proponent should consider installing solar panels as an alternative sourceof power throughout the project implementation.

5.1.4 No project alternative

This means that the status quo remains and the proponent will have to contend with the land being in no use which may lead to underutilization of the land and the proponent missing out on the good returns from the business sector being experienced presently.

5.1.5 Comparison of alternatives

The proposed project is the best alternative as it will work to positively impact the living standards and ethics of the community in handling of their late beloved ones, increase the government's revenue, improve in service delivery and create employment opportunities for more people and many more advantages as discussed in this report.

5.2 PUBLIC PARTICIPATION AND STAKEHOLDERS ENGAGEMENT.

5.2.1 Importance of Public Participation

Public participation is basically concerned with involving, informing and consulting the public, planning, management and other decision-making activities which can be considered part of the Environmental Impacts Assessment process. It offers and encourages the public to express their views. Public participation tries to ensure that due consideration will be given to public values, concerns and preferences when decisions are made.

For large projects, such as the one proposed in this case various stakeholders should be consulted and involved in all Stages of project planning, project implementation and decommissioning.

5.2.1 Stakeholder Mapping and Engagement

STAKEHOLDER	ROLE
Ministry of Health	Advice on appropriate modern technology use in Body preservation
Public Health Department	Access risks to Public Health posed by the project
Local Administration (Chiefs and ward administrators)	For resolving conflicts and various local issues
Roads Department/ KENHA	For issues dealing with the entry and exit of vehicles from the Funeral Home
NEMA	Environmental issues
NCA	Construction issues
Neighbours	Community issues

CHAPTER SIX

ENVIRONMENTAL MANAGEMENT PLAN

6.1 Introduction

The EMP involves risk management strategies that should be undertaken by the project proponent and the project manager to mitigate environmental degradation. This involves monitoring, control, reclamation and restoration of the environment back to a serene state. EMP will therefore provide a logical framework within which the identified issues of environmental concerns can be mitigated, monitored and evaluated.

This chapter therefore highlights the monitoring and evaluation that will be done during the construction and operation of the proposed ***Lilies of Heaven Funeral Home.*** A Monitoring Plan shall be developed on the basis of these recommendations and also studies to analyze long-term impacts are also recommended.

Environmental monitoring involves measurement of relevant parameters, at a level of details accurate enough, to distinguish the anticipated changes. Monitoring aims at determining the effectiveness of actions to improve environmental quality. The environmental management and monitoring plans have been developed and outlined to bring home the key findings of the Environmental Impact Assessment of the project in mention, recommending necessary mitigation actions, defining roles, monitor able indicators and the estimated cost.

6.2 Environmental, health and safety management and monitoring plan

6.2.1 Construction phase

Table 6: Construction Phase

Environmental /Social Impact	**Proposed MitigationMeasures**	**Responsibility**	**MonitoringPlan**	**Approximate cost (Ksh)**
Air Pollution	-Control speed and operation of construction vehicles. -Prohibit idling ofvehicles. Spraywater on excavated areas. -Maintenance of construction plant and equipment. -Sensitize construction workers. -All bare areas should be landscaped after construction. Workers should be provided with dust masks if working in sensitive areas -The area shall be fenced to curb dust from spreading to the neighborhood. -Avoid spillage of loose soil to the road where it will be disturbed and blown away by traffic.	Contractor	Amount of Dust produced Level of landscaping carried out	Cost varies With service extent

	-Stockpiles of, sand and soil should be covered or surrounded with windbreakers.			
Noise Pollution	-Maintain plant equipment -Construction should be carried out during day time -*W*orkers to wear ear muffs if working under noisy conditions. -Management to ensure that noise from the residence is kept under reasonable levels	Contractor Management	Amount of noise	Cost varies with service extent
Traffic and Transport	Proper signage to be put in place to notify neighbors of the activities and the presence of heavy vehicles**,** and to direct traffic, Presence of boards to direct traffics to the site. Any work that disturbs work signals operations shall be coordinated with the relevant authorities Site adherenceto traffic rules.	Contractor Management	Clear well-maintained signboards along the roads.	Cost varies with damage extent
Ecological Considerations (Flora and Fauna	Demarcate the project area to be affected by the construction works to prevent the effects of construction from spilling over into other areas. Fence the demarcated areas appropriately in accordance with the requirements of NCA for	Proponent and the contractor	Ecological aesthetics Natural ecology in areas not in use	To be covered in the construction phase.

