

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED MINING AND PROCESSING OF RARE EARTH ELEMENTS (COLTAN, BERYLLIUM AND CERIUM) ON A SECTION OF KORA NATIONAL PARK IN BOKA AREA, TANA RIVER COUNTY.



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1.1.1 Project Report for the Proposed mining of rare earth elements on a section of Kora National Park

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DISCLAIMER

The proponent proposes to establish mining and processing of rare earth elements in a section of Kora National Park in Boka area in within the larger Tana River County. Copies of documents, details and information in the report are what were obtained from the proponent. Portions of this report are based on documents, data and verbal information provided by third party sources and reports prepared by other professionals. The experts may not have independently verified all the information and accept no responsibility for the accuracy of information contained in such reports. Whilst this report and the opinions contained herein are accurate to the best of the experts' knowledge and belief, the experts cannot guarantee the completeness or accuracy of any description based on the supplied information.

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Acronyms and Abbreviations Used in This

Report EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
NEMA	National Environmental Management Authority
PPE	Personal Protective Equipment
OHS	Occupational Health and Safety
EHS	Environmental Health and Safety
ERPs	Emergency Response Plans
NO _x	Nitrogen Oxides
SO _x	Sulphur Oxides
CO _x	Carbon Oxides
EMCA	Environmental Management Coordination Act
Ha	Hectares
EA	Environmental Audit

EXECUTIVE SUMMARY

Maboka Mining Limited herein after referred to as *the proponent* proposes to establish mining and processing of rare earth elements in Boka area within Kora National Park in Tana River county. The proposed project will involve the extraction of the underlying and/or overlying carrier hard rock and then mechanical extraction of the rare earth and processing. The area was previously explored and the exploration and feasibility study indicated that there were significant and abundant deposits of the mineral's worth exploitation. The proponent proposes to mine and process basically three (3) rare earth elements namely coltan, beryllium and cerium. Rare earth elements are essential part in technology and green energy.

The study was accomplished through desktop study, interviews with the proponent and other stakeholders, and site visits. The area is generally characterized by rugged topography.

There is growing recognition of the importance of protection and management of the environment and the natural resources unlike in the past where policy makers directed all the efforts in economic development without due regard to the resource base on which the economic development depend on. As a result, there has been unprecedented environmental degradation due to the lack of environmental conservation resulting to unsustainable development. More recently developers, spurred on by regulators world over, have recognized the need for change in order to safeguard the environment.

The EIA study report was conducted in accordance with the requirements of the Environmental Management and Co-ordination Act (EMCA) and the Environmental (Impact assessment and Audit) Regulations 2003. The major objective of the study is to identify the potential impacts of the proposed project, enhance the positive impacts identify ways of avoiding the negative impacts and where not possible, propose reduction and mitigation measures. This is for the purposes of environmental enhancement and co-existence with other land uses.

The terms of reference are to evaluate the environmental impacts on groundwater and surface water, air quality, wildlife and habitat, social and economic aspects, existing land use, visual impacts, transportation impacts, and the effects of noise, blasting and vibrations from the proposed rare earth elements mining operations and related activities.

The study examines the proposed mining project for the purpose of evaluating the environmental impacts on air quality, noise impacts, existing land use, visual impacts, groundwater and surface water, wildlife and habitat, social and economic, transportation impacts, and the effects of blasting and vibrations from the proposed rare earth elements mining and processing operations and activities.

The study was accomplished through desktop study, interviews with the proponent and other stakeholders, and site visits. The land parcel on which the proposed mine is to be established is a national park under the management of KWS. All the National parks are classified as protected areas under Kenyan law and international bodies such as IUCN and UNEP WPC.

Kora National Park (KNP) covers 1,787 km² and is by far the largest protected area (PA) in the Eastern Conservation Area (ECA), and the third largest protected area in Kenya. The park is located in Tana River County, and was gazetted as a national park in 1989 (Legal Notice No.: 339 of 6th October 1989), prior to which it had been gazetted as a game reserve since 1974. Wildlife populations in the area are currently low; although surveys have shown the area is rich in floral biodiversity. Meru National Park and the Tana River mark 65 km of the park's northern boundary. Features of the Tana River include Adamson's Falls, Grand Falls and the Kora rapids. Its eastern boundary is marked by the Mwitamvisi River. The park has several seasonal and dry rivers.

The proposed site is within a low-altitude area which receives very low and unreliable rainfall but the rocks underneath the soils and in some areas are exposed to the surface rendering sections of the land therefore unsuitable for vegetative growth. In general, the vegetation in the area is various indigenous and exotic trees, grass, shrubs and weeds. The land has not been utilized for any economic use but minor subsistence agriculture.

Various alternatives were considered including the proposed site and project, alternative site and design, technology and materials and the proposed site, design, materials were chosen due to various factors among them the availability of land, availability of the rare earth elements deposits for exploitation, demand for such minerals, the important part that the minerals play in technology and green energy solutions, potential returns, infrastructure availability and the fact that the proposed site is suitable for the proposed use and provides better use of the land. Various alternatives have been considered but the proposed alternative has been found to be one available alternative as it maximises the benefits to all beneficiaries and the potential negative impacts are not so significant and can further be mitigated by adherence to the proposed EMP.

The proposed project is estimated to cost approximately Kenyan shillings **Four hundred and sixty-one million (Kshs 461, 000,000.00).**

The study identified various potential positive impacts from the project the major ones being mining of the rare earth elements that widely used in technology and green energy solutions, generation of revenue to the county and national government through the various levies and taxes charged, creation of employment and means of livelihood, increasing the utility of the land, contribution to industrialization, earning of foreign exchange and the chance to introduce trees in the area by the proponent after rehabilitation of the mined areas thus modifying the area microclimate.

The benefits notwithstanding, the proposed project has the potential to impact negatively on the environment. The potential negative impacts include the threat to wildlife conservation and habitat destruction/disruption; noise; vibration from blasting; occupational health and safety issues; effects on air quality (air pollution by dust and fumes); effects on landscape (visual intrusion) and land degradation; effects on hydrological regime, contamination risks, runoff and erosion; waste management and impacts to wildlife and vegetation.

The ideal strategy to counter identified adverse effects is avoidance and whenever not be possible, alternative strategies of reduction, remediation, and compensation

may be explored. Measures can therefore be divided into two categories namely primary measures that intrinsically comprise part of the development design; and secondary measures designed to specifically address the remaining (residual) adverse effects.

Many protected areas everywhere are under threat; in general, threats to protected areas increase by the minute. The main dangers are the human greed and ever-increasing demands for resources, much of it to meet basic human needs of the ever-increasing unprecedented population. The KNP is already seriously constrained by livestock incursion which has led to overgrazing and disruption of wildlife. The proposed area is one of the most affected including human settlements within the park. Due to the presence of minerals in the area, illegal small-scale mining has been ongoing in the past leaving depressions and unrehabilitated land. the mining operations should be carried out within the shortest time possible and rehabilitation conducted to restore the land.

Save for the illegal grazing in the park, the local community does not benefit from the park and thus may feel no need to protect the same. There is need for KWS to engage the local community further in education and management of the park for successful restoration. The proposed mining may be more beneficial to the local community since some of them will be employed and also the royalties payable to the community as per legal provisions.

IUCN also recognizes that there are situations where trade-offs (offsets) may offer an apparently attractive solution, under which mining is permitted where it adversely affects a protected area, in return for funds for an extension to that area or for other conservation purposes.

