ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED ESTABLISHMEMT OF ASBESTOS DISPOSAL SITE IN KIMENU, THIKA SUB COUNTY, KIAMBU COUNTY.

PREPARED FOR:

COUNTY GOVERNMENT OF KIAMBU DEPARTMENT OF ENVIRONMENT AND SOLID WASTE MANAGEMENT.

SUBMITTED TO NEMA ACCORDING TO THE ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT (EMCA) (CAP 387).

OCTOBER, 2024.

EXPERTS AND PROPONENT DETAILS

In carrying out this assignment, NEMA Registered experts endeavored to comply with the legal requirement as contained in the National Environmental Management and Coordination Act and other subsequent regulations.

We have applied the required professional standards and practice in carrying out this work.

The following registered EIA/EA Expert conducted and prepared this report and has applied the required professional standards and practice in carrying out this work.

PROPONENT

SIGNED FOR OR ON BEHALF OF:

NAME……..

DESIGNATION……

SIGNATURE……. Date ……..

COUNTY GOVERNMENT OF KIAMBU,
P.O. BOX 2344 - 0900,
KIAMBU, KENYA
TEL: 0675858167/171
EMAIL: info@kiambu.go.ke

LEAD EXPERT:

SIGNATURE: ……. Date ……

MARY N. KAMAU,
NEMA REG. NO. 7071,
NAIROBI, KENYA.

Disclaimer:

This environmental and social impact assessment project report is based on information made available by the Proponent to the Consultant and findings from field assessment. It is strictly confidential to the Proponent and any materials thereof should strictly be in accordance with the agreement from the Proponent. It is, however, subject to conditions in the Environmental (Impact Assessment and Audit) Regulations, 2003.

EXECUTIVE SUMMARY

Environmental Impact Assessment study report is a planning tool now generally accepted as an integral component of sound decision-making. The purpose of Environmental Impact Assessment is to give the environment its due place in the decision-making process by clearly evaluating the environmental consequences of the proposed activity before action is taken. Early identification and characterization of critical environmental impacts allows the public and the government to form a view about the environmental acceptability of a proposed developmental project and what conditions should apply to mitigate or reduce those risks and impacts. Following concern arising from the presence of asbestos wastes generated in various asbestos containing materials, building and construction sectors, the company commissioned a study to assess and identify the appropriate site where these materials can be disposed safely. The study was to identify the impacts of such disposal within the dumping site area and to make recommendations thereon. The study has made a series of recommendations regarding handling and disposal among others.

As legislative requirements provide for the preparation of an Environmental Impact Assessment for projects that might have adverse effects upon the environment, the proposed project is being subjected to the statutory EIA process. Following a directive by the government to get rid of asbestos, the County government of Kiambu identified a suitable land fill for disposal of asbestos. The County government will work together with those in possession of asbestos by providing a Licensed area for those willing to dispose off asbestos. The Asbestos Management, Handling and Disposal land is registered under Kiambu county government, proposes to provide a facility that will offer solutions to asbestos disposal from various building that intend to dispose off the asbestos roofing's and any other asbestos containing materials within republic of Kenya.

Asbestos is a naturally occurring mineral that once was lauded for its versatility, recognized for its heat resistance, tensile strength and insulating properties, and used for everything from fire-proof vests to home and commercial construction. It was woven into fabric, and mixed with cement.
Its properties were so desired that the United States military mandated its use in every branch of service. Asbestos was a perfect blend to make things better – except it was highly toxic, too. Today asbestos is a known cause of mesothelioma cancer, is banned in more than 50 countries and its use has been dramatically restricted in others.

Asbestos is a Group of six different fibrous minerals (amosite, chrysotile, crocidolite, and the fibrous varieties of tremolite, actinolite, and anthophyllite) that occur naturally in the environment. All forms of asbestos are hazardous, and all can cause cancer.
The major components of this project will be erecting of a temporary site office and house, sanitary block with toilets, shower room and changing room, truck washing bay chain link fence/perimeter wall to cover the selected area for disposal of asbestos, temporary storage areas, excavations of pits/cells, provision of safety gears that are appropriate for asbestos disposal, provision of security services at the site at a cost of estimated Ksh.4 million. The proposed disposal site is in a bare field.
In view of its anticipated environmental impacts, an environmental Impact assessment was prepared to enhance project acceptability and identify measures aimed at mitigating the negative impacts. The full EIA followed an earlier scoping exercise that identified the significant impacts. The assessment used site surveys and a checklist among other tools. This report highlights the main features of the project and the procedural context, within which the EIA was prepared, and discusses some of the main issues that need to be addressed to improve the project's area and the surrounding.
The terms of reference for the preparation of the EIA Report are:

- A critical look into project objectives
- The proposed location of the project site
- Description of project objectives.
- A concise description the national environmental legislative and regulatory framework, and any other relevant information related to the project
- Evaluation of the technology, procedures and processes to be used in the implementation of the project
- Description, evaluation and analysis of the foreseeable potential environmental effects of the project broadly classified into physical, ecological/biological and socio-economic aspects which can be classified as direct, indirect, cumulative, irreversible, short-term and long-term effects.
- Evaluation and analysis of alternatives including the proposed project, project alternative, project site,

design and technologies

- An Environmental Management Plan (EMP), proposing the measures for eliminating/minimizing or mitigating adverse impacts on the environment,
- Propose measures to prevent health and safety hazards and to ensure security in the working environment for the employees, and for the management in case of emergencies.

This encompasses prevention and management of the foreseeable accidents and hazards during operational phase.

SUMMARY EMP FOR CONSTRUCTION AND OPERATION

IMPACTS	**Mitigation measures**
Excavations and protection of flora and fauna	Protect as possible indigenous trees and other surrounding vegetation that need not be removed. Minimize site clearance to only areas needed for excavations Undertake continuous excavation of asbestos pits/cells. That is excavation of any subsequent pit shall base on expected asbestos materials Plant trees around the perimeter fence and within some section of the site Cover any asbestos pit that is not full with polythene sheet and soil 1m above the buried asbestos and seal the cell with concrete material as it awaits more asbestos materials to be concluded as full.
Safety & health	• Occupational Safety and Health Act, 2007 • Training the workers on the potential health risk caused by exposure to asbestos and how to reduce these risks • The asbestos removal and disposal workers shall be trained on safe asbestos handling techniques. • Notify workers about the upcoming disposal activity and the Safety requirements • Prepare appropriate PPE • PPEs shall be of single use and shall be used once and disposed with asbestos materials • Post appropriate signpost of the site that will inform the workers of key rules to follow • Put in place an appropriate emergency and incident response plan
Waste Generation	• Train cleaning and maintenance workers on the need for proper waste management • Minimize waste generation, segregate general and hazardous waste in color coded refuse bins. • Any waste/material contaminated with asbestos shall out rightly be disposed of in asbestos pit
Asbestos management	• The onsite and offsite Asbestos disposal site shall be marked clearly as asbestos hazard area in accordance with the National Guidelines on Safe Management and Disposal of Asbestos • The asbestos will be appropriately contained and sealed to minimize exposure • The asbestos prior to removal shall be treated with a wetting agent to minimize asbestos dust • Asbestos shall be handled and disposed by skilled & experienced professionals • If asbestos material is being stored temporarily, the wastes shall be securely enclosed inside closed containments, marked appropriately and secured. • The removed asbestos will not be reused or recycled in anyway • The asbestos materials removed shall be buried onsite/offsite based on the clients' preference • Removal including Onsite/offsite disposal of asbestos shall be subjected to environmental impact assessment in accordance with the Environmental (Impact Assessment and Audit) Regulations, 2003.

Management of temporary waste storage sites	• Ensure management of temporary waste storage sites is in line with the National Guidelines on Safe Management and Disposal of Asbestos. • Register and monitor waste volumes at the temporary waste storage site • Oversee the physical removal of the waste from the temporary waste storage sites
Traffic and Pedestrian Safety	• Signposting, warning signs, barriers and traffic diversions: site should be clearly visible and the workers warned of all potential hazards • Provision of safe passages and crossings for pedestrians be made

	• Train staff at the site on safe and convenient passage at the work place. • Ensuring safe and continuous access to office facilities, shops and residences during disposal and cleaning activities, if the facility is in operation during this activity
Air Quality	• Establish simple air quality monitoring that ensures the outputs of the monitoring process are maintained and utilized in improving. • Appoint a dust monitoring agent/lab to monitor and analyze dust and air quality • Air monitoring should be done continuously in areas related to asbestos removal works.
Storm water Management	Ensure all storm water from the site is directed towards the established water drains
Hygiene and sanitary provision	Provide washrooms, bathrooms and changing rooms within the facility Provide truck was bay for cleaning asbestos transportation vehicles
Disposal Scheduling and Hours	The disposal and cleaning activities should be limited from 7 am or sunrise (whichever is later) to 5 pm or sunset
Clearance Inspections	Inspections should be done to ensure that temporary storage site and work environment is cleaned to a satisfaction standard.

The County government is in the process of ensuring cleaner environmental hygiene. Cleaner Production is an approach to environmental management that aims to improve the environmental performance of products, processes and services by focusing on the causes of environmental problems rather than the symptoms. In this way, it is different to the traditional „pollution control" approach to environmental management. Where pollution control is an after-the- event, „react and treat" is the approach used; Cleaner Production reflects a proactive, „anticipate and prevent" philosophy. Cleaner Production is most commonly applied to production processes by bringing about the conservation of resources, the elimination of toxic raw materials, and the reduction of wastes and emissions.

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BACKGROUND OF THE PROJECT

1.1 Project Definition

This Environmental and Social Impact Assessment study report is for the proposed Establishment of Asbestos Disposal Site in Kamenu, Thika Sub County, Kiambu County. Asbestos is a group of six fibrous minerals that occur naturally in metamorphic deposits located around the world. Of the hydrous magnesium silicate variety, the six types include tremolite, actinolite, anthophyllite, chrysotile, amosite and crocidolite. The major producers of asbestos include Canada, Kazharkstan, Ukraine, Russia, India, South Africa and Zimbabwe. Asbestos used to be mined in Kenya in the past but was stopped. Asbestos is a chemically inert mineral that is fire resistant and does not conduct heat or electricity thus making it a commonly used insulator. It has high tensile strength, insoluble and odourless. Due to these properties, asbestos has been used in a wide range of manufactured goods, including roofing materials, ceiling and floor tiles, paper and cement products, textiles, coatings and friction products such as automobile clutch, brake, transmission parts and sewer pipes. When used due to its resistance to fire or heat, it is woven into fabrics or mats while when used for building material such as roofing sheets, it is often mixed with cement.