	hoarding of Construction sites. The flora and fauna should be restored by maintaining the restored plants.			
Soil erosion & compaction	-Provide soil conservation -Structures on the areas prone to soil erosion ɒ reduce impact of erosion -There should be designated pathways and driveways for movement within the compound to avoid unnecessary compaction. -All bare areas should be well landscaped after completion.	Contractor and Management	Observation of soil aesthetics	50,000
Solid Waste	Collect and appropriately dispose all solid wastes including excavated soil and materials that will not have been used up from the site daily or regularly as appropriate through an integrated solid waste management system that comprises of recycling, reuse, combustion, decomposition of organic matter and sanitary land filling in order to prevent accumulation at the sites.	Contractors, proponent and quantity surveyor	Monitoring of waste management	To be covered in cost of construction done.

Wastewater and sewerage and sanitary conveniences	Provide lockable washrooms for the construction workers and separate them based on gender into ladies and gents. .. Properly use and clean sanitary facilities daily		Sanitary conveniences and proper sanitary	. 300 per day
Compliancewith legislations	Conduct inspections and self-audits for application of relevant permits and licenses from respective authorities and renew them as required: Certificate of aWorkplace of the construction site pursuant to OSHA, 2007 Document and keep records of all environmental and health matters in accordance with Section 68 (3) of EMCA, 1999(Cap. 387) and OSHA, 2007 Register construction site with NCA in accordance with NCA requirement	Contractor Proponent		Current NCA regulations apply
Construction materials	Evaluate and plan for the proposed project including purchasing of construction materials to ensure that the design optimizes the use of these materials. Some materials can be re-used or recycled	Contractors, proponent and quantity surveyor	Use and misuse of materials	varied

Water usage	Recycle and re-use water anduse water wisely by Ensuring that taps are not running when not in use. Maintenance of pipes, taps and storage containers and tanks to fix leakages Construct or install bigger storage facilities (such as 10,000 litre plastic tank) to be able to cope with potential stresses in supply	Contractorand proponent Constrictors and allworkers. Site managers and all workers. Contractors and proponent	Over- extraction ofwater resources Conflicts over water-use Increased demand on water resources Wastage ofwater	Water suppliers rates apply. Cost varies with damage extent 60,000 per 10,000 litre tanks
Energy consumption	Install meters to monitor energy consumption and clearly mark distribution board switches to indicate respective circuits Switch off electrical appliances including lights when they are not in use Weather-proof all lighting and power points And install lightening arrestors and ensure there are no live electrical wires that are exposed Install alternative energy sources such as solar panels and automatic generators not only for	Contractors and proponent Site managers and allworkers Proponent and contractors	Consumption rates	Kenya Power and Lighting Company rates apply Covered in Cost of construction 10,000 per solar panel land 35,000 per generator

	powerback-up but also to reduce dependency on Electricity			
Fires	Prominently display 'NO SMOKING' signs at the sites especially in areas where flammable materials are stored or used and emergency telephone numbers (suchas ambulance,fire tenders and police) where everybody at the site can see them. Regularly train personnel in relation to fire emergencies (Do this at least once for every employee during the construction period) Install fire suppression equipment through a licensed fire officer (fire extinguishers on the corridor,fire blankets in the kitchen and at least one firehose reel on building or as may be appropriate)	Site managers Contractors and all workers Contractors and proponent	Monitoring of fire response equipment and rooms and adherence of the workers to fire signs	1,000 5,000 per trainee 3000 per fire blanket, 7,000 per 9 kg fire extinguishers.
Safety, health, hygiene and sanitary conveniences	Provide workers with appropriate PPE such as aprons,ear muffs, nose mask and gloves Maintain First Aid Kits at the site in easily accessible areas	Contractors Contractors and all specialty supervisors	OSHA guidelines	500 per worker 1500 per kit

	Indicate dangerous spots at the sites Install and safeguard machinery, equipment, PPE, appliancesand toolsappropriately and carryout regular maintenance services in accordance withtheir manufacturer's safety datainformation Train workers in emergency management at least once before the construction works Make distinctions in all stores in such a way that non-food or poisonous materials are not stored together or mixed with food.			Cost varies with service extent 50,000 per session in a group