It is important to recognize that conservation is expensive and many a times, funding is inadequate and thus many challenges arise.

The mining companies should be aware that the issue of how to deal with protected areas is seen by many as the test of their willingness to embrace a more responsible policy toward the environment and a sustainable approach to human well-being. Climate change is creating havoc and a special challenge to both humans and wildlife. Mining and exploitation of rare earth elements are driving green energy development beside numerous uses in many other technological applications and devices.

It is possible to minimize and control the negative impacts if they have been taken care of at the design and planning stage. Proposed measures that should be incorporated should include:

- Adapting effective waste management system within the company to ensure proper disposal of the generated waste materials including mining and process waste and should be reduced at source. Soils removed should be stored out of the working areas for use in future during decommission.

- Earth mounds around the working areas will reduce the noise and dust going out of the mining areas. Machinery and equipment should be well maintained to reduce exhaust fumes and prevent fuel, oil and grease spills/leaks and should not be serviced on site unless a garage is set up.
- For occupational health and safety, occupational health and safety training is recommended and operators should be provided with PPEs. Fire-fighting equipment should also be installed and there should be a first aid box as required by the OSHA.
- To safeguard against visual intrusion, height of wastes and stockpiles should be controlled below skylines and existing landscape should be conserved including ridgelines.
- The proponent should engage the services of a hydro geologist to monitor the mining depths to avoid excavations to the level of water table and reduce chances of contamination or effects on underground hydrological regime
- Appropriate and standard blasting practice, materials and engagement of qualified and experienced person to blast shall greatly reduce chances of fly rock, air overpressure and ground vibrations. Blasting should be avoided during adverse weather conditions and local community should be warned of blasting beforehand. Should the conditions warrant, a controlled zone should be created for protection of people and animals. Damages and injuries should be fairly compensated and grievance redress system established. However, with the improved blasting technology, adverse impacts of blasting can be reduced to minimum with minimal disturbances and nuisances since blasting can be reduced to just mild with insignificant noise and vibrations
- All excavated and exhausted areas should be rehabilitated. Quality vegetation should be re-introduced and monitored accordingly for sustainable rehabilitation
- Introduction of trees along the boundaries and other areas not under the mining and processing activities shall help in modifying the microclimate and beauty.
- To reduce erosion and degradation, the proponent and the proprietor should plant sufficient and appropriate vegetation (trees, grass, etc.) and use physical barriers such as rocks.
- Dust control shall be greatly achieved by watering dust generating areas, planting of trees, live fencing, and appropriate earth mounds and dust filters among others. Reduction of drop heights and sheltering dust generating areas away from wind shall also go a long way in dust generation and propagation control
- To protect the various dry rivers in the park, stringent soil erosion measures should be put in place

It is highly recommended that mining be conducted in phases with the area divided into manageable sections such that a section will be exhausted and progressively rehabilitated as the mining activities move to the next section. This will not only facilitate sustainable rehabilitation of the land but shall greatly promote easy

decommissioning. It shall also facilitate safety of people and animals (including livestock and wildlife) since there shall be no disused depressions which pose a safety hazard to people and animals and also hold water which pose a threat to health by providing a breeding ground for mosquitoes and other risks associated with such pits including safety hazards.

Though comprehensive based on the predicted and foreseeable potential impacts, these recommended measures are meant to guide and should be monitored and evaluated periodically once the project is implemented so as to guard against changes in the light of the real actual experiences as the proposed project progresses. The project proponent shall continue to work closely with the environmental consultants, hydrogeologist, department of Mining, KWS, KFS, NEMA, area residents and the county and national government to enhance the environment and to ensure that issues that the environmental concerns are well addressed and integrated into the project at every stage of successive implementation. This way, the co-existence of the proposed project with the environment throughout the project cycle will have been achieved. Adoption of best practices and best technology in mining, blasting and crushing is a prerequisite for sustainability. From the ESIA study, it is clear that the proposed project is viable as much as it poses a significant threat to the KNP, environment and the ground water resource thus great care MUST be taken since the project site is within a national park thus biodiversity and habitats should be protected as much as possible. The geological exploration and assessment indicated that there are sufficient and suitable rare earth elements for economic exploitation and therefore a viable project likely to change the economic status of the area and beyond and the country (Kenya) at large. Wastes and tailings may pose a threat if not well managed thus proper and sound management systems must be established and adopted.

INTRODUCTION

General overview, Justification and rationale for EIA

Mining of rare earth elements involves the removal of the specific mineral components from the carrier rocks using earth moving equipment, blasting and heavy trucks. It can also be done using simple hand tools like chisel and mallet. The latter method of mining is becoming obsolete and is mainly practiced in less developed countries. Mechanized mining is efficient and produces target materials in large scale, covering large and expansive areas, within a short period of time. It therefore has a pronounced environmental impact as it leaves behind large excavations, after mass movement of materials. It usually accelerates land degradation and erosion especially after the soil has been set loose. Vegetation is also affected as well as human settlements, vegetation and habitats.

All mining activities usually alters the Biophysical and social environments of the mining areas. Control measures and procedures are thus inevitable to limit impacts to acceptable and sustainable levels.

Mining operations in Kenya are subject to government regulations relating to environmental protection and safety of the working conditions discussed later in the report.

The proposed project is collaborated by the fast-growing demand for the rare earth elements for various and wide respective uses. Besides, the project brings forth various advantages as discussed elsewhere in this report.

The rationale for the EIA project report is to integrate environmental aspects in the planning and implementation processes of the proposed project to mitigate adverse impacts and enhance the positives. Besides, environmental impact assessment (EIA) for such projects is now a legal requirement. The ultimate objective an EIA is to provide decision makers, relevant institutions/organizations, proponent and other stakeholders with the foreseeable environmental impacts of a proposed activity and therefore enable planning ahead considering all predictable outcomes and adequately providing for the them for sustainability.

The purpose of the study is to accommodate the potential environmental (physical, ecological and cultural/socio-economic) concerns and address them adequately throughout the project cycle. The study is expected to raise both the potential positive and negative impacts likely to emanate from the proposed project. Integrating *Sustainable Environmental Management principles* in the planning, implementation and throughout the project cycle is vital in reducing/mitigating conflicts and enhancing environmental conservation.

Objectives

The main objective of this EIA study report was to establish the baseline conditions of the proposed site, evaluate the existing and the anticipated impacts and propose measure to enhance the positive impacts and measures to attenuate the effects of the significant negative impacts.

Terms of Reference (TOR)

This Environmental Impact Assessment involved the generation of baseline information, establishing the current status of the proposed project site and its environs, identification of predictable effects of the development on the environment (including infrastructure, occupational health and safety issues) and direction & magnitude of the changes, analysis of the compatibility of the proposed project with the surrounding land uses (as per the prevailing policy and legal framework) and the proposition of potential mitigation measures to be undertaken throughout the project cycle; and development of an environmental management plan with proposed mechanisms for monitoring and evaluating the compliance and environmental performance.

Scope of EIA Study

The study has been conducted as per the above TOR and as set out in EMCA, 1999 and the Environmental (Impact Assessment and Audit) Regulations, 2003 (amended). i.e. to evaluate the potential and the foreseeable impacts of the proposed project, generation of baseline information evaluation and recommendation of the best alternatives from the options available (if any), the nature, order of magnitude, extent, duration and reversibility of the potential changes. The geographical scope is limited to the direct and indirect physical extent as may be foreseeably affected by the proposed project.