Asbestos is a hazardous material with extremely fine fibres and can remain suspended in air for hours. If handled without caution, it may cause serious chronic health problems such as asbestosis, lung cancer and mesothelioma. The diseases cause long term serious social, economic and emotional problems. When left intact and undisturbed, asbestos materials do not pose a health risk. It becomes a problem when, due to damage, disturbance, or deterioration over time, the material releases fibres into the air. Exposure to air containing the fibres increases the risk of inhaling the fibres and developing the associated diseases.

Given the extent of scale works that the proposed asbestos land fill covers accompanied by the removal, transport and disposal and the sensitivity of the environment in which they are being carried out, Kiambu County considered that in terms of good practice it was prudent to commission Environmental Impact Assessment in order to: Identify key issues and impacts associated with the proposal appropriate mitigation to minimize any impacts to assist with obtaining statutory approvals where required.

1.2 The need for the ESIA study

The purpose of Environmental and social Impact Assessment is to give the environment its due place in the decision-making process by clearly evaluating the environmental consequences of the proposed asbestos landfill and handling from various sites within Kiambu County. Early identification and characterization of critical environmental impacts allows the public and the government to form a view about the environmental acceptability of a proposed project and what conditions should apply to mitigate or reduce those risks and impacts. The study will identify the impacts of such proposal and make recommendations thereon. As legislative requirements to provide for the preparation of an Environmental Impact Assessment for projects that might have adverse effects upon the environment, the proposed project is to be subjected to the statutory ESIA process.

Due to risks of asbestos fibre to human health, there has been general need to phase out the use of asbestos and asbestos containing products such as roofing materials and the need to dispose asbestos in a manner guided by the EMCA Cap 387, subsidiary legislation on solid waste management and the National Guidelines on Safe management and Disposal of Asbestos. A document released on August 15 by the World Health Organization highlighted the data gaps regarding the incidence of asbestos-related diseases caused by occupational exposures in Africa, and the lack of progress on eliminating hazardous exposures which this information vacuum has caused. In this regard, Nile ltd. had received a directive from County Government of Mombasa to remove the asbestos sheets from their ware house on the ground of hazardous nature of asbestos.

It also important to note that NEMA issued a directive on asbestos management to the Ministries Departments and Agencies (MDAs) on 15th November 2016 requiring removal, handling and disposal of worn out asbestos. The directive required MDA to:-

- Keep an inventory of all asbestos containing materials within their institutions and forward them to

  NEMA.

- Any building within the organization with asbestos roofing sheets that are still in good condition should be encapsulated by either coating or painting the asbestos to prevent the release of asbestos dust and fibres into the environment.
- MDAs were further advised that asbestos roof should NOT be used for rain water harvesting because of the risk of contamination/pollution of the water for others uses.

- All asbestos roofing sheets within the institution offices which are worn out/broken/dilapidated should be removed immediately to prevent any further exposure of this hazardous material to the environment and the general public. Prior to removal, an Environmental Impact Assessment (EIA) should be undertaken in accordance with the provision of the Environmental (Impact Assessment and Audit) Regulations of 2003. The EIA should be specify safe conditions for removal, Handling, transportation and disposal of asbestos in line with the asbestos guidelines with the inclusion of a detailed risk assessment report on the status of the asbestos proposed for disposal.
- The final disposal of the asbestos should either be at a designated site within the jurisdiction of MDAs' county government, a licensed private disposal site or at designated site within your facility. This final disposal site must be clearly stated in the EIA report. Transportation of the asbestos waste outside your premises should be handles by NEMA licensed asbestos waste transporters.

It is on this background that Kiambu County Government is set to remove asbestos roofing sheets from its premises across the county.

Need for Environmental Impact Assessment Accordingly, under the Environmental Management and Coordination Act (EMCA) Cap 387, it is compulsory that such a project undergoes an Environmental Impact Assessment (EIA) process, to evaluate the potential positive and negative impacts of the project, so as to adapt the project activities to sustainability requirements. In this regard, the proponent contracted an environmental experts registered by National Environment Management Authority (NEMA) to carry out the Environmental Impact Assessment and to compile a project report. This report details the findings of this study in accordance with the EMCA Cap 387 and the EIA/EA Regulations of 2003.

1.3 Location

The proposed asbestos land fill has been proposed to be at Kamenu, Thika Sub-county in Kiambu County.

1.4 Project Proponent

The project proponent is Kiambu County Government, Department of Environment and Solid Waste.

1.5 Project Objective and Scope of the ESIA

The ESIA exercise will evaluate asbestos land fill establishment and available options.

The objective of the ESIA study will be to determine whether or not the proposed asbestos land fill establishment works will have any adverse impacts on the immediate and transboundary environment, taking into account environmental, social, cultural, economic and legal considerations. The main objectives of the ESIA will be to:

- Identify and document the anticipated negative environmental and social impacts of the proposed works
- Propose mitigation measures for the negative impacts that must be undertaken during the implementation of the proposed works;
- Verify compliance with national environmental regulations and policies, instream works/ structures best practice and standards;
- Seek the views of interested or affected person in consultation with the National Environment Management Authority (NEMA); Water resources Authority or any other Lead Agencies.
- Prepare Environmental and Social Management Plan (ESMP) compliant with the Environmental Management and Coordination Act (2015) as well as Environment Impact Assessment and Audit Regulations, 2003 Legal Notice No 31, 2019.

NB: The ESIA for the proposed asbestos landfill establishment works with associated removal, transportation and disposal will consider important principles. These principles are designed to, amongst others, serve as a general framework for environmental planning and guidelines referenced for the protection or management of the environment.

The principles include a number of internationally recognized environmental law norms and, i.e. *Preventive principle; Precautionary principle and Equitable access for the previously disadvantaged to ensure human wellbeing*.

Environmental management must place people and their needs at the forefront of its concerns, and serve their physical, psychological, developmental, cultural and social interests equitably. The proposed works must be socially, environmentally and economically sustainable. Sustainable development therefore requires the consideration of all relevant factors including:

- The avoidance, or minimization and remediation, of disturbance of ecosystems and loss of biological diversity;

- The avoidance, or minimization and remediation, of pollution and degradation of the environment;
- The avoidance, or minimization and remediation, of disturbance of landscapes and sites that constitute the nation's cultural heritage;
- That waste is avoided or minimized; and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- That the use and exploitation of non-renewable natural resources should be undertaken responsibly and equitably;
- That the development, use and exploitation of renewable resources and the ecosystem of which they are part should not exceed the level beyond which their integrity is jeopardized;
- The application of a risk-averse and cautious approach; and
- That negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimized and remedied.

1.6 Terms of Reference (TOR)

The purpose of the TOR is to: -

i. To give an outline of the project, project objectives purpose; existing policies, legislation and institutional framework affecting the project;
ii. To list the Experts who will carry out the ESIA Study and prepare ESIA Study Report.
iii. Outline the ESIA process to be followed;
iv. To identify anticipated positive and negative environmental impacts of the proposed project on biophysical and purpose ways for investigating the impacts and developing workable mitigation measures;
v. Give brief description of local environment
vi. Give an indication of ESIA timeframe.

1.7 Proposed project description

1.7.1 Establishment of asbestos disposal site.

The proposed project will involve construction and operation of an asbestos disposal site in Kamenu Ward, Thika Sub-County in Kiambu County. The scope of the proposed project will involve fencing the entire land with 8 feet high chain link and designating 3 acres of the land parcels for asbestos

disposal such that the minimum distance from such zone is at least 50 from the boundary fence. The three–acre designated zone will also be fenced and a lockable gate that will be manned 24/7 installed. The project will also feature the following components:

- Disposal pits to be constructed at a designated zone on demand with dimensions based on the volume of supplied waste but with minimum external dimensions of 7m x 2.5m x 3m (LWH). The pits shall bear 130mm thick concrete lining/wall and a base of similar thickness. All the pits shall be lined with water proof sheeting before asbestos material is disposed of. The maximum proposed depth is for the pits has t be way too far from the water table to be estimated at after geophysical investigations coupled with hydrogeological information.
- Site office with washrooms on a single floor to be constructed on land
- An overhead water storage tank.

1.7.2 Removal works, transportation and disposal

Being a health hazard, asbestos-containing materials and asbestos have to be disposed of with care after its removal so as to avoid exposure to it. It is to be noted that it is the handling of asbestos, which represents the most risks, not so much its disposal. There is a risk hazard only if asbestos is inhaled/breathed by a person. Exposure to asbestos dust may lead to health consequences such as asbestosis, lung cancer and mesothelioma. Hence, in the wet form, asbestos does not constitute a hazard. Asbestos fibers do not evaporate into air or dissolve in water. Asbestos fibers are generally not broken down to other compounds and will remain virtually unchanged over long periods. Asbestos fibers are not able to move through soil. Asbestos is known to be resistant to heat and chemicals and provides excellent insulation properties. Because of the above mentioned characteristics, asbestos has, in the past been used for a wide range of manufactured goods, mostly in building materials (roofing shingles, ceiling and floor tiles, paper products, and asbestos cement products), friction products (automobile 2 clutch, brake, and transmission parts), heat-resistant fabrics, water pipes, gaskets, and coatings. Many houses, schools and other buildings containing asbestos are presently undergoing renovation works throughout Kenya. Due to asbestos fiber risks to human health, there has been general need to phase out the use of asbestos and asbestos containing products such as roofing materials and the need to dispose asbestos in a manner guided by the EMCA Cap 387, subsidiary legislation on solid waste management and the National Guidelines on Safe

management and Disposal of Asbestos. It is on this premise that the proponent has proposed to safely remove, transport and dispose asbestos site, where it is contracted with the tasks of removal of hazardous asbestos material e.g. roofing and finding a place to dispose it safely and in accordance with the law. An environmental impact assessment is being undertaken for the proposed activity in a bid to seek clearance from NEMA and obtain a License for the proposed actions.