6.2.2 OPERATION PHASE

Table 7: Operation Phase

Environmental / SocialImpact	**Proposed MitigationMeasures**	**Responsibility**	**Monitoring Plan**	**Approximate Cost(Ksh)**
Run-off	Carry out periodic checks andmaintenance of all drainage channels to remove obstructions	Funeral home Management	Properly installed and maintained drainage systems	Varies with damage extent
air quality	Suppress dust by sprinkling water on all dusty ground surfaces	Workers	Clean and safe air	100 per day
	Provide adequate ventilation in the rooms in the facility by opening windows andusing exhaust fans			-
	Embalm all bodies before storage in order to prevent them from rotting	Morticians	Proper maintenanceo f bodies and no foulsmell	900 per day

	Spray the cold room with appropriate smell deodorizers in order to counteract foul smell from the facility .			500 per spray
	Provide all workers in areas where air quality iscompromisedwith appropriate PPE	Funeral home management	Properly dressedworkers	500
	Inspect the refrigeration system daily to detect and repair any malfunctioning which could lead to rotting of bodies.		Well maintained refrigeration system	Cost varies per damage
	Dispose wastes regularly and appropriately to prevent wastes from decomposing at collection Areas		Waste bins and waste management schedules	500
	Provide all Workers in areas where air quality is compromisedwith appropriate PPEs		Clean andsafe air	400 perworker
	Maintain all internal roads to reduce fugitive dust and provide for the smooth movement of vehicles		Properly maintained roads	20,000

Fires	Conduct inspection of the firefighting equipment every three months	Funeral home Management	Clear signs that are always followed throughout the phase	50,000 per service
	Display emergency telephone numbers (such as ambulance, fire fighters and police), 'NO SMOKING'signs especially in areas where flammable materials are stored or used and 'FIRE EXIT' points in the building where everybody can see them.			1,000
Energy consumption	Use only energy- saving lighting such as fluorescent tubes and energy saving bulbs	Mortuary management	Properly functional electrical appliances	400 per bulb
	Provide electrical appliances such as fridges, computers and television sets with shock guards such as fridge guard and UPS and ensure that electrical circuits are not Overloaded			2,000 –3,000 per guard/UPS
	Switch off all electrical appliances When they are not in use	All workers		-
Noise	Switch off machines and vehicles that are not in use	Mortuary management	Properly maintained sound and noise	-

	Keep all machinery in good condition to reduce noise generation			5,000 per service
	Properly tune sound systems to prevent interference with the neighbors			-
	Keep all machinery in good condition to reduce noise Generation	Machine operators		Cost varies with service extent
Sanitary conveniences, wastewater and sewerage	Separate sanitary rooms based on gender unless they are to be used by one person	Funeral home operators	Properly managed sanitary rooms,sewerage pipes and septic tanks to prevent spillage	-
	Conduct regular checks to detect and correct sewage pipe blockages, damages and Leakages			Vary with service extent
	Use biodigester and/or the pit latrines			10,000 per service
	Properly use and clean sanitary facilities daily	All users		300 per day
Funeral home Disorder: Unclaimed bodies congestion	Store only enough bodies to the capacity of the funeral home in order to prevent congestion	Funeral Home Management	Admission of identified bodies, clear signs for directions and proper disposal methods of unclaimed bodies	-

	Set and display and/or make known funeral home rules to ensure people collect bodies of their loved ones on time to prevent bodies overstaying in the facility			500
	Remove and appropriately dispose all unclaimed bodies after a specific established period and after following relevant legal procedures			10,000 per body
Solid wastes: Nuisance Environmental contamination Health hazard	Install two or more wastebins at each collection point to ensure separation ofwastes into recyclable and non-recyclable wastes or other appropriate categories (covered or auto-closing bins are preferred to minimize invasion by Pests and Rodents or other animals and for hygienic purposes respectively) Collect and dispose all solid wastes from the site appropriatelyand regularly as appropriate in order to prevent wastes accumulating and decomposing at the site.	Funeral home management	Proper solid waste handling techniques	800 – 5,000 depending on size of bin 1,000 per month
Water Use: Wastage of water Increased demand of water	Conduct regular checks, inspections and maintenance of pipes, taps and storage containers and tanks to fix leakages. Recycle and reuse water where possible. Ensure taps are not running when not in use			5,000 per maintenance