Methodology

The methodology involved visits to the proposed site for data collection, relevant desktop study, analysis and interpretation of data collected, analysis of proposed designs, activities and schedules, public stakeholder engagement/participation and consultation with professionals and other stakeholders.

Objectives and scope of the proposed project

Whereas the main objective of the proposed project is establishment of rare earth elements mining and processing project for some economic gains to the proponent, the main objective of this EIA Study report was to establish the baseline conditions of the proposed site, evaluate the existing and the anticipated impacts and propose measures to enhance the positive impacts and measures to attenuate the effects of the significant negative impacts. The main objective of the proponent is to establish a mine and process rare earth elements for commercial purposes. The scope of the project is limited to the identified geographical location of a Kora National Park in Boka area specifically defined by the coordinates. All activities including excavation, mining/extraction of the minerals awaiting transportation, loading, storage of raw materials, and storage of waste and tailings shall be within the boundaries of the proposed site before rehabilitation of the mined areas. There may be minor disturbances or spill over effects to the immediate neighbourhood due to such issues such as noise & vibration, dust, traffic etc but they shall be reduced to the minimum possible as recommended in the mitigation measures. The proposed project shall entail the extraction/exploitation of the identified specific rare earth minerals for commercial purposes by use of heavy earth moving equipment and mining equipment proposed to be moved on site for the period of the mining and processing operation.

The need for the proposed project (mining and processing of rare earth elements)

Besides being essential to many kinds of consumer technology, including cell phones, hard drives, electric and hybrid vehicles; rare earth minerals also are considered crucial to shifting the economy away from fossil fuels toward electricity and renewable energy.

According to a report by the Paris-based International Energy Agency, the world's sources of critical minerals are increasingly concentrated in just a few countries, most notably China leaving the global economy vulnerable to supply cut-offs that could disrupt industry and hit consumers with higher prices. The report looked at the availability of minerals and metals that may be small in quantity – but large in impact when it comes to shifting the economy away from fossil fuels toward electricity and renewable energy. It found out that for copper, lithium, cobalt, graphite and rare earth elements, the average market share of the three top producing countries rose to 86% in 2024 from 82% in 2020. China is the leading refiner for 19 out of 20 strategic minerals studied in the report, and has an average share of around 75%. Indonesia showed strong growth in nickel, a key component in making of steel and batteries for electric vehicles. The current trend toward export restrictions and trade disputes increases concerns, the IEA said.

RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORK

Mining policy and environmental legislation

Kenya's mining industry is dominated by production of non-metallic minerals which are mainly: soda ash, fluorspar, diatomite, vermiculite, natural carbon dioxide, kaolin, barytes, a variety of gemstones, limestone and lime, products including various construction materials. For metallic minerals, small quantities of gold are being produced. Iron ore is also produced from localized small deposits.

There has been a clear lack of a formal mining policy in Kenya. Mineral exploitation and mining have been carried under the auspices of the Mining Act, Cap 306 (now the Mining and Minerals Act) administered by Mining Ministry. The ministry has the responsibility of undertaking geological surveys, geo-scientific research, coordination and regulation of the activities of the mining sector. All un-extracted minerals under or upon any land, as per the Act, are vested in the Government, subject to any rights, which under the Act, have been granted to any other person. The reviewed Mining and minerals Act law provide for lesser discretionary powers to the licensing authorities and hence provide for greater security of tenure. Similarly, there is now a planned mining policy, which will cover environmental protection, local processing, technology transfer and royalties and taxes.

Kenyan laws now require that the resulting open pits be rehabilitated appropriately, so that the natural environment is protected.

The Mining and Minerals Act

Mining in Kenya was initially governed by the "The Mining Act" (Cap 306 of the Laws of Kenya), which came into force in 1940. There have been subsequent revisions to this Act, which vested all Minerals in the government and did not have requirements for an EIA. The government has now revised its Mining Act into the new Mining and Minerals Act. The new Act is to be the main legislative tool that governs the prospecting and extraction of all minerals including quarrying activities in the country. It is however, not yet harmonized with the EMCA (1999) for the EIA requirements.

The Environment Management and Coordination Act (1999)

The Act entitles every person in Kenya to a clean and healthy environment and aims to safeguard and enhance the environment. Though there are other sectoral laws on environmental conservation, this is the supreme legislation. It provides guidelines on issues of environment, stipulates offences and penalties and establishes NEMA. The Act also lists the type of projects, which must be subjected to the EIA process and establishes NEMA.

Environmental Management and coordination Act, 1999, provide a legal and institutional framework for the management of the environment related matters. It is the framework law on environment. Top most in the administration of EMCA is National Environmental Council (NEC), which formulates policies, set goals, and

promotes environmental protection programmes. The implementing organ is national environmental authority (NEMA). EMCA comprises of the parts covering all aspects of the environment.

The Act prohibits discharging or applying poisonous, toxic, noxious or obstructing matters, radioactive or any other pollutant into aquatic environment. The Act requires that operators of projects which discharge effluent or other pollutants submit to NEMA accurate information about the quantities of the effluent. The Act demands, among others that all effluent generated from point sources are discharged only into the existing sewages system upon issuance of prescribed permit from the county governments. *In compliance, the proponent appointed experts to conduct the EIA to seek approval of the proposed project.*

The Environment (Impact Assessment and Audit) Regulations, 2003

The Regulations are entrenched under section 147 of the EMCA, 1999 of the laws of Kenya. The regulations provide the framework for carrying out EIAs and EAs in Kenya. The Regulation provide for fees, guidelines, rules, standards and administration procedures in the EIA/EA process. The Regulations' amendments made significant changes regarding fees payable, various timings and modified the Second Schedule of EMCA, 1999. The amendments revised the fees payable and categorised the projects (under) Second Schedule) into low risk, medium risk and high risk. Currently, the prescribed fees directly payable to NEMA is equivalent to 0.1% of the estimated project cost. *This EIA study report is conducted in conformity with these regulations and EMCA, 1999.*

The Wildlife Conservation and Management Act, 2013

The Act defines biodiversity as the variability among living organisms from all sources including ecosystems and the ecological complexes of which they are a part, compassing ecosystem, species and genetic diversity. Under the Act, "national park" means an area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.

Wildlife conservation and management shall be devolved, wherever possible and appropriate to those owners and managers of land where wildlife occurs.

The Act establishes the Kenya wildlife Service (KWS) as body corporate. The functions of the KWS include:

- (a) conserve and manage national parks, wildlife conservation areas, and sanctuaries under its jurisdiction;
- (b) provide security for wildlife and visitors in national parks, wildlife conservation areas and sanctuaries;
- (c) set up a county wildlife conservation committee in respect of each county;
- (d) promote or undertake commercial and other activities for the purpose of achieving sustainable wildlife conservation;
- (e) collect revenue levies and charges due to the national government from wildlife and, as appropriate, develop mechanisms for benefit sharing with communities living in wildlife areas;

- (f) develop mechanisms for benefit sharing with communities living in wildlife areas; (g) advise the Cabinet Department on matters pertaining to wildlife policy, strategy and legislation;
- (h) coordinate the preparation and implementation of ecosystem plans;
- (i) prepare and implement national park management plans; assist and advise in the preparation of management plans for community and private wildlife conservancies and sanctuaries
- (j) undertake and conduct enforcement activities such as anti-poaching operations, wildlife protection, intelligence gathering, investigations and other enforcement activities for the effective carrying out of the provisions of this Act;
- (k) conduct and co-ordinate, all research activities in the field of wildlife conservation and management and ensure application of research findings in conservation planning, implementation and decision making;
- (l) advise the National Land Commission, the Cabinet Secretary and the Council on the establishment of national parks, wildlife conservancies and sanctuaries;
- (m) promote and undertake extension service programmes intended to enhance wildlife conservation, education and training;
- (n) identify user rights and advise the Cabinet Secretary thereon; (o) grant permits;
- (p) establish forensic laboratories;
- (q) monitor the compliance of terms and conditions of licences; and
- (r) perform such other functions as the Board may assign the Service or as are incidental or conducive to the exercise by the Service of any or all of the functions provided under this Act.