1.7.3 Project Activities, description and inputs

i. Asbestos Survey; a walk-through inspection to be carried out to identify all asbestos on site, their uses, location, condition and quantities.

ii. Risk assessment: If there is a doubt about the presence of asbestos roofing sheets, the procedure for management of asbestos should be followed. Risk assessment has to be done as a starting point for effective **asbestos** risk management.

iii. Hydrogeological investigations.

iv. Waters and soil testing.

v. ESIA reports for proposed

- Asbestos disposal site establishment. THE SITE HAS TO BE LICENSED BY NEMA.
- Removal, transportation and disposal of asbestos from the different sites for procurement of EIA license. EIA reports are site specific and thus all sites having asbestos will need an EIA done for the safe removal, transportation and disposal works.

vi. Authorities contacted and notified of the proposed works. vii. Asbestos Packing into Polythene bags and sealing - using black double wrapped 500mm polythene paper tied with sisal strings and marked “Danger … contains asbestos fibre. Cancer and lung disease Hazard!”

viii. Loading of Asbestos onto trucks: Using a forklift carefully assisted by manual labourers with full PPE attire to avoid breakage, minimize dust and maintain high health standards. ix. Transportation of asbestos to Land fill: Using NEMA licensed truck fully covered at the back and marked “Danger contains asbestos fiber- cancer and lung disease Hazard!”

x. Offloading and burying of Asbestos at an approved site: The approved site must have a fencing and a signage: Fencing site with chain link, lockable-fence must be at least one metre from pit edge and erecting Warning notice “Asbestos Hazard Area, Keep Out”- at least 150mm height and clearly visible. The approved must be secured and protected from visitors

and services due to the hazardous nature of asbestos. It will be marked "Danger … contains asbestos fiber... Cancer and lung disease Hazard!"

xi. General cleaning of trucks and PPE: as prescribed in the NEMA National Guidelines on management and disposal of Asbestos.

CHAPTER TWO

2.0 PROJECT, DESIGN AND CONSTRUCTION.

The ESIA report is based on information and consultations with the project proponent, EIA expert, the structural drawings and details contained in the architectural plans and drawings of the proposed project. The County Government of Kiambu wants to establish an Asbestos disposal Site at the existing Kang'oki dumpsite to improve the Asbestos management in the country as per the directive.

2.1 Ownership and location of the project

The proposed landfill development is situated on a freehold land owned by The County Government of Kiambu. The site is at the outskirt of Thika town along Thika-Garrisa Highway at 1°04′27.6''S and 37°07′01.1''E. The proposed landfill site is situated on a plain terrain overlooking Kilimambogo Hill. The site is approximate 10 km from Thika town and approximate 65 KM from Nairobi. The proposed site extends over an area of 100 acres. The site is accessed via Thika-Garissa road. There is no functional management office at the site at the moment. The existing land use in the immediate neighborhood is agricultural land, quarry, education, and community facility, commercial and human settlements.

2.2 project description

The proposed project will involve construction and operation of an asbestos disposal site in Kamenu Ward, Thika Sub-County in Kiambu County. The scope of the proposed project will involve fencing the entire land with 8 feet high chain link and designating 3 acres of the land parcels for asbestos disposal such that the minimum distance from such zone is at least 50 from the boundary fence. The three–acre designated zone will also be fenced and a lockable gate that will be manned 24/7 installed. The project will also feature the following components:

- Disposal pits to be constructed at a designated zone on demand with dimensions based on the volume of supplied waste but with minimum external dimensions of 7m x 2.5m x 3m (LWH). The pits shall bear 130mm thick concrete lining/wall and a base of similar thickness. All the pits shall be lined with water proof sheeting before asbestos material is disposed of. The maximum proposed depth is for the pits has t be way too far from the water table to be estimated at after geophysical investigations coupled with hydrogeological information.

- Site office with washrooms on a single floor to be constructed on land
- An overhead water storage tank.

2.3 Zoning Regulations

The project is designed to maximize use of the plot and to meet the requirements of the County government of Kiambu in terms of ground coverage, plot ratio, road surrender, and building line. The proposed development is located in existing Kang'oki dumpsite area within the jurisdiction of Thika Sub County.

2.4 Project Site Specifications

The following are specific descriptions of the project site;

- The proposed site is located at Kang'oki dumpsite, Kiganjo in Kamenu ward, Thika Sub County within Kiambu County off the Thika –Garisa Highway approximately 5 km from Thika town at Kiganjo area.
- At the neighborhood of the proposed site there are human settlement, farming activities, education facilities, commercial activities and quarry mining, community facility, among others. The site is near THIWASCO sewage treatment site and fourteen falls is also within proximity distance.

CHAPTER THREE

3.0 METHODOLOGY AND BASELINE INFORMATION

3.1 Methodology

A team of experience and qualified environmentalist assigned this work has carried out the ESIA of this project. The team conducted reconnaissance survey to identify the major environmental issues. Accordingly, field surveys were also undertaken to assess physical and biological environment. Detailed assessment of the baseline environment has been conducted data collection from secondary source has been done to support the findings of the field survey. The field studies were supported by data collected from secondary sources.

In this particular survey, public participation and consultation was widely used and the bottom-top approach of participation applied. Both scientific and social data collection methods were used and they included the following:

3.1.1 Focus Group Discussions

Due to sensitive nature of the proposed development, a focus group discussion was held between the residents of the area and the environmental consultants. The focus group discussions were held on **22nd and 29th October 2024**. This was done to seek the opinions of the locals and their concerns regarding the proposed project.

A meeting was also held between the area administration and the environmental consultant regarding their opinion on the project and the perception of the public

3.1.2 Observations

Field observations formed an integral part of the report as the experts gathered considerable information through observations. This involved site visits and recording the situation on the ground. Observations were also used as a tool for verifying the facts that were gathered through interviews and questionnaires.

3.1.3 Photography

Photos were taken to show the actual site of the proposed development, resources on site and

neighboring development.

3.1.4 Secondary data

Various literatures were used in aiding the successful completion of the report. They include: The Environmental Management and Coordination Act No.8 of 1999, Government printers, The Physical Planning Act Cap 286 of 2009; Government printers, Nairobi, Environmental Impact Assessment Audit Regulations 2003; Government printer, Environmental Management and Coordination (Waste Management) regulations, 2006, The Public Health Act, Cap 242, The Urban Areas and Cities Act, 2011, The occupational Safety and Health Act (OSHA),The factories and other places of work (Hazardous Substances) Rules, 2007 among others.

3.2 Baseline Information

The proposed asbestos land fill has been proposed to be at Kamenu, Thika Sub- County in Kiambu County.

3.3 Geography and Climate

The proposed project is located within the County of Kiambu which borders Nairobi, Machakos, Kajiado and Muranga County. The climate is moderate tropical with sunshine most of the year round and typical average temperatures of 25°C during the day, with the hottest period in January and February leading to the long rains and the coldest in July and an altitude of 1631m above sea level. The "long rains" season lasts from March/April to May/June. The "short rains" season is from October to November/December.

3.4 Soil Type and Gradient

The major soil types within the proposed project area are black soils with good water holding capacity and with all the major plant nutrients. The area is also gently sloping hence soil erosion is not a major concern for the developers/ farmers. However, is worthy to note that deforestation and environmental degradation over the past recent years has may lead to cases of soil erosion as well as instances of landslides.

3.5 Hydrology

There are many rivers that flow within the county, some of which are seasonal while the rest are permanent. The major permanent river in the area is Chania River which passes through the

downstream of the site.

3.6 Flora

Trees play an important role in our daily lives. The obvious ones they attract rain, act as water catchment areas, purify air, act as wind-breakers, block noise and dust, produce oxygen and in return take in carbon dioxide(act as carbon sinks), control soil erosion, act as a habitat(homes for birds and insects), absorb run off and also they add value to property among many others. Within the proposed project area there are shrubs and other low order vegetation at the neighboring which are generally naturally occurring. A selective strategy will be applied during the pre-construction stage in that those not interfering with the construction layout plans will be left intact.

The following mitigation measures will be incorporated throughout the project cycle:

- Vegetation which will not interfere with the proposed development will be left intact,
- After the construction phase landscaping will be done by planting combinations of ornamental plants and flowers which will improve the aesthetic value and contribute to microclimate modification.

3.7 Neighboring facilities and features.

At the neighborhood of the proposed site there are existing Sewerage treatment site of Thika, farming activities, education facilities, human settlement and commercial facilities. The residents in this area are in a mixed economic status including the middle and lower middle class.

3.8 Administrative and Social Amenities:

The area is well served with Administration and social amenities. Schools in the area include both secondary and primary levels e.g. Kiganjo Primary school.

3.9 **Security**

The project site is within an area that is considered relatively secure, as most of the neighboring land-uses have not fully developed.

3.10 **Street Lighting**

The proposed project area does not have security/ street lighting either along the main roads or the access roads.

3.11 Population Density

The proposed project is located at Kang'oki, Kiganjo area in Thika sub county, Kiambu County which has a population of 1,782,083 people (**According to the 2009 National Population and Housing Census**) in a total coverage area of **2543 km^2** with a population density of approximately 6**38** persons per km^2 of whom, live in the urban areas and the rest living in the rural areas. The proposed development site has low population density compared to the other parts of the county. This can be explained by the physiologic characteristic of the area.

3.12 Infrastructure

The zone where this project is located has essential infrastructure to support this type of development. The site is located along the Thika –Garisa highway which serve the area residents within both the immediate area and large sections of the Country. The road to the site is in good condition. The Kiambu County Government and the Kenya Rural Roads Authority should therefore take regularly maintain the roads so as to ensure that they are able to serve the area residents efficiently during all seasons. Power lines and communication masts are available in the project site area. The proponent should however liaise with the Kenya Power and Lighting Company Limited to ensure compliance with the Way Leaves Act and also avoid accidental tampering of electrical wires

3.13 Water

The proposed Asbestos disposal site development will have insignificant water consumption level. Despite that, the proponent is advised to harvest water and provide storage facility. The water harvested will be used for drinking, cleaning the facility and in case of any emergency requiring water.

3.14 Effluent

The proposed landfill development will generate no effluent. The waste cleaning water from the premises will be channeled to an onsite septic tank or a waste water treatment point on the site before discharged from the site.