Material storage and usage	Store and use all materials as outlined on their manufacturers' data safety **Labels.** Make distinctions in all stores in such a way that non-food or poisonousmaterials are not stored together or mixedwith food.	Morticians	Well useand maintenance of materials	- -

6.2.3 DECOMMISSIONING PHASE

Table 8: Decommissioning Phase

Environmental/ Social Impact	**Proposed MitigationMeasures**	**Responsibility**	**MonitoringPlan**	**Approximate Cost(Ksh)**
Change in aesthetics of the site	Demarcate theproject area to be affected by the demolition works and hoard the appropriately to prevent impacts from spreading to other areas .Re establish vegetation through implementation of a well-designed landscaping programme and rehabilitate the site.	Proponent and	Site rehabilitation in accordance with NCA requirements	-

Safety, Health and Hygiene	Make distinction in all stores in such a way that non-food or poisonous materials are not stored together or mixed with food. Provide workers with appropriate PPE such as aprons, earmuffs, nose masks and gloves. Prominently display 'NO SMOKING' signs, indicate dangerous spots at the site and conspicuously display contacts of emergency service providers such as ambulance, fire tenders and police. Train workers in emergency Management at least once during the decommissioning Period. Install, store, use, maintain and safeguard machinery,equipment, PPE, tools and appliances appropriately in accordance with their	Contractor Contractor	Compliance with the OSHA regulations	500 per Worker 1,000 50,000 per Group Cost varies with service extent 1,500 per kit

	manufacturer's safety datainformation. Maintain First Aid Kits at the site in easily accessible areas			
Interference with Traffic flow	Regularly service vehicles to ensure that they are in good condition Place clear signage on the road alerting the presence of the site and a vehicle parking area	All drivers Contractor and Proponent	Compliance with the traffic rules	Cost varies with damage extent 1,000
Fires	Use fire suppression equipment such as fire extinguishers and sand buckets for fire management (Remove these from the site Later in the decommissioning process)	Contractor	Fire response equipment and signage around the morgue	-
Noise	Keep all machinery in good condition to reduce noise generation Advice drivers to avoid hooting vehicles unnecessarily and when passing through noise-sensitive areas such as religious places, learning	Machine Operators Contractor	No or little noise heard from the site	Cost varies with service extent

	area sand hospitals and all machine operators to switch them off when they are not in use. Provide workers in noisy areas with ear muffs.			 500 per worker.
Solid wastes	Collect and dispose all solidwastes from the site through an integrated waste management system that comprises of recycling, re-use, combustion, decomposition of organic matter and sanitary land filling in order to prevent accumulation at the site.	Contractor	Proper waste managementstrategies employed	10,000
Dust and exhaust Emissions	Sprinkle water on all dust active areas to suppress dust Provide workers in dust and/or exhaust concentrated areas with nosemasks. Properly service, maintain and tune all equipment and machinery to minimize exhaust emissions	Contractor Contractor and all machine operators	Properly equipped workers. Proper management of dusty areas, equipment and machinery	100 per day 500 per worker Cost varieswith service extent
Wastewater and sewerage and sanitary conveniences	Properly use and clean sanitary facilities daily	Site manager and all workers	Clean sanitary facilities	300 per day
Compliance with	Conduct an environmental assessment and	Contractor	Proper documentation	40,000

legislations	prepare a decommissioning report for application of a decommissioning permit from NEMA.	and proponent	and certification	
	Document and keep records of all environmental and health matters in accordance with Section 68 (3) of EMCA,1999 (Cap 387) and OSHA, 2007.	Contractor		500

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

The proposed ***Lilies of Heaven Funeral Home*** will have numerous positive impacts as highlighted in the report. The negative impacts that will be experienced during the establishment of the home can be mitigated by implementing the suggested mitigation measures. The report concludes that if all the suggested measures and the recommendations are followed, there will be no adverse impacts on the environment. It is therefore clear that since the community has been involved in decision making and did not object to its development, the project can be implemented following the environmental mitigation measures and recommendations to prevent any challenges from the community and also adverse impacts to the environment.