Under the Act, each County shall have Wildlife Conservation Committee. The Act outlines the composition and functions of the committee. The Act also provide for compensation of claims for human death or injury or crop and property damage by wildlife and sets the amounts for such compensation.

Regarding mining, the Act has the following provisions:

Consent for mining and quarrying

- (1) No person shall mine or quarry in a national park without the approval and consent of the Service.
- (2) The Service shall only approve and give consent for mining or quarrying where—
 - (a) The area does not contain endangered or threatened species;
 - (b) The area is not a critical habitat or ecosystem for wildlife.
 - (c) The area is not an important catchment area or source of springs.
 - (d) An environmental impact assessment has been carried out in accordance with the provisions of the Environmental Management and Co-ordination Act (Cap. 387);
 - (e) Approval has been obtained in accordance with the applicable law regulating mining
 - (f) The miner has undertaken, through execution of a bond, the value of which will be determined by the Service, to rehabilitate the site upon completion of his operation to a level prescribed by the Service and the Mining Act (Cap. 306): Provided that the Cabinet Secretary may, on the recommendation of the Service, and after consultation with the Cabinet Secretary responsible for mining, by

notice in the Gazette, publish rules to regulate and govern mining operations in such protected areas;

(g) The carrying on of mining or quarrying operations shall not contravene any rules made under this Act.

(3) Subject to subsection (2), mining or quarrying may be carried out in a national park and reserve under the authority issued by the Service.

Wildlife Conservation and Management Act (Cap. 376), Kenya

(4) The provisions of this section with respect to mining and quarrying shall apply mutatis mutandis with respect to wildlife conservancy and sanctuary.

The Environmental Management and Co-ordination (Water Quality) Regulations, 2006

These regulations set the standards of domestic water and waste water. The regulations are meant for pollution control and prevention and provides for protection of water sources. *The proposed project has no chance of significantly affecting this since there is no formal piped water supply, sewer and there is no surface water body nearby (except dry rivers) which only flows when raining within the area and from the upstream.*

Environmental Management and Co-ordination (waste management) Regulations, 2006

These regulations define the responsibilities of waste generators and defines the duties and requirements for transportation and disposal of waste. It provides for mitigation of pollution and provides for hazardous and toxic wastes. The regulations require a waste generator to dispose waste only to a designated waste receptacle. *The proponent shall adhere to the regulations and proposes to contract a NEMA registered waste transporter otherwise all efforts shall be done to reduce mining wastes.*

Environmental Management and Coordination (Noise and Excessive Vibrations Pollution) (Control) Regulations, 2009.

The noise and excessive vibrations regulations require that noise and excessive vibrations should be minimized to the largest extent possible and that this should not exceed particular decibels.

To minimize the impacts of noise and vibrations from the proposed activities, the activities will be limited to working hours between, 8.00 am and 5.00 pm. All possible care will be undertaken to ensure that the machinery is properly greased and oiled to reduce friction and possible noise emission. Blasting, crushing, and traffic noise shall also be controlled to the minimum. *The proponent shall strictly adhere to the provisions and requirements of these Regulations*

The Forest Conservation and Management Act, 2016

This is an ACT of Parliament to give effect to Article 69 of the Constitution with regard to forest resources; to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socio-economic development of the country and for connected purposes.

The Act was a repeal of The Forest Act, 2005. The Act establishes a service known as Kenya Forest Service and contains many innovative means of forest management, including a strong emphasis on partnerships, the engagement of local communities, and promotion of private investment aimed at correcting previous shortcomings. This paper presents the environmental compliance and enforcement programs in Kenya for sustainable forests management and lessons learned. The Forests Act (2005) empowers the Kenya Forest Service with institutional powers and responsibility to ensure that key measures are initiated on forest protection.

The Act provides for Institutional reorganization including the establishment of the Kenya Forest Service with powers devolved to Forest Conservation Committees and Community Forest Associations.

Part II Section 5 of Forests Act outlines the function of Kenya Forest Service which includes formulating policies and guidelines regarding the management, conservation and utilisation of all types of forest areas in the country, protect forestry and promote forestry education and training among other functions. It is the implementation of the new forest regulations that will create a strategic option for better service. Compliance and enforcement of the new Act have been done on the basis of delegation of powers and duties. The new Constitution of Kenya chapter 5, part 2 deals with environment and natural resources. It outlines the obligations of the national government in respect of the environmental issues.

The constitution has also spread implementation of specific national government policies on natural resources and environmental conservation including forestry to the county government. This shows that Kenyans have realized and learnt the importance of environmental protection and conservation.

The Explosives Act (Cap 115)

The Act regulates the purchase, assemblage, manufacture and use of explosive materials. Explosives are used routinely in many quarries and mines for blasting and lessening of rocks. The Act also stipulates conditions for use, precautionary measures and storage requirements. *The proponent has already applied to the Commissioner of Mining and Geology for the permit to use explosives and cannot proceed to use the same until the permit is granted.*

The Sustainable Waste Management Act, 2022

An Act of Parliament to establish the legal and institutional framework for the sustainable management of waste; ensure the realisation of the constitutional provision on the right to a clean and healthy environment and for connected purposes. The act establishes Waste Management Council.

The objectives of this Act are:

- (a) promote sustainable waste management;
- (b) improve the health of all Kenyans by ensuring a clean and healthy environment;
- (c) reduce air, land, fresh water and marine pollution;
- (d) promote and ensure the effective delivery of waste services;
- (e) create an enabling environment for employment in the green economy in waste management, recycling and recovery;
- (f) establish an environmentally sound infrastructure and system for sustainable waste management;
- (g) promote circular economy practices for green growth;
- (h) mainstream resource efficiency principles in sustainable consumption and production practices;
- (i) inculcate responsible public behaviour on waste and environment.

The Act emphasizes on "waste hierarchy" which it defines as the order of priority for efficient use of resources and minimisation of pollution by avoidance, reduction, reuse, repair, refurbishment, recycling, recovery and finally treatment for safe disposal. The Act promotes "sustainable waste management" meaning use of material resources efficiently as prioritized by waste hierarchy, circular economy and clean production in order to reduce the amount of waste that is generated, deposited or discarded in the environment including the management of materials that would otherwise have been dumped or wasted in a way that contributes to environmental, social and economic goals of sustainable development.

The Act states that any person whose activities generate waste shall collect, segregate and dispose of or cause to be disposed of the waste in accordance with this Act.

The Climate Change Act, 2016

An Act of Parliament to provide for a regulatory framework for enhanced response to climate change; to provide for mechanism and measures to achieve low carbon climate development, and for connected purposes. The act establishes National Climate Change Council chaired by the President.