CHAPTER FOUR

4.0 ENVIRONMENTAL LEGISLATIVE AND REGULATORY FRAMEWORK

4.1 Introduction

The policy, legal and institutional frameworks on health, safety, environmental standards and sustainable use of natural resource related to the activities at the company include the following:

- The Constitution of Kenya
- The Environment (Impact Assessment and Audit) Regulations, 2003
- The Environment Management and Co-ordination Act-1999
- Environmental Management and Coordination (Waste Management) Regulations, 2006 Legal Notice No.121
- The Water Act, 2002
- Water Quality Regulation
- The Physical Planning Act Cap 286
- Public Health Act, Cap 242
- The Way Leaves Act
- Policy Guidelines on Environment and Development (Sessional paper No.6 of 1999)
- National Policy on Water Resources Management and Development sessional paper No.1 of 1999
- Building Codes 1968
- Compliance of Solid Waste Management Legal Notice No. 121
- The Noise and Excessive Vibrations Act, 2009
- Work injury benefits Act-Act No.13 of 2007
- Kenya's Vision 2030
- National Environmental Action Plan (NEAP)
- The Local Government Act Cap 265
- The Energy (Energy Management) Regulations, 2012
- Occupational Safety and Health Act, 2007
- The County Governments Act, 2012
- The Radiation Protection Act Cap 243

- The Transport Licensing Act Cap 404
- The Factories Act Cap 514
- The Traffic Act Cap 403
- The Scrap Metal Act Cap 503
- Land Titles Act Cap 282
- Registration of Titles Act Cap 281

4.2 The Constitution of Kenya

This is the principal guiding law in the country from which all the subsidiary laws are drawn from. **Article 42** of the Bill of Rights of the Constitution grants every person has the right to a clean and healthy environment and thus forming a basis for this report.

4.3 The Environment (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. *(The proponent has set out to carry an ESIA for the proposed Asbestos disposal site)*

4.4 The Environmental Management and Coordination Act (EMCA)-1999

This is an Act of parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto. Part VII on Environmental Audit and Monitoring section 58 specifically detail the need to undertake Environmental Impact Assessment of all projects likely to cause negative impacts to the environment as listed in the second schedule of the act. Further part V of the Environmental Impact Assessment and therefore mandatory that an Environment Impact Assessment process is undertaken. It is therefore mandatory that an Environmental Impact Assessment must be undertaken by all ongoing projects to ensure that the activities at their premises comply with all legal and institutional frameworks that are in place to safeguard the environment, health and safety of the workers.

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

Notice No.121

1) 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.

2) A waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations.

5 (1) A waste generator shall minimize the waste generated by adopting the following cleaner production methods:

a) Improvement of production process through

i) Conserving raw materials and energy

ii) Eliminating the use of toxic raw materials; and

iii) Reducing toxic emissions and waste

b) Monitoring the products cycle from beginning to end by-

i) Identifying and eliminating potential negative impacts of the product;

ii) Enabling the recovery and re-use of the product where possible; and

iii) Reclamation and recycling; and

c) Incorporating environmental concerns in the design and disposal of a product.

4.6 The Water Act, 2002

Part II, section 18, of the water Act 2002 provides for national monitoring and information systems on water resources. Following on this, sub-section 3 allows the Water Resources Management Authority 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 thereof furnished to the authority.

Section 73 of the act allows a person with license (licensee) to supply water to make regulations for purposes of protecting against degradation of water sources. 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 water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction.

4.7 The Environmental Management and Coordination (Water Quality) Regulations, 2006

Part II of the regulations state that every person shall refrain from any act which directly or indirectly

causes or may cause immediate or subsequent water pollution and it shall be immaterial whether or not the water resource was polluted before the enactment of the act.

2. No person shall throw or cause to flow into or near a water resource and liquid, solid or gaseous substance or deposit any such substance in or near, as to cause pollution.

No person shall:

a) Discharge, any effluent from sewerage treatment works industry or other point source into aquatic environment without a valid effluent discharge license issued in accordance with the provisions of the act.

b) Abstract ground water or carry out any activity near any lakes, rivers, steam, springs and wells that is likely to have any adverse impact on the quantity and quality of the water without an Environment Impact Assessment license issued in accordance with the provisions of the Act; Or

c) Cultivate or undertake and development activity within a minimum of six meters and a maximum of thirty meters from the highest ever recorded flood level, on either side of a river or stream, and as may be determined by the authority from time to time.

4.8 The Physical Planning Act Cap 286

The physical planning act has provisions to control development and use of land in particular areas, especially where a project may involve subdivisions or amalgamation of land parcels, or located in an area otherwise reserved for other uses.

4.9 The Urban Areas and Cities Act, 2011

Local authorities are given power to control or prohibit all developments which, by reason of smoke, fumes, chemicals, gases, dust, smell, noise, vibration or other cause, may be or become a source of danger, discomfort or annoyance to the neighborhoods, and to prescribe the conditions subject to which such developments shall be carried on. These powers were previously granted by The Local Authority Act, Cap265 which is now repealed by this Act as indicated in Part VIII, Section 55 that states "**All rights, assets and liabilities accrued in respect of the properties vested in the local authorities established under the Local Government Act (Cap. 265) which shall stand repealed after the first election under the Constitution shall be dealt with as provided by law**."

4.10 Public Health Act (Cap 242)

Under this Act, every local authority or health authority is mandated to take all lawful, necessary and reasonable practicable measures to prevent all injurious conditions in premises, construction condition or manner of use of any trade premises. Nuisances under this act include any noxious matter or waste water, flowing or discharged from any premises wherever situated, into any public street, or

into the gutter or side channel of any street or water course, or any accumulation or deposit of refuse or other offensive matter. Every council and every urban area council may make by-laws as to buildings and sanitation. The proponent intends to prevent nuisances within the project jurisdiction as indicated in the Environmental Management Plan.

4.11 The Way Leaves Act

The areas zoned for communication line, sewer lines, power lines, water pipes etc. are known as way leaves. The way leave act prohibits development of any kind in these designated areas. Thus any developer is bound by this act and who, in consultation with the project architect, must see to it that no development takes place in these areas.

4.12 Policy Guidelines on Environment and Development (Sessional paper No.6 of 1999)

Among the key objectives of the policy paper on Environment and Development (Sessional paper No.6 of 1999) are to ensure that from the onset, all development policies, programmes and projects take environmental considerations into account and to ensure that an immediate environmental impact assessment (EIA) report is prepared for all kinds of developments before implementation. Under this paper, broad categories of development issues among them the human settlement sector, have been covered that require sustainable approach. The policy recommends the need for enhanced re use/recycle of residues including wastewater, use of low non-waste technologies, increased public awareness and appreciation of clean environment. It also encourages participation of stake holders in the management of wastes within their localities. Regarding human settlement, the paper encourages better planning in both rural and urban areas and provision of basic needs such as water, drainage and waste disposal facilities among others.

4.13 National Policy on Water Resources Management and Development

While the National Policy on Water Resources Management and development (1999) enhances a systematic development of water facilities in all sectors for the promotion of the country's socio-economic progress, it also recognizes the by-products of these processes as waste water. It, therefore, calls for the development of appropriate sanitation systems to protect people's health and water resources from pollution. Projects therefore, should be accompanied by corresponding waste management systems to handle the waste water and other wastes emanating there from. The same policy requires such projects should undergo comprehensive Environmental Impact Assessment.

The proposed project has complied by initiating the preparation of this ESIA report. The proponent has made arrangements for the discharge of waste water into a soak pit, effluent into the waste water treatment plant while storm water will be discharged into the surface drainage channels.

4.14 The Factories Act Cap 514

Solid Waste Segregation and Reduction at Production and Consumption Levels

The Factories Act is one of the existing laws that deal with those sectors that generate solid waste. Section 13 of this Act makes it mandatory for every factory owner to ensure that the factory environment is kept in a clean state and from effluvia arising from any drain, sanitary convenience or nuisance and without prejudice to the quality of the foregoing provision. The foregoing provision as outlined in paragraphs (a) and (b) of this section include accumulations of dirt and refuse which shall be removed daily by a suitable method from the floors and benches of the workrooms, and from the staircases and passages. The floor of every workroom is to be cleaned at least once a week by washing or, if it is effective and suitable, by sweeping or by any other method. Even though the Act provides for a section to ensure that the factory environment is kept clean, it does not clarify or provide a section on reduction of the waste generated by such factories or the segregation of the waste cleaned from the stated parts of the factory rooms.

4.15 The Radiation Protection Act (Cap 243)

Section 7(d) of the Act gives the power to the board to keep a register of owners of radioactive material and to license disposal of radioactive waste. Section 2(1) describes the duty of a license i.e., he shall be responsible for ensuring exposure to radiation from transport, storage and disposal shall be kept reasonably low. Section 16(2) of the Act outlaws disposal of irradiating devices radioactive material or any other sources of ionizing radiation without being in possession of a valid license a contravener

will be guilty of an offence and liable to imprisonment for not more than two years. Nonetheless, section

18(b) requires the minister in consultation with the board to make regulation for/and methods for disposing radioactive waste products from any source

4.16 Building Codes 1968

Section 194 requires that where sewers exists, the occupants of the nearby premises shall apply to the local for a permit to permit to the sewer line and all the waste water must be discharged into the sewer the code also prohibits construction of structures or building on sewer line.

4.17 The Transport Licensing Act Cap 404

Any police officer in uniform in accordance to section 26 of the Transport Licensing Act may stop any vehicle or ship and may inspect any vehicle or ship with a view to ascertain whether or not the provisions of this Act or of any regulation made there under are being complied with, and may demand for inspection the production of any license, certificate, document or record of any description Whatsoever which may, under the provisions of this Act or any regulation made there under be required to be carried on such vehicle or ship. The field visits established that this provision is not being adhered to as most police officers tend not to stop the trucks carrying the solid waste even though such trucks are not normally compliant with the section herein. This is perhaps due to the claim that these trucks are normally uncovered and produce obnoxious smell and so stopping such trucks would therefore affect the officers and other road users.