7.2 Recommendations

a) Adopt high standards of construction and ensure regular maintenance practices of the proposed building in order to ensure long life for the proposed buildings.
b) Clinical information accompanying bodies should not be made available to anyone other than the responsible mortician.
c) Develop an Environmental Policy stating commitment, intentions and principles of action with respect to the environment including compliance with relevant environmental regulations. This is to form a basis upon which the management of the facility is to set its environmental objectives and targets as in the environmentalmanagement plan.
d) Ensure record keeping and documentation are appropriately carried out to assist in building of self-auditing capacity.
e) Food and chemicals to be handled with care.
f) For security purposes, the proponent can insure the premises as per statutory requirements (comprehensive, third party and workman's compensation policies).
g) High standards of construction and regular maintenance practices are strongly recommended to ensure durability of the facility.
h) Implement and follow the EMP.

i) Measures shall be put in place for proper handling of infectious wastes and labeling of bodies.

j) Proper management of water and drainage channels around the proposed project will greatly improve quality of sanitation around it.

k) The contractors, the proponent through the funeral home management are advised to maintain good relations with area residents and especially their immediate neighbors in order to make them live in harmony with the community. This includes purchasing locally produced food stuffs and other locally produced products in order to enhance local development in the area and considering the area residents when offering job opportunities at the site.

l) The management of the funeral home shall ensure the occupational health of its staff in all aspects.

m) The morticians need to wash and dress all bodies and enclose them in leak proof bags.

Since the proponent is well advised in accordance with the provision of applicable laws and is will adhere to the implementation of environmental management plan and the regulatory requirements regarding the constructionand operational phases of the project, **the EIA license can be issued to enable project execution.**

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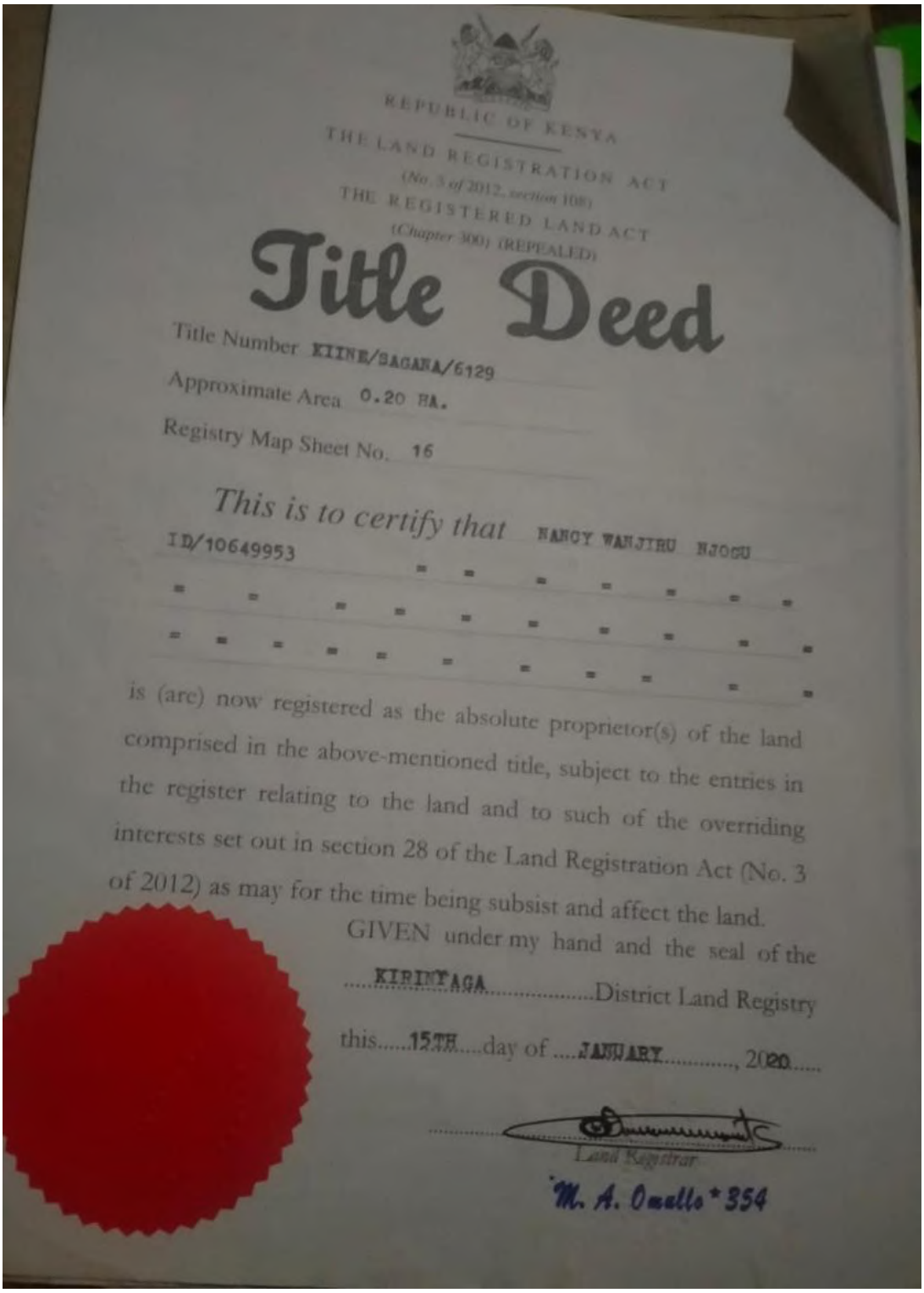
APPENDICES