Without prejudice, this Act shall be applied in all sectors of the economy by the national and county governments to - mainstream climate change responses into development planning, decision making and implementation; build resilience and enhance adaptive capacity to the impacts of climate change; formulate programmes and plans to enhance the resilience and adaptive capacity of human and ecological systems to the impacts of climate change; mainstream and reinforce climate change disaster risk reduction into strategies and actions of public and private entities; mainstream intergenerational and gender equity in all aspects of climate change responses; provide incentives and obligations for private sector contribution in achieving low carbon climate resilient development; promote low carbon technologies, improve efficiency and reduce emissions intensity by facilitating approaches and uptake of technologies that support low carbon, and climate resilient development; facilitate capacity development for public participation in climate change responses through awareness creation, consultation, representation and access to information; mobilize and transparently manage public and other financial resources for climate change response; provide mechanisms for, and facilitate climate change research and development, training and capacity building; mainstream the principle of sustainable development into the planning for and decision making on climate change response; and integrate climate change into the exercise of power and functions of all levels of governance, and to enhance cooperative climate change governance between the national government and county governments.

The Kyoto Protocol

The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC or FCCC) an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro, Brazil from 3–14 June 1992. The treaty is intended to achieve "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." The Kyoto Protocol establishes legally binding commitments for the reduction of four greenhouse gases (carbon

dioxide, methane, nitrous oxide and sulphur hexafluoride) and two groups of gases (hydrofluorocarbons and perfluorocarbons) produced by "Annex I" (industrialized) nations, as well as general commitments for all member countries.

As of 2008, 183 parties have ratified the protocol, which was initially adopted for use on 11 December 1997 in Kyoto, Japan and which entered into force on 16 February 2005. Under Kyoto, industrialized countries agreed to reduce their collective GHG emissions by 5.2% compared to the year 1990. National limitations range from 8% reductions for the European Union and some others to 7% for the United States, 6% for Japan, and 0% for Russia. The treaty permitted GHG emission increases of 8% for Australia and 10% for Iceland. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

The Kyoto Protocol emphasizes on Clean Development Mechanism projects i.e. emission saving initiatives and according to UNEP, there are approximately 4200 ready or in the pipeline CDM projects up from 60 in 2004. Currently, there are various CDM projects in Kenya up from none in 2005. Kyoto includes defined "flexible mechanisms" such as Emission Trading, the Clean Development Mechanism and Joint Implementation to allow Annex I economies to meet their greenhouse gas (GHG) emission limitations by purchasing GHG emission reductions credits from elsewhere, through financial exchanges, projects that reduce emissions in non-Annex I economies, from other Annex I countries, or from Annex I countries with excess allowances. In practice this means that Non-Annex I economies have no GHG emission restrictions, but have financial incentives to develop GHG emission reduction projects to receive "carbon credits" at can then be sold to Annex I buyers, encouraging sustainable development. In addition, the flexible mechanisms allow Annex I nations with efficient, low GHG-emitting industries, and high prevailing environmental standards to purchase carbon credits on the world market instead of reducing greenhouse gas emissions domestically. Annex I entities typically will want to acquire carbon credits as cheaply as possible, while Non-Annex I entities want to maximize the value of carbon credits generated from their domestic Greenhouse Gas Projects.

Kenya ratified the UNFCCC on 30th August 1994 thereby signifying her determination to join the international community in combating the problem of climate change. The ultimate objective of the Convention is Stabilization of the greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system"

The challenge for Kenya is to develop strategies, which would promote sustainable development, without compromising in increased emission of GHGs. It is necessary therefore to develop appropriate policies and response strategies to manage GHG emissions. Policies and strategies must be based on reliable inventory of GHG emissions and sinks. The First National Communication of Kenya is the main output of the enabling activity project. The Ministry of Environment and Natural Resources through the National Environment Secretariat (now NEMA) executed the Climate Change Enabling Activity. In this document, four thematic areas were identified in accordance with the UNFCCC guidelines for the preparation of Non-Annex 1 national communication.

Occupational Safety and Health Act (OSHA), 2007

The Act makes provision for the health, safety and welfare of persons employed in various places of work. The provisions require that all practicable measures be taken to protect persons in places of work from dust, fumes or impurities originating from any process within the workplace. The provisions of the Act are also relevant to the management of hazardous and non-hazardous wastes, which may arise at a project site.

Health

The premises must be kept clean, daily removal of accumulated dust from floors, free from effluvia arising from any drain, sanitary convenience or nuisance and without prejudice to the generality of foregoing provision.

The circulation of fresh air must secure adequate ventilation of workrooms. There must be sufficient and sustainable lighting in every part of the premise in which persons are working or passing. There should also be sufficient and sustainable sanitary conveniences separate for each sex, must be provided subject to conformity with any standards prescribed by rules. Food and drinks should not be partaken in dangerous places or workrooms.

Provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear goggles, gas masks and head covering and maintained for the use of workers in any process involving expose to wet or to any injurious or offensive substances.

Safety

Fencing of premises and dangerous parts of other machinery is mandatory. Training and supervision of inexperienced workers, protection of eyes with goggles or effective screens must be provided in certain specified processes. Floors, passages, gangways, stairs, and ladders must be soundly constructed and properly maintained and handrails must be provided for stairs

Special precaution against gassing is laid down for work in confined spaces where persons are liable to overcome by dangerous fumes. Airs receivers and fittings must be of sound construction and properly maintained. Adequate and suitable means for extinguishing fire must be provided in addition to adequate means of escape in case of fire must be provided.

Welfare

An adequate supply of both quantity and quality of wholesome drinking water must be provided. Maintenance of suitable washing facilities, accommodation for clothing not worn during working hours must be provided. Sitting facilities for all female workers whose work is done while standing should be provided to enable them take advantage of any opportunity for resting.

The Act stipulates that every premises shall be provided with maintenance, readily accessible means for extinguishing fire and person trained in the correct use of such means shall be present during all working periods.

The Act state that regular individuals' examination or surveys of health conditions of industrial medicine and hygiene must be performed and the cost will be met by the employer. This will ensure that the examination can take place without any loss of earning for the employees and if possible within normal working hours.

The Act provides for development and maintenance of an effective programme of collection, compilation and analysis of occupation safety. This will ensure that health statistics, which shall cover injuries and illness including disabling during working hours, are adhered.

The Act provides for all necessary safety precautions to ensure the health and safety of workers. *The proponent has to be responsible in enforcing the requirements during installation, repairs and maintenance after project completion.*

National Environmental Action Plan (NEAP)

According to NEAP, 1994 the Government recognized the negative impacts on ecosystems emanating from development programmes that disregarded environmental sustainability. Established in 1990, the plan's effort was to integrate environmental considerations into the country's economic and social development. Under the NEAP process EIA was introduced.

Physical Planning Act, Cap 286

The Physical Planning Act has provisions to control development and use of land in particular areas for harmonized development. The proposed mine is situated within Tana River county. *The land is within a national park but the proponent has already applied for a lease from KWS to mine in the specified section.*

County Government Act of 2012

The Act was a repeal of The Local Government Act in conformity with the new constitutional dispensation. The Act empowers County Governments to make by-laws in respect of suppression of nuisances, imposing fees for any license or permit issued in respect of trade or charges for any services. County Governments 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 neighbourhood, and to prescribe the conditions subject to which such developments shall be carried on. *In compliance, EIA study report has proposed potential mitigation measures (in the EMP and monitoring plan; and the environmental management Framework in the report.*

Public Health Act, Cap 242

The primary purpose of this Act is to secure and maintain public health. Some of its provisions relevant to this project include prohibition of nuisance activities such as spillages or noise or other condition deemed to be injurious or dangerous to health. Under this Act, every health authority or local authority is mandated to take all lawful, necessary and reasonably practicable measures to prevent all injurious conditions in premises, construction condition or manner of use of any trade premises.