4.18 Compliance of Solid Waste Management Legal Notice No. 121

The environment management and coordination Legal Notice No. 121 on (Waste Management) provides for the responsibility of waste generation, cleaner production methods, segregation of waste by generator, waste transportation license responsibility of waste transporter, transportation of waste by licensed transporters, license for disposal facility, waste treatment by operators of disposal sites, requirement of environmental audit and re-use and recycling plant. The legal notice provides mitigation measures to industrial waste and their treatment. The hazardous and toxic wastes have been specified by the legal notice that also provides for various requirements of EIA. Details on how toxic and hazardous waste should be handled, stored, treated, transported and even provision of permits. This has to apply to pesticides and toxic substances, biomedical waste, and radioactive waste whereby collection, transportation, storage, treatment and disposal of them have been specified. The legal notice further specifies offence, penalties and operation of regulation that have to be followed

when dealing with any type of waste. The proposed development will have to adhere to legal notice No 121 in its project cycle that is from construction, operational and decommissioning of the housing project. The project proponent will be responsible for implementing the legal notice No 121 throughout the project cycle. The solid waste management provides room for NEMA licensed companies to handle the waste in sound manner.

4.19 Noise and Excessive Vibrations Act, 2009

Under this Act, 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.

4.20 Work injury benefits Act-Act No.13 of 2007.

This is an Act of parliament to provide for compensation to employees for work related injuries and diseases contracted in the course of their employment and for connected purposes.

4.21 Kenya's Vision 2030.

According to Vision 2030, Kenya plans to be an adequately and decently housed nation in a suitable environment by the year 2020. The vision also aims at the enactment of the Housing bill, 2006.

4.22 National Environmental Action Plan (NEAP)

According to the Kenya National Environmental Action plan (NEAP, 1994) the Government recognized the negative impacts on ecosystems emanating from industrial, economic and social development programmes that disregarded environmental sustainability. Established in1990, the plan's effort was to integrate environmental considerations into the country's economic and social development. The integration process was to be achieving through a multi sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources are an integral part of societal decision making. Under the NEAP process EIA was introduced and among the key participants identified were the industrialists, business community and local authorities.

4.23 The Scrap Metal Act (Cap 503 Laws of Kenya)

No person shall Section 22(2) of the Act prohibits anybody from exporting any scrap metal unless he has given to the public officer in charge of the police station nearest to the premises in which the scrap metal is stored immediately before its being dispatched for export not less than seventy-two hours' notice in writing of his intention to export the scrap metal, specifying in such notice the premises and time at which the scrap metal may be inspected. However, this provision is not being adhered to as most people transport scrap metals contrary to these provisions.

4.24 Land Titles Act Cap 282

The Land Titles Act Cap 282 section 10 (1) states that there shall be appointed and attached to the Land Registration Court a qualified surveyor who, with such assistants as may be necessary, shall survey land, make a plan or plans thereof and define and mark the boundaries of any areas therein as, when and where directed by the Recorder of Titles, either before, during or after the termination of any question concerning land or any interest connected therewith, and every area so defined and marked shall be further marked with a number of other distinctive symbol to be shown upon the plan or plans for the purposes of complete identification and registration thereof as is herein after prescribed. In accordance to this act, the proposed project plot has been surveyed and the boundaries marked and a Title Deed issued (**see attached)**

4.25 Registration of Titles Act Cap 281

Section 34 of this Act states that when land is intended to be transferred or any right of way or other easement is intended to be created or transferred, the registered proprietor or, if the proprietor is of unsound mind, the guardian or other person appointed by the court to act on his/her behalf in the matter, shall execute, in original only, a transfer in form F in the First Schedule, which transfer shall, for description of the land intended be dealt with, refer to the grant or certificate of title of the land, or shall give such description as may be sufficient to identify it, and shall contain an accurate statement of the land and easement, or the easement, intended to be transferred or created, and a memorandum of all leases, charges and other encumbrances to which the land may be subject, and of all rights-of-way, easements and privileges intended to be conveyed. The parcel of land is owned by the County Government of Kiambu.

4.26 The Traffic Act (Cap 403 Laws of Kenya)

Section 55(1) of the Traffic Act states that no vehicle shall be used on a road unless such vehicle and all parts and equipment thereof, including lights and tyres comply with the requirements of the Act and such parts and equipment shall at all times be maintained in such a condition that the driving of the vehicle is not likely to be a danger to other users of the road or to persons travelling on the vehicle. However, most of the vehicles being used to transport solid waste within the city are in conditions this is not inconsonance with this provision. Most of the trucks are not covered and so as they move, the carried waste spills over on the road. Some lack basic parts like lights and reflects and therefore pose great danger to other road users contrary to the provision of section 55(1). Nonetheless, most of these trucks are normally overloaded and this is against section 56(1) of the Act which states that no vehicle shall be used on a road with a load greater than the load specified by the manufacturer of the chassis of the vehicle or than the load capacity determined by an inspector under the Act.

4.27 The Energy (Energy Management) Regulations, 2012

5. (1) The owner or occupier shall develop an energy management policy for the facility (factories, commercial buildings, institutional buildings and local authorities) which shall have the minimum requirements as provided in the First Schedule.

(2) The owner or occupier shall within one year of classification file the energy management policy for every designated facility with the Commission for approval before implementation.

(3) The owner or occupier of a facility shall designate an energy officer for every designated facility, who shall be responsible for the development and implementation of energy efficiency and conservation.

(4) The owner or occupier of a facility shall maintain records of information for every designated facility for a minimum period of five years from the date of occupation of the facility, which shall include;

(a) Monthly and annual electricity, fuel and water consumption;

(b) Monthly production data or occupancy levels; and up to date building plans, infrastructure plans and floor area drawings.

(5) The owner or occupier shall cause an energy audit of the facility to be undertaken by a licensed energy auditor at least once every three years. (3) The owner or occupier shall submit the report of the audit to the Commission in a manner approved by the Commission, within six months from the

end of the financial year in which the audit is undertaken.

4.28 Occupational Safety and Health Act, 2007

This is an act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces. **6**. (1) every occupier shall ensure the safety, health and welfare at work of all persons working in his workplace. Section **7** also requires that the occupier develops a safety policy for the workplace and ensure that all workers have knowledge of it therefore the contractor shall ensure that a safety policy is in place during both the decommissioning and construction phases.

44. (1) Before any person occupies or uses any premises as a workplace, he shall apply for the registration of the premises by sending to the Director a written notice containing the particulars set out in the Fourth Schedule. The owner/ management/ contractor should ensure that the construction site for the proposed development is registered with the Directorate of Occupational Health and Safety.

4.29 The County Governments Act, No. 17 of 2012

An Act of Parliament to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Under Section 134, the official repeal of Cap. 265 i.e. The Local Government Act shall occur upon the final announcement of all the results of the first elections held under the Constitution. This therefore grants the powers previously held by the Town, Municipal and City Councils to the County Governments including approvals of development and the related monitoring activities

CHAPTER FIVE

5.0 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

5.1 Project Stakeholders

They include but not limited to;

- People who reside adjacent to the site
- People who work at the site, either employed by a company or self-employed
- Institutions operating in areas adjacent to the site
- Workers and companies operating at landfill site elsewhere in Thika Sub County
- Environmental officers and waste handler
- County and National Government who deals with issues relating to the proposed development such as Thika Sub County, public Health and NEMA
- NGOs, CBOs and other representatives of persons who may be affected by the project
- The beneficiary community in general.
- Industries in Thika and in the county.

Consultation during detailed design

- Focus-group discussions with affected persons and other stakeholders (including women's groups, NGOs and CBOs) to hear their views and concerns, so that these can be addressed in project design where necessary
- Structured consultation meetings with the institutional stakeholders to discuss and approve key aspects of the project.

Consultation during construction

- Public meetings with major stakeholders to discuss and plan work programs and allow issues to be raised and addressed once construction has started
- Smaller-scale meetings to discuss and plan construction work with primary stakeholders to reduce disturbance and other impacts, and provide a mechanism through which affected persons can participate in project monitoring and evaluation.

Project disclosure

- Public information via newspaper to explain the project to the populations and prepare them

for any disruption they may experience once the project is underway

- Site signboard indicating the presence of the facility and its hazardous nature
- Public disclosure meetings at key stages to inform the public of progress and future plans, and to provide copies of summary documents
- Formal disclosure of completed project reports by making copies available at convenient locations informing the public of their availability, and providing a mechanism through which comments can be made.

5.2 NEMA Recommendation

The public are supposed to participate and be involved because the project being carried out will affect them. The role of public consultation and involvement in Environmental Impact Assessment and examination process is meant to assure the quality, comprehensiveness and effectiveness of the Environmental Assessment. It also ensures that the public views are adequately taken into consideration in decision making process. Effective public participation should cover most categories of concerned groups; the youth, women, men, the aged, employed and unemployed persons.

5.3 Sources of Information

One of the key information sources used during the Initial Environmental Examination was the consultative public participation. This exercise was carried out on 22nd October, 2024 by a team of experienced qualified environmental experts. This was done through focus group discussion where the area residence presented their concerns regarding the project**.**

The purpose for these discussions was to identify the positive and negative impacts and subsequently promote and mitigate them respectively. It also helped in identifying any other miscellaneous issues which may bring conflicts in case project implementation proceeds as planned.

5.4 Issues Raised

The stakeholders consulted gave both positive and negative views, as well as suggestions for the proponent to consider during construction and operation phases of the proposed project. Their views are as discussed below:

5.4.1 Positive issues

1. Employment Opportunities

During the focus group discussions, the members of the public were positive that during the proposed project construction and subsequent operational phase, the project will create employment

opportunities for the persons and companies involved in the proposed project. There were also fears that the negative impacts of the project could be more severe compared to the opportunities created.

2. Security improvement

The persons interviewed remarked that the proposed development will enhance security in the area as the result of the proponent hiring security guards to man the proposed project during both construction and operation phase.

3. Improved business opportunities

The proposed development shall in itself further open up the area for improved business opportunities as other complementary businesses will emerge thus open up the area further and stimulate growth.

4. Safe Disposal of asbestos.

The proposed project shall in itself ensure the safe encapsulation and disposal of asbestos, preventing carcinogenic diseases.

5.4.2 Negative impacts

1. Dust Emissions/Air Pollution

There were concerns over possibility of generation of large amount of dust within the project site and surrounding areas as a result of excavation works, transportation and encapsulation of the asbestos materials. The residents suggested that the proponent should ensure that dust levels at the site are minimized as they are health hazard. The residents insisted that the developer should provide measures beyond reasonable doubt that the dust which might be generated by the waste is controlled on the site. Additional mitigation measures presented within the E.M.P will be fully implemented to minimize the impacts of dust generation.