Appendix I: Title deed



REPUBLIC OF KENYA

THE LAND REGISTRATION ACT
(No. 3 of 2012, section 108)
THE REGISTERED LAND ACT
(Chapter 300) (REPEALED)

Title Deed

Title Number KIINE/BAGANA/6129

Approximate Area 0.20 HA.

Registry Map Sheet No. 16

This is to certify that NANCY WANJIRU NJOGU
ID/10649953

is (are) now registered as the absolute proprietor(s) of the land comprised in the above-mentioned title, subject to the entries in the register relating to the land and to such of the overriding interests set out in section 28 of the Land Registration Act (No. 3 of 2012) as may for the time being subsist and affect the land.

GIVEN under my hand and the seal of the .....KIRINYAGA.....District Land Registry this.....15TH.....day of .....JANUARY....., 2020.....

.....
Land Registrar

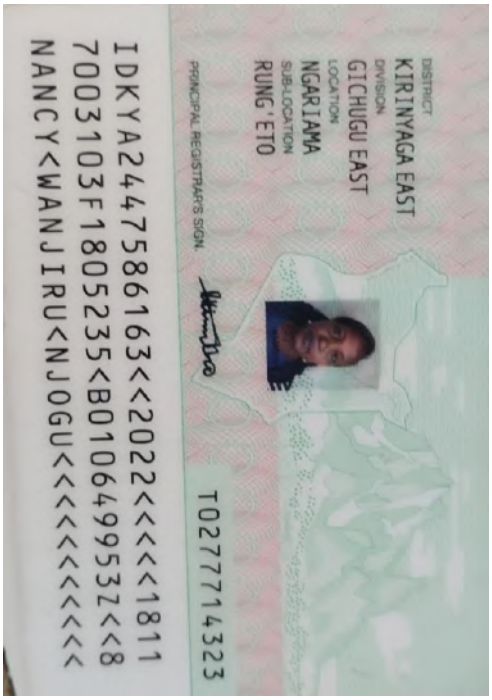
M. A. Omollo * 354

Appendix II: Minutes for the Public Participation Meetings

Appendix III: Copy of the EIA Licenses

Appendix IV: Architectural Designs.


JAMHURI YA KENYA
REPUBLIC OF KENYA
SERIAL NUMBER 244758616
ID NUMBER 10649953
FULL NAMES
NANCY WANJIRU NJOGU
DATE OF BIRTH
10. 03. 1970
SEX
FEMALE
DISTRICT OF BIRTH
KIRINYAGA 'CEN'
PLACE OF ISSUE
NDARAGWA
DATE OF ISSUE
23. 05. 2018
HOLDER'S SIGN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7003103F1805235<B01064995322<<8
NANCY<WANJIRU<NJOGU<<<<<<<<<<
TO2777714323
PRINCIPAL REGISTRAR'S SIGN.
DISTRICT
KIRINYAGA EAST
DIVISION
GICHUGU EAST
LOCATION
NGARIAMA
SUB-LOCATION
RUNG'ETO

Appendix V: Evidence of public participation