Water Act, 2002

The Act deals with control and conservation of water resources. It prohibits activities that may cause pollution to sources of water likely to be used for human consumption or domestic use or in the manufacture of food for human consumption. In this case, both surface and underground water sources are at risk to pollution from seepage of spilled fuel and contaminated runoff amongst other risk sources. The Act sets out the minimal distances to be provided as a buffer from rivers and water bodies. It also regulates water use.

The Traffic Act

This regulates emissions from motor-vehicle engines whether stationary or mobile, with regard to air pollution management. The Act is applicable thus to trucks and other fuel-oil engine machinery used at the proposed mine.

The Penal Code

It prohibits voluntary corruption or fouling of water of any public spring or reservoir “so as to render it less fit for the purpose for which it is ordinarily used”.

The Workman’s Compensation Act, Cap 236

In its Third Schedule, the Act Specifies the nature of occupations and the diseases they can cause. The Act lists a number of chemicals, which are likely to cause diseases. The list has been found to be too restrictive in light of the fact that presently there are literally thousands of chemicals; hence, the list should be substituted with a more comprehensive one. Furthermore, the Act is insufficient in giving levels of concentrations, which could be injurious.

RESETTLEMENT ACTION PLAN

The proposed project is not anticipated to displace any person or facility. The reason being, the proposed project is being implemented on a section of land that has been disturbed during exploration and illegal small-scale mining. The section is on a raised ground with rock outcrops. There is no human settlements on the proposed section of the site. Human settlements are concentrated on other sections of the park near the area.

As at the time of the study, the subject sections of the site were vacant. Thus, there arose no need at any one given time to move or resettle anyone.

Should the need arise in future for expansion of the proposed project (after implementation) where extra land may be needed, the proponent will at that time explore the options available in consultation with the KWS on issues regarding land that may be affected by such proposal, the government and all the stakeholders subject to the prevailing law and rules of natural justice. In such a scenario, the proponent may opt to lease the land as may be feasible.

Despite that there is no resettlement, there is need to seriously look at the interests of the local communities. As such, there is need to put in place a budget for community development plans and Corporate social responsibility. Effective and meaningful community and stakeholder engagement and consultative and public participation is very critical. Through such forums, the community shall identify their priorities such as seeking employment opportunities and other development projects that shall benefit them.

Over and above the minimum benefits entrenched in law for local communities, mining companies should have an input in community development. It is important that mining companies should avoid child labour and should put in place fair compensation plans and grievance redress mechanism plans.

CLIMATE CHANGE ADAPTATIONS AND MITIGATION STRATEGIES

Climate change has become real due to the past human activities. Among the main issues include global warming, change in weather patterns, extinction of species, dwindling resources etc. it is very important that we focus on various coping and adaptation strategies in an effort to mitigate and slowly reverse on the actions that adversely accelerate climate change.

It should be noted that environmental enhancement is a universal responsibility and everyone must take part during each and every action or activity because it is the cumulative individual actions that make or destroy the environment at large. Singly, one's action may appear negligible but that the accumulative effect from the millions of people across the globe.

Among the very important strategies include harvesting of rain water; harnessing solar power and designing of buildings to utilize natural lighting during the day. Harvesting of rain water shall not only reduce the strain on water resources but shall also greatly reduce surface runoff which eventually cause flooding, loss of life and damage to property. Harnessing of solar power also reduces the constraints to the power supply and reduce the negative impacts associated with production of power at various sources particularly the diesel-powered power generating plants.

Another very important strategy is sound waste management. The action plan should include reduction of waste generation at source, re-use and recycling. Waste reduction, recycling and re-use saves on resources and promotes a clean environment. Management of waste shall involve reduction of waste, segregation to encourage re-use and recycling and sound final disposal as provided by the Waste Regulations. With the advancement of technology that exist today, wastewater treatment is another very important strategy where wastewater is treated and re-used.

During construction and erection of structures, suitable technologies must be adopted to ensure that open areas allow for water percolation to recharge of underground water. This shall also reduce the surface runoff.

Adequate and suitable ventilation at the design stage shall also promote natural ventilation thus reducing the need for artificial ventilation and associated

negative impacts. Where artificial ventilation must be put in place, substances that damage the environment must be avoided.

Water conserving systems must be put in place while tree planting should be practiced due to the role played by trees in cleaning the environment not to mention other important uses. When planting trees, the right species must be identified. The government's proposed target of achieving 10% forest cover must be institutionalized such that it becomes an objective in every proposed project and thus more effort must be put in internalizing the objective in all people.

BASELINE INFORMATION, ENVIRONMENTAL SETTING OF THE PROJECT AREA AND ITS ENVIRONS

Historical background of KNP

Kora National Park (KNP) covers 1,787 km² and is by far the largest protected area (PA) in the Eastern Conservation Area (ECA), and the third largest protected area in Kenya.

The park is located in Tana River County, and was gazetted as a national park in 1989 (Legal Notice No.: 339 of 6th October 1989), prior to which it had been gazetted as a game reserve since 1974. Wildlife populations in the area are currently low; although surveys have shown the area is rich in floral biodiversity.

Meru National Park and the Tana River mark 65 km of the park's northern boundary. Features of the Tana River include Adamson's Falls, Grand Falls and the Kora rapids. Its eastern boundary is marked by the Mwitamvisi River. The park has several seasonal and dry rivers.

KNP is one of the five protected areas that make up the Meru Conservation Area (MCA): Meru National Park, Bisanadi National Reserve, Kora National Park, Rahole National Reserve and Mwingi National Reserve. The Kenya Wildlife Services (KWS) has jurisdiction over the two national parks, while Isiolo and Kitui Reserves respectively. Garissa County Government has jurisdiction over Rahole National Reserve. Meru National Park and Kora National park are now physically linked by a bridge which has been built over the Tana River.

Physical location of the proposed project site

The proposed project site is located in northern side of Kora National Park in Boka area within the larger within Tana River county. It is into the interior off Garissa Road about 140 km from the Garissa Road. GPS coordinates on a section of the site are - 0.36195 N, 38.72586 E.