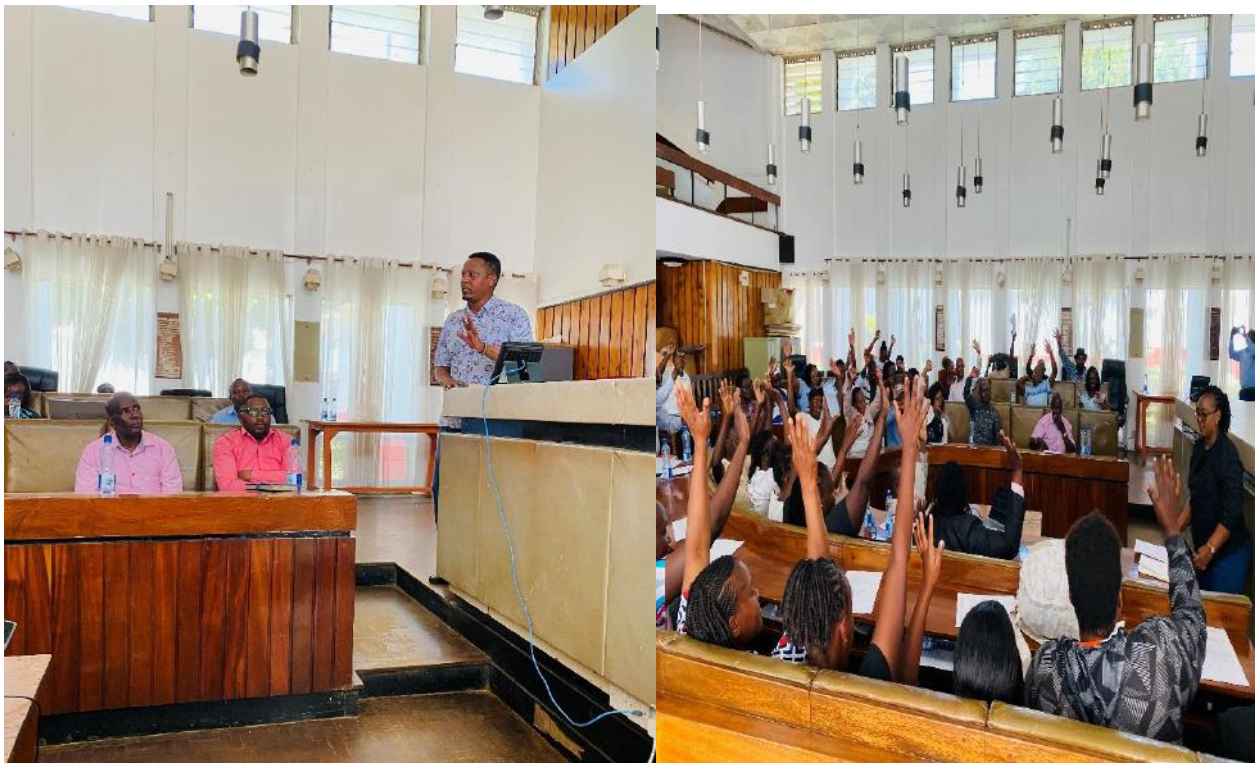
2. Noise

During the operational phase, there will be an increase in noise levels around the premises. The proponent is therefore advised to provide a wall around the construction site to act as a buffer to the noise produced. Proper maintenance of the machinery and other equipment used on the site as well as the restriction of construction activities in the stipulated 0800hrs to 1700hrs on weekdays as well as 0800hrs – 1300hrs on Saturdays is advised to reduce the effect of noise generated.

3. Water contamination

The proposed development may release leachate which might finds it way in both surface water and groundwater leading to water contamination. There is need to establish leachate management mechanism to avoid water pollution. This was one of the major concerns of the residents. They insisted that the proposed development will interfere with the ground water and surface water leading to health hazards of the whole community.

In this regard, a detailed hydrological assessment needs to be carried out to determine the implication of the proposed project on the ground water contamination.



Public Consultation Exercise

CHAPTER SIX

6.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES FOR ASBESTOS DISPOSAL SITE

Anticipated impacts at an asbestos disposal site can be positive or negative, direct or indirect. To understand the environmental impacts of the project, the project is broken down into activity components and examined for environmental risks. The identified impacts are then addressed through mitigation measures, leading to the formulation of an Environmental Impact Management Plan for the project.

6.1.1 Biophysical Impacts

6.1.1.1 Groundwater Contamination (Water Quality)

Asbestos disposal sites have a significant potential to affect groundwater. The following factors need to be assessed:

- Soil permeability
- Shallow water tables
- Groundwater flow direction
- Vulnerability of aquifers
- Groundwater quality
- Groundwater chemistry
- Potential contamination sources

Pollution risks from asbestos disposal activities can arise from oils, fuels, and construction materials used during construction. These pollutants could reach surface and underground water systems, leading to groundwater contamination.

Mitigation Measures:

- Use impermeable liners to prevent contamination from asbestos fibers and leachate.
- Collect leachate in lined ponds and drains.
- Divert storm water away from waste sites and collect runoff in lined ponds.
- Avoid development in high-risk areas near groundwater.
- Service construction vehicles in designated workshops to prevent spills.

- Regularly monitor groundwater for contamination by collecting samples from boreholes adjacent to the site.

6.1.1.2 Surface Water Contamination

Surface water contamination may occur from improper management of asbestos waste and construction materials. Oils, fuels, and chemicals used during the construction phase may spill and flow into nearby water bodies.

Mitigation Measures:

- Install drip trays to capture oil or fuel spills during vehicle maintenance.
- Minimize hazardous materials stored on-site and ensure proper containment.
- Conduct concrete batching on impermeable surfaces.
- Ensure safe transportation and disposal of asbestos waste.
- Introduce waste and sewage collection and disposal procedures.

6.1.2 Geology and Soils

Excavations, grading, and other construction activities may lead to soil erosion, compaction, and contamination by chemicals, which will affect soil quality.

Mitigation Measures:

- Implement anti-erosion measures such as berms and replanting of vegetation.
- Inspect unpaved roads regularly to prevent erosion.
- Rip compacted soil to restore natural structure and permeability.
- Manage stockpiles to reduce erosion and plant grass to stabilize disturbed areas.

6.1.3 Vegetation

Clearing of vegetation for the disposal site may lead to soil erosion and loss of habitat. In addition, invasive plant species may establish themselves in disturbed areas.

Mitigation Measures:

- Minimize vegetation clearance and promote natural regrowth in rehabilitated areas.
- Rehabilitate disturbed areas by planting indigenous species.
- Control the spread of invasive plant species.

- Avoid cutting down sensitive or protected vegetation without proper assessment.

6.1.4 Fauna

Disruption of faunal habitats will occur during construction, which could result in the displacement or loss of wildlife.

Mitigation Measures:

- Minimize disturbance to surrounding habitats.
- Avoid unnecessary clearing of vegetation.
- Restore affected areas by encouraging natural habitat regeneration.
- Educate personnel to prevent the capture or disturbance of animals during construction.

6.1.5 Human Environment

6.1.5.1 Transportation of Waste

Increased traffic from the transportation of asbestos to the disposal site could degrade road infrastructure and cause community discomfort.

Mitigation Measures:

- Maintain access roads used for waste transportation.
- Develop traffic management plans to minimize road damage and community inconvenience.

6.1.5.2 Nuisance

Noise and dust from construction activities may cause discomfort to nearby residents and workers.

Mitigation Measures:

- Limit construction activities to daytime hours.
- Use vehicles and equipment with noise suppressors.
- Regularly maintain equipment to reduce noise pollution.
- Investigate and address noise complaints promptly.

6.1.6 Noise

Construction activities will generate noise, potentially impacting nearby communities and wildlife.

Mitigation Measures:

- Restrict noisy activities to specific hours.
- Use low-noise equipment and properly maintain all machinery.
- Erect noise barriers or berms where necessary to minimize noise propagation.

6.2 Operational Phase

6.2.1 Changes in Community Structure

Asbestos disposal activities may alter the community structure by affecting species diversity and population dynamics. The site may attract pest species or invasive species, altering the local ecosystem.

Mitigation Measures:

- Minimize disturbances to local fauna and vegetation.
- Prevent personnel from interfering with wildlife, including setting traps.
- Promote the rehabilitation of disturbed areas with native species.

6.2.2 Noise

During the operational phase, noise from waste delivery trucks and equipment such as bulldozers will affect the surrounding environment.

Mitigation Measures:

- Fit vehicles with silencers and regularly maintain them.
- Monitor noise levels regularly to ensure compliance with acceptable limits.
- Investigate noise complaints and take corrective measures.

6.2.3 Human Environment

6.2.3.1 Nuisance

Odor from asbestos disposal may cause discomfort to workers and nearby communities.

Mitigation Measures:

- Properly manage asbestos waste to minimize odor.

- Maintain a complaints register and establish a system for addressing issues raised by the community.

6.2.3.2 Job Creation

The asbestos disposal site will create permanent and temporary jobs, positively impacting the local economy.

Mitigation Measures:

- Employ local residents during both the construction and operational phases to maximize community benefits.

6.2.3.3 Health

Exposure to asbestos dust poses health risks, especially to workers and nearby communities.

Mitigation Measures:

- Implement health and safety protocols, including regular medical checkups for workers.
- Provide personal protective equipment (PPE) such as respirators, gloves, and overalls to employees.
- Build a perimeter wall to limit access to the site.
- Conduct training and capacity-building for nearby residents regarding asbestos risks and mitigation strategies.

6.3 Summary of Operation and Maintenance Impacts

Proper management of the asbestos disposal site will help minimize contamination and aesthetic degradation. The site should adhere to environmental regulations to ensure that leachate, pollutants, and by-products are managed properly, preventing harm to the environment and human health.

Water contamination.

The wastes from the disposal site can end up in water bodies, polluting water resources. The main pollutants are wastewater from toilets and from cleaning of the premises, and the leachate from the stored asbestos in the disposal site.

Noise.