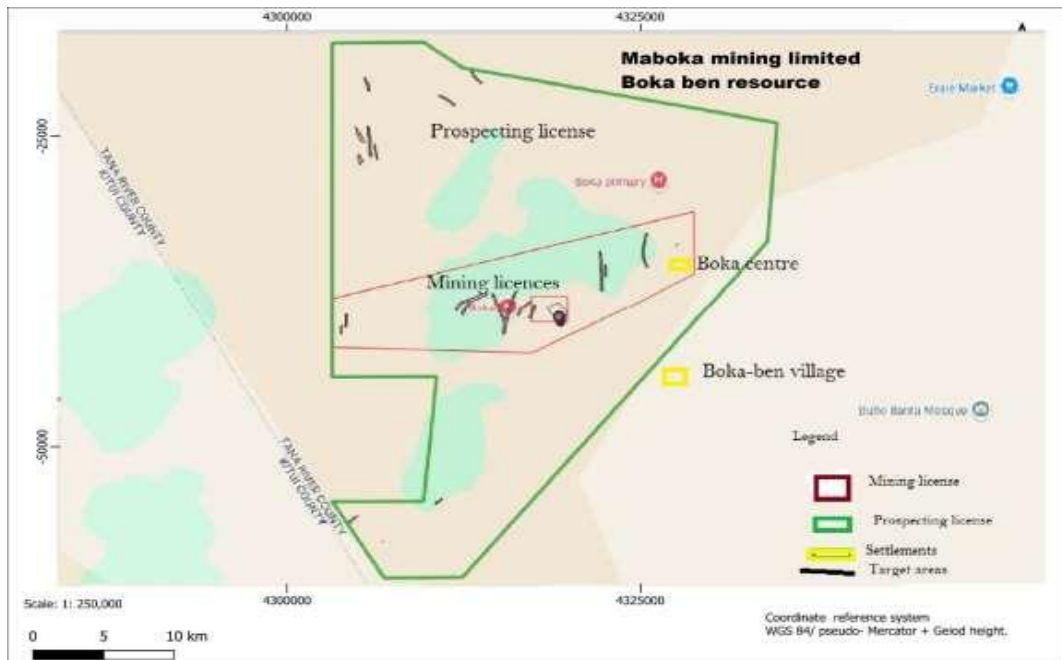
Georeferenced map drawn to scale clearly showing the targeted proposed project site

The map is here below attached and the GPS coordinates in the using KME file in a WGS84 Format

The following are coordinate of the mining licence boundaries.

Coordinate reference system: WGS 84

	Latitude	Longitude
1	0°22'40.82''S	38°38'45.58''E
2	0°21'26.03''S	38°38'46.60''E
3	0°19'11.75''S	38°47'23.60''E
4	0°20'47.12''S	38°47'22.86''E
5	0°22'48.67''S	38°43'30.08''E



Physical environment

Geology and Soils

The soils in the area classified as basement complex derived and for the most part shallow gritty, but along the Tana and at the mouths of watercourses the soil is alluvial. The soils are well drained, shallow, dark reddish brown and sediments mainly from crystalline basement rocks. The soils are very shallow and, in some areas, like around the proposed site are characterized by rock outcrops.

Hydrogeology

The hydrogeological features of the area, like the entire County, consist of an almost closed basin. There are many dry rivers within the park which are mostly dry only with water during the rains.

One of the most striking geographical features of Kora National Park is the Tana River, which gracefully meanders through the park, carving out a lush gallery forest along its banks. This river is not only a vital water source for the diverse wildlife inhabiting the park, but it also enhances the scenic beauty of the area.

Topography and elevation

The general area is characterized by a topography both with both steep and gentle slopes, valleys and flat topography. The altitude rises from 230m in the east to 560m in

the south west. The central area of the park is an undulating peneplain. Basement ridges protrude above the surface of the peneplain as rocky *inselbergs*, domed hills or hard rocks that rise steeply from the surrounding area. The highest of these inselbergs are *Mansumbi* (488 m (1,601 ft)), *Kumbulanwa* (450 m (1,480 ft)) and *Kora Rock* (442 m (1,450 ft)).

The park's landscape is characterized by vast open plains, acacia woodlands, rocky outcrops, and rolling hills. At its heart lies Kora Rock, an imposing granite formation that stands as a sentinel over the park. This feature not only adds to the park's rugged charm but also serves as a reminder of its historical and cultural significance.

Climate

KNP is located in a semi-arid region with an annual rainfall of between 250mm in the east to 500mm in the west. The proposed site is within a low-altitude area which receives very low and unreliable rainfall. Average daytime highs range from 33°C to 35°C all year often peaking at 38°C in November, while nights cool down to about 15°C to 20°C. The driest months are June – October and December – March while the wettest months are April – May and November to early December.

Water Resources

The area has no piped water but there are many dry rivers with deposited sand. Water supply is there unavailable and inadequate. Local community normally source water from far mainly in shallow wells along the dry rivers where sand has preserved some water

Sensitive ecosystem

Being within a National Park, the entire area is considered a sensitive ecosystem since it is a conservation area. There are no surface water bodies within the immediate environs.

Historical and cultural significance

Beyond its natural beauty, Kora National Park is steeped in historical significance. The most notable aspect of its past is its connection to George Adamson, one of Africa's pioneering conservationists. Adamson, famously known as "Baba ya Simba" (Father of Lions), dedicated much of his life to rehabilitating lions and reintroducing them into the wild. His work at Kora gained international recognition, drawing attention to the importance of wildlife conservation.

Another significant historical figure associated with Kora Rock is Dedan Kimathi, a revered Kenyan freedom fighter. The rock served as a stronghold and hideout during the Mau Mau resistance movement against British colonial rule. Today, it stands as a symbol of Kenya's rich and resilient heritage, drawing history enthusiasts who wish to explore the legacy left behind by these iconic figures.

Land use and site ownership

The proposed project site is a section within the larger KNP which is gazette as a national park and thus under the management of KWS. However, KWS has entered into a lease agreement with the proponent for exploration and mining of the rare earth elements. The land to be used measures approximately 60km². The area is mainly used for grazing livestock and the roaming wildlife but the local community has established residential villages.

Biological environment

Flora

The project is located within an area receiving low and unreliable rainfall. These conditions and the rocks in some sections are therefore unfavourable for agriculture and vegetation growth and thus predominant natural indigenous vegetation is grass, shrubs and trees although some people have introduced some exotic tree species especially the neem trees. *Acacia commiphora* bushland is the dominant vegetation, with patches of riverine forests along the River Tana. There is undergrowth of *Grewia*, *Bauhinia*, *Aspilia* and *Solanum* species among others. There is very little undergrowth below the woody plant community, partly due to high woody cover that shields other plants from growing under it and over-grazing by livestock that invade the park especially during the dry season. Dense riverine forests of doum and raffia palms *Hyphaene* and *Raphia* species grow along the Tana River. There are some riverine swamps with *Cyperus* species and grasses *Echinochloa hapladelphoides* and *Pennisetum mezianum*

Fauna

Being a national park, KNP provide habitats. There is a wide variety of animal species in the park, including the caracal, Tanzanian cheetah, African bush elephant, genet, hippopotamus, spotted and striped hyenas, African leopard hyenas, lion, serval, wildcat and several types of antelope. KNP is home to a variety of small to medium-sized mammals. These include Kirk's dik-dik, common duiker, lesser kudu, greater kudu, gerenuk, common zebra and diverse rats such as the naked mole rat.

General photos showing various aspects of topography, soils, vegetation etc of the area









Socio-economic environment

The main economic activity is subsistence farming, livestock and small-scale bee keeping so their main source of income is sale of the livestock, milk and honey. Social amenities such as hospitals and schools are not easily available in the locality but are mainly found in surrounding market centres and towns. The main Road to access the area is Garissa Road which is tar surfaced but the immediate access road is earth but improved with murram/quarry chips in some sections near Garissa Road else the area is inaccessible during rainy season.

Others social infrastructure like schools, religious places, shopping areas etc.) are within reasonable reach though not conveniently available for all.

There are no surface runoff drainage structures in the area but surface runoff drains naturally in line with the prevailing topography. As at the time of the study, the area was covered by the mobile service providers.

INFRASTRUCTURE AND SERVICES

A summary of the various support infrastructures and services is here presented below.