Noise from the establishment can be a nuisance for communities living in the immediate vicinity of the CLF. Major sources of noise are the chaos created by the laborers working in the operation of the site and heavy vehicular movement to transport solid waste from the municipal areas to the CLF site.

Health, hygiene, and safety.

Spread of diseases to workers and their families may occur due to inadequate provision of safety equipment and lack of practice of safety rules and precautions.

Topographical modification.

The implementation and subsequent operational activity of the landfill site may lead to unfriendly topographical alterations and modifications in the natural environment and overall landscape of the surrounding area.

Asbestos dust.

Dust migration due to pressure differentials and diffusion can occur. This can cause health hazards to the adjacent settler if is not managed Vegetation covers alteration. Nature of vegetation cover of the landfill site as well as the surrounding area will alter and will have an impact on the drainage pattern of the locality.

Decline in land value

Declination of land value may be an impact if the landfill site operation is not properly controlled and monitored.

6.4 Decommissioning Phase

Once the site is decommissioned, the asbestos disposal site will be rehabilitated with a grass layer to stabilize the surface, reducing the visibility of man-made landforms.

Summary of Positive Impacts

- Employment creation.
- Enhanced security and infrastructure.
- Improved waste management facilities.
- Contribution to Vision 2030 goals.

Summary of Negative Impacts

- Release of asbestos dust.

- Habitat destruction and pollution risks.
- Potential disease outbreaks and introduction of invasive species.

Summary of Mitigation Measures

- Collection and management of leachate.
- Soil erosion control measures.
- Rehabilitation of affected areas to restore ecosystems.

CHAPTER SEVEN

7.0 ANALYSIS OF PROJECT ALTERNATIVES

This section analyses the projects alternatives in terms of site, technology scale and waste management options. According to the ESIA regulations, project alternatives are required to be considered within the ESIA report and be evaluated in terms of social, biophysical, economic and technical factors. However alternatives can be defined as different means of meeting the general purpose and requirements of the activity, in relation to the proposed project. These include activity, site, and layout alternatives, which are presented in this section.

7.1 NIL INTERVENTION/ NO-GO OPTION

The nil intervention alternatives are the option of not undertaking the proposed activity at all. The no-development alternative is not considered to be feasible as existing asbestos disposal facilities are not adequate. The majority of the asbestos generated are poorly disposed. In order to avoid an asbestos disposal crisis it is necessary to identify and develop sites to cater for future asbestos disposal requirements in the country. If asbestos disposal sites were not establish, the country would experience the number of consequences

- Illegal dumping of asbestos, especially of general industrial, commercial and garden refuse has been identified as an existing problem. This current problem may increase due to the high transport cost that would result from the transporting the asbestos elsewhere.
- Local community members will not be provided with the opportunity to develop entrepreneurial skills and activities relating to asbestos disposal site operation.
- There may be a loss of investment in the sub-region as business and industry requiring suitable economic waste disposal facilities may locate elsewhere.
- There has been significant development in the area over the past 5 years and the viability of further development could be affected if there is no area designated for future landfill development.

CHAPTER EIGHT

ENVIRONMENTAL MANAGEMENT PLAN

8.1 Introduction

The objectives of the Environmental Management Plan are:

- To guide the project implementers in project planning.
- To guide the project implementers on the likely impacts of the project and when they are likely to occur.
- To give an assessment of the capacity requirements for the implementation of the EMP.
- To guide the project implementers to allocate adequate resources for the implementation of the mitigation measures.

8.2 Costing

It is noted from the plan that some impact mitigation activities, costing is not done. This is because costing for such activities may have been catered for, under another project component/phase for a similar or related activity. For instance, the cost of provision of dust coats and masks is entered once, as it is not expected that the contractor will have to buy this item again for all the purpose listed in the subsequent phases. A set of standard protective clothing will last one worker throughout the construction phase.

8.3 Plan Period

The EMP provided here is to cover the first year of the project's operations. It is then expected that an Environmental Audit will be undertaken at the end of the year to evaluate conformity to the EMP as well as identify any gaps and recommend corrective adjustments to the plan. This is then addressed through a loop mechanism from construction phase to operational phase to identify the success of the project versus the failures. This should be analyzed through the environmental criteria of impact and mitigations.

8.4 Environmental Management Plan (EMP)

The table below gives a summary of the environmental health and safety impacts that the project has on the proposed site and the possible mitigation measures monitoring actions required ensuring minimal damage of the environment.

Environmental/ Social Impact	Proposed Mitigation Measures	Responsibility	Parameters to be Monitored	Frequency of Monitoring	Timing/frequency Target date	Cost (ksh)
Air Pollution	• Wet asbestos materials before removal and transport to prevent airborne fibers • Cover trucks transporting asbestos with impervious sheets • Use specialized vacuum cleaners with HEPA filters for cleaning contaminated areas • Limit vehicle speed within the site to reduce dust • Perform regular maintenance on vehicles and machinery to reduce emissions • Workers should wear PPE such as respirators approved for asbestos • Set up air quality monitoring stations	Contractor	Asbestos fiber concentration (air sampling) PPE use Vehicle emission records Community complaints	Monthly After each significant disposal Spot check s	During construction During operational	180,000.00

	around the site • Conduct regular inspections to ensure containment measures are effective					

Leachate and soil contamination	• Install a multi-layered impermeable liner at the bottom of the disposal site to prevent leachate infiltration • Construct a leachate collection system with dedicated treatment facilities • Conduct regular soil testing around the site to check for asbestos contamination • Build a controlled drainage system to channel clean storm water away from contaminated areas • Ensure proper handling and disposal of liquid waste generated from decontamination processes • Use impermeable containers for storing asbestos waste temporarily	Proponent/ Contractor	Groundwater quality Soil contamination testing Leachate treatment efficiency Site drainage functionality	As necessary	During operation	To be determined

	• Train workers on spill prevention and immediate containment procedures					
Water contamination	• Construct perimeter drains to prevent storm water from contacting asbestos waste • Install impermeable barriers on all sides of the asbestos disposal site • Periodically monitor groundwater and nearby water bodies for potential contamination • Store hazardous materials in sealed containers with secondary containment • No washing of asbestos-contaminated machinery or vehicles on-site • Use a closed-loop water system for any necessary washing or decontamination • Set up wash stations with runoff collection systems for workers and	Contractor/ Management	Complaints from community Waste disposal manifest/record	As work in progress	During construction During operational	To be determined

	equipment					
Noise pollution	• Operate heavy machinery only during specified hours (0800-1700 on weekdays, 0800-1300 on Saturdays) • Equip noisy machinery with noise-dampening equipment, such as silencers and mufflers • Establish noise barriers (temporary fencing, soundproofing materials) around the site • Conduct noise-level monitoring at the site boundary to ensure compliance with NEMA guidelines • Provide workers with appropriate hearing protection (ear muffs, ear plugs) • Implement a grievance mechanism for the community to report noise concerns	Contractor/ Management	Complaints from community Noise level monitoring record	As work progress	During construction During decommissioning	130,000
Ecological Considerations (Flora	▪ Conduct a biodiversity survey prior to site preparation to identify sensitive species	Management	Vegetation on the site	As required	Occupation	120,000

&Fauna)	• Minimize clearing of vegetation to necessary areas only • Develop and implement a site rehabilitation plan with native species after completion of construction and disposal • Set up buffer zones between disposal sites and any natural habitats • Avoid nighttime construction to reduce disturbance to wildlife • Regularly monitor the impacts on local fauna (e.g., migratory patterns, breeding cycles) • Provide wildlife corridors to maintain ecological connectivity where applicable					
First aid	▪ • Maintain a well-stocked first aid kit on-site with asbestos-related emergency supplies (e.g., oxygen masks) • Ensure a qualified nurse or first aid responder is available during working	Management	First aid kit on the site	As work progress on	During construction and operation	120,000

	hours • Post clear emergency response procedures at key locations on-site • Conduct health and safety training, including asbestos handling and exposure response • Regularly perform emergency drills for fire, spills, and exposure incidents • Provide medical screening for workers, including lung function tests for those exposed to asbestos					
Soil erosion and compaction	Install erosion control measures such as silt fences, check dams, and gabions around the disposal site • Minimize soil disturbance by phasing excavation and covering disturbed areas • Rehabilitate eroded areas by re-vegetating with native grasses and plants • Create designated routes for heavy machinery to prevent unnecessary soil compaction • Monitor erosion levels during periods	Contractor	Soil condition	As required	During construction and operation	115,0000

	of heavy rainfall • Use biodegradable mats or mulch to stabilize loose soils on slopes					
Waste water (Run-off)	Construct and maintain drainage channels to manage storm water and runoff from contaminated areas • Implement a system to prevent surface water from entering the asbestos disposal site • Build settling ponds or filtration systems for runoff to capture asbestos particles • Periodically clean and maintain drainage channels to prevent blockages • Install grease traps in areas where machinery is washed or maintained • Use permeable paving materials where possible to promote groundwater recharge	Contractors/ Management	Complaints from community Waste disposal manifest/record	As work in progress	During construction and occupation	110,000.00
Fire preparedness	▪ Ensure fire extinguishers, fire hoses, and other firefighting equipment are	Management			Construction and occupation	120,000.00

	installed and regularly inspected • Designate fire marshals and provide firefighting training for workers • Establish and practice a fire evacuation plan, including clear signage and escape routes • Conduct fire drills at least twice a year to test preparedness • Ensure the site has clear access for fire trucks and emergency services • Install smoke detectors in high-risk areas and monitor equipment for overheating					
Traffic density	▪ Implement clear signage around the site to direct vehicle traffic and prevent congestion • Coordinate asbestos transport schedules to avoid peak traffic times • Use flaggers or traffic marshals to manage heavy vehicle movements during peak disposal periods • Enforce strict speed limits within the	Contractor Management			During construction and Operation	120.000.00

	site (15-20 km/h) to minimize dust and accidents • Maintain records of vehicle inspections to ensure compliance with safety standards					
Occupational health and safety	▪ **Construction Phase**: • Provide all workers with PPE (e.g., respirators, overalls, gloves, helmets) • Install decontamination facilities for workers exiting asbestos handling areas • Conduct regular health and safety training, including asbestos-specific procedures • Provide food handlers with hygiene training and ensure food is safely prepared • Ensure compliance with the Occupational Health and Safety Act	Contractor Management	Complaints from community	As work progress	During construction	120,000.00
	In the operational phase;	Contractor			During	150,000.00

	▪ The proponent shall ensure that there persons who are trained in occupational health and safety ▪ The proponent should ensure that there are adequate and regularly ▪ serviced fire equipment ▪ There should be adequate signage provided in the development e.g. emergency exit signs ▪ Emergency contact information should be well displayed at appropriate areas	Management			occupation	
Security	▪ Employ security personnel to patrol the site during construction and operation • Install perimeter fencing to prevent unauthorized access to hazardous areas • Install CCTV cameras and lighting at key points within the site for 24/7 monitoring • Maintain records of all site visitors, contractors, and vehicles entering and	Contractor and Management	Site security records	As work progress	During construction and management	130,000.00

	exiting the site • Establish a security management plan and review it regularly for effectiveness					
	Total monitoring					1,360,000

1.8 8.5 Decommissioning

Environmental/ Social Impact	**Proposed Mitigation Measures**	**Responsibility**	**Parameters to be Monitored**	**Timing/frequency Target date**	**Cost (ksh)**
Air Quality (Asbestos Fiber Release)	• Ensure all asbestos-containing materials (ACMs) are double-bagged and sealed in impervious containers for final transport to an approved landfill • Dampen asbestos materials to prevent fiber release during handling and transportation • Use negative pressure enclosures	Contractor	Air quality monitoring (asbestos fiber levels) PPE compliance Visual inspection of containment measures	Throughout decommissioning	150,000.00

	with HEPA filters to control airborne fibers during decommissioning activities • Prohibit dry sweeping or compressed air cleaning of areas containing asbestos • Workers must wear full PPE, including respirators, during any asbestos removal operations				
Soil and Water Contamination	• Remove any contaminated soil or debris in a controlled manner and transport it to licensed hazardous waste disposal facilities • Excavate soil to a safe depth around the asbestos disposal site to remove any potential asbestos contamination • Install groundwater monitoring wells to test for any residual contamination • Seal the site with a top layer of clean fill material and ensure proper re-vegetation with native species	Proponent/ Contractor	Soil and water quality tests Groundwater sampling Visual site inspection Disposal records of contaminated materials	Throughout decommissioning	200,000

	• Cover exposed soil during excavation and transportation to prevent erosion and dust				
Waste Management	• All asbestos waste to be transported to an authorized hazardous waste landfill • Use approved, labeled containers for asbestos waste, ensuring they are leak-proof and properly sealed • Set up designated areas for temporary waste storage away from sensitive environments (water sources, residential areas) • Ensure safe transport and disposal of asbestos waste by certified waste handlers • Record keeping of all waste generated, transported, and disposed of during the decommissioning phase	Contractor/ Management	Waste manifests and disposal records Storage area inspections Compliance with legal waste transport regulations	Throughout decommissioning	120,000
Noise pollution	Schedule decommissioning activities during daylight hours (0800-1700) to minimize disturbance	Contractor/ Management	Noise level measurements	Thoughout During decommissioni	130,000

	• Equip heavy machinery with noise-dampening equipment (silencers, mufflers) • Install temporary noise barriers or acoustic enclosures around high-noise areas • Monitor noise levels at site boundaries to ensure compliance with NEMA guidelines • Notify nearby communities in advance of major noisy activities and provide a grievance mechanism for complaints		Equipment maintenance records Community complaints	ng	
Occupational Health and Safety (OHS)	▪ Provide workers with comprehensive training on asbestos handling, including safe removal and disposal procedures • All personnel working in asbestos areas must wear proper PPE (respirators, gloves, overalls) • Provide decontamination facilities for workers leaving asbestos-handling	Management	PPE compliance Worker health and safety records Training records Incident reports	Throughout decommissioning	150,000

	zones • Conduct regular health checks for workers involved in asbestos removal • Set up emergency response systems, including fire extinguishers, first aid kits, and emergency exit routes • Ensure proper signage and restricted access to areas undergoing asbestos removal				
Ecological Impact (Flora & Fauna Rehabilitation)	▪ Rehabilitate the site post-decommissioning by re-vegetating with indigenous species • Ensure soil stabilization through planting or mulching to prevent erosion • Remove all non-native plants and invasive species that may have proliferated during the disposal site's operational phase • Monitor ecological recovery periodically and replace vegetation where necessary	Management	Vegetation growth and health Soil stabilization Ecological surveys	During Decommissioning	120,000

	• Establish wildlife corridors if the decommissioned site is near a natural habitat				
Post-Decommissioning Monitoring	Conduct regular monitoring of air, soil, and water quality for at least five years after the site's closure • Monitor for any signs of residual contamination or environmental degradation in surrounding ecosystems • Inspect and maintain drainage and containment systems to prevent future contamination • Develop a long-term environmental monitoring plan in consultation with NEMA and local authorities • Regularly update the community on monitoring results and any necessary corrective actions	Contractor	Post-decommissioning reports Water and soil quality monitoring Site rehabilitation progress	Five years post-closure	300,000

Chapter 9: Conclusion and Recommendation

9.0 Conclusion

The overall objective of this Initial Environmental Examination (IEE) for the proposed Asbestos Disposal Site in Kimenu is to assess the potential environmental and social impacts associated with the project and provide clear recommendations for mitigation measures. This will help in guiding decision-makers to make an informed decision regarding the development.

During the assessment, a comprehensive public participation process was undertaken to ensure that community concerns were addressed. The examination has evaluated the environmental significance of the proposed site, taking into account the impact of asbestos disposal and the surrounding environmental context.

The key impacts identified and assessed through this process are categorized into negative and positive impacts. These impacts have been analyzed in detail, and where feasible, mitigation measures have been suggested to minimize adverse effects.

Negative Impacts:

1. **Air Quality and Health Risks**

   The potential release of asbestos fibers into the air during transport, handling, or storage could result in severe health risks, especially for nearby residents and workers. Proper containment, handling, and monitoring measures are crucial to minimize this risk.

2. **Groundwater Contamination**

   Poor leachate management could result in contamination of local water bodies, posing a serious environmental hazard. Effective liner systems and leachate collection systems need to be in place to mitigate this risk.

3. **Loss of Natural Habitat**

The development of the disposal site will lead to the loss of natural vegetation and wildlife habitat. Although this cannot be fully mitigated, site rehabilitation and re-vegetation with indigenous species after decommissioning will reduce long-term impacts.

4. **Visual Impacts**

The site will change the local landscape and may negatively affect the visual aesthetics of the area. This impact is difficult to mitigate given the scale of the above-ground landfill development.

5. **Relocation of Communities**

Though no relocations have been proposed, future air quality and health assessments must continually monitor and assess potential impacts on local communities.

Positive Impacts:

1. **Effective Asbestos Management**

The development of a dedicated asbestos disposal facility provides a safe and secure method for handling hazardous waste, mitigating the current risks associated with unmanaged asbestos in the region.

2. **Job Creation and Economic Development**:

The project will generate employment during construction and operational phases, contributing to local economic development. Furthermore, secondary industries such as waste management and recycling will benefit from this project.

3. **Enhanced Infrastructure**:

The project will necessitate improvements in local infrastructure such as roads, drainage systems, and security systems, benefiting the local population.

4. **National and County Waste Management Goals**:

The facility aligns with Kiambu County's long-term waste management strategy, addressing the nation's critical challenge of safe hazardous waste disposal, particularly asbestos.

5. **Improvement of Local Security**

The security systems that will be installed around the disposal site will also improve the general security of the surrounding areas.

The analysis of these impacts shows that while there are significant environmental challenges posed by the development of the site, most of the negative impacts can be effectively managed through the proposed mitigation measures. If these measures are strictly followed, the project is viable and addresses the urgent need for an asbestos disposal facility within the region.

9.1 Recommendation

Based on the findings of the IEE, the following recommendations are proposed to ensure the safe and environmentally sound development of the Asbestos Disposal Site in Kimenu**.**

1. **Mitigation Measures Implementation**

   All mitigation measures outlined in the Environmental Management Plan (EMP) must be strictly implemented throughout the construction, operation, and decommissioning phases. This includes proper handling, containment, transportation, and disposal of asbestos materials.

2. **Air Quality Monitoring and Control**

   Strict air quality controls and continuous monitoring of asbestos fibers in the air are essential to protect workers and local residents from the health risks associated with airborne asbestos fibers. The use of negative pressure enclosures and HEPA filters should be mandatory during high-risk activities.

3. **Leachate Management**

   A comprehensive leachate collection and treatment system should be installed to prevent contamination of surface and groundwater. Regular water quality monitoring must be conducted throughout the project's lifecycle to detect any potential contamination early and take corrective action immediately.

4. **Habitat Rehabilitation**

   Post-decommissioning rehabilitation of the site should include the re-establishment of natural vegetation using native plant species. This will contribute to ecological recovery and reduce long-term environmental impacts.

5. **Community Engagement**

Ongoing community engagement and involvement are critical to ensure transparency and address any concerns from local stakeholders. A grievance redress mechanism should be established to provide the community with a platform to raise concerns during the project's implementation.

6. **Ongoing Occupational Health and Safety (OHS) Training**

Workers involved in asbestos handling should undergo regular training on safety protocols, asbestos handling, and emergency response. Regular health checks must also be provided to monitor potential asbestos-related illnesses.

7. **Closure and Decommissioning Plan**:

A detailed decommissioning plan should be developed before closure of the disposal site. This plan should outline how asbestos materials will be contained, removed, and disposed of, along with post-closure monitoring of air, soil, and water quality.

8. **Regulatory Compliance**

The project must adhere to all relevant environmental and health regulations, including EMCA (1999), OSHA, and NEMA guidelines. Regular audits should be conducted to ensure compliance with these standards.

In conclusion, the proposed asbestos disposal site in Kimenu addresses a critical need for hazardous waste management in the region. With proper mitigation measures, community involvement, and adherence to best environmental and safety practices, the project can proceed while minimizing its environmental footprint and contributing positively to the local economy and infrastructure.

10.0 REFERENCES

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APPENDICES;

Appendix 1: Questionnaires/ Public barasa minutes

Appendix 2: Hydrogeological Report

Appendix 3: Terms of References Approval Letter