Roads and Accessibility

The site lies off an earth access road. The immediate access road is under improvement but may not be all weather. The road is well connected with the tar-surfaced Garissa Road though it is quite a distance and therefore the site is accessible mainly during the dry periods.

Water supply

The proposed project site is within semi-arid area with no piped water supply network. The park has many dry rivers and Tana River gracefully meanders in the park. It is proposed that the proposed project will have cold-water storage tanks for operations and use by workers. Water in the area is sources from the shallow wells dug in the dry rivers. It is recommended that the proponent explore harnessing rainwater for general use.

It is recommended that appropriate and preventive measures be taken at the design stage to provide for rain water harvesting system and storage which shall otherwise reduce the full dependency on the available and scarce water resource in the area. This will include gutters, down pipes and suitable water storage tanks for the harvested rainwater.

The use of runoff generated within the project area shall be put into consideration, whereby it shall be harvested and stored. This can be used in flushing out toilets thus supplementing the use of normal water supply. The run off can suitably be stored in underground tanks and then pumped/lifted to the sanitary facilities (toilets)

Sewerage system

The proposed site has no sewer and therefore pit latrines shall be used.

Surface Drainage

The area is generally drained by the existing natural drainage system.

Solid waste Management

Wastes from the project will be varied. The area is within the jurisdiction of the CGTR, which has the responsibility of disposal of waste. However, the proponent/contractor has an option of contracting a private garbage collecting company. This calls for sound waste management system especially during operations. All solid wastes should be dumped in approved dumpsites and in accordance with the regulations.

As is the case in many other settlement areas, it is anticipated that a professional garbage collector will be contracted to supplement the efforts of the CGTR in garbage collection, transportation and disposal.

Energy supply and use

The proposed activities will require fuel. This will be sourced from legalized dealers.

Electrical power will come in handy in driving the selected machinery. The power (electricity) shall be supplied by portable generators since there is no mains supply. In addition to the above, the need for energy conservation will be emphasized. During operation phase, the use of renewable energy sources such as solar will be encouraged in areas requiring less energy.

Communication

The area is covered by communication facilities mainly mobile telephony service providers though the coverage is not very good in some areas. All these will facilitate communication during the implementation and on operation of the project.

Security

The area should be fenced off to safeguard the animals (wildlife and livestock) and people as well. The should be fully manned 24 hours. If necessary and if conditions warrant, outdoor and indoor lighting will as well be installed sufficiently within the project area. The property management is anticipated to engage security firms to beef-up security.

PROPOSED PROJECT DESCRIPTION AND ACTIVITIES

NATURE, DESIGN AND DESCRIPTION OF THE PROPOSED PROJECT

The main proposed activity will involve the extraction of the rare earth elements carrier rocks and then breaking them to extract the identified rare earth elements that include *coltan*, *beryllium* and *cerium*. Rare earth elements are a major raw material in various technological advancements. Besides being essential to many kinds of consumer technology, including cell phones, hard drives, electric and hybrid vehicles; rare earth minerals also are considered crucial to shifting the economy away from fossil fuels toward electricity and renewable energy among others. Mining involves extraction of the underlying and sometimes overlying rock materials and it is proposed that the process will be mechanized with extensive use of earth moving equipment, plant and heavy trucks.

PROPOSED ACTIVITIES

Preparatory work

The initial activity on the proposed new mine is the preparatory works for the site which will normally entail the provision of a road access, site offices and compound, and usually some mineral processing facilities. These activities are expected to last for a limited duration.

Movement of the top/soft material – soil and overburden

In most cases (though not always), mining involves the extraction of hard underlying rocks. This implies that all the topsoil and soft rocks have to be removed from the proposed mining area to expose the target rock deposits. This will be achieved through the use of graders and dozers. The material is deposited or thrown away into a different area for storage and shall later be used for rehabilitation.

Drilling and blasting

Once the deposit is exposed, drilling will be done into the hard rocks that are carrying the rare earth elements and/or barring the access to the minerals. This will be facilitated by the use of a drilling machine powered by high pressure, normally generated by the compressor. Drilling usually provides a hole in which blasting would be carried out; and the depth of the hole is deep enough. Blasting will then be carried out in the hole that will have already been drilled. Explosion causes tremor shacking the hard rock and setting it apart. This excavated material will be further crushed to access the rare earth elements for refining.

Rock crushing and extraction of the rare earth metals

To get access to the rare earth metals, the fragmented rock materials will be passed through a series of processes for the removal and processing of the rare earth metals.

Proposed mine raw materials/inputs, products, by-products and wastes

The proposed mining activity shall be producing rare earth elements extracted from the ground. As such, the raw material for production shall be the raw extracted rock boulders. Other inputs though not necessarily raw materials include the earth movers and trucks (for moving materials and loading/offloading), explosives for blasting the rock where necessary, energy (electricity and fossil fuels) for running the machinery and equipment, labour force, oils and greases for greasing the moving parts among others. The main product from the mining shall be rare earth elements but in the process of extraction/crushing, waste rock materials, dust and tailings shall be produced as a by-product. The waste rock materials and dust may also be used in the construction industry though the proponent does not intend to utilize them and will preserve them for rehabilitation of the mined areas. Wastes from the proposed project include but not limited to mining wastes, tailings, soils and overburden, extirpated vegetative materials and general waste such as emanating from construction of site buildings and structures (e.g. wastes (pieces) from iron sheets, timber, glass, plastic and PVC materials, steel metals, broken stones; tiles and debris not to mention packaging materials). Mining dust and other mine wastes, soils and extirpated vegetative materials shall be used for rehabilitation of the mine pits while other general wastes shall be disposed to approved dumpsites. All efforts shall be made to waste reduction at source and efforts geared towards waste recycling and reuse. All wastes (recyclable and non-recyclable wastes) shall be disposed off appropriately as discussed in mitigation measures elsewhere in this report.

Storage

A designated area will be selected and set out during the proposed project design for temporary storage of the finished product, soil and overburden and mine waste/dust and tailings.

Transport

Transportation of the finished product out of site will be by road and mainly by the trucks provided by product buyers.

Activities during decommissioning phase

Decommissioning is an important phase in the project cycle and comes as the last to wind up the operations/activities of a particular project. The main purpose of decommissioning is to restore/rehabilitate the site to acceptable standards.

The operations of a mine are dependent on many factors such as availability of rare earth elements to be exploited, legislation, changes in land use planning, emerging alternative potential optimal land use among others. This may take a long period of time and there may be many changes which may not be foreseeable including the

technological and legal aspects. The decommissioning may also come earlier than the anticipated/projected life of the mine again due to various reasons like change in physical planning policy or the discovery/realization of a more optimal use of the land or even cancellation of the land lease. It is therefore recommended that an EIA be conducted when the time for decommissioning comes so that all aspects will be looked at against the prevailing conditions and requirements. However, the purpose of decommissioning is mainly to rehabilitate the project site to an acceptable standard and all efforts should be geared to making the site as close as possible to its original state before the project was implemented.

The decommissioning will in brief involve demolitions of the structures, removal of debris and landscaping. The other social implications involve the laying off workers who may be employed thus will lose their income, issues of safety and health etc. due to the fact that no body knows the future, it is highly recommended that an EIA be prepared when the time comes since quit may come earlier or later due to the vagaries of weather, human behaviour and policy changes among other factors and quantification and accurate prediction of the likely potential impacts is quite difficult.

In view of the foregoing and in line with the principles of sound environmental management, it is paramount that the appropriate controls and procedures be put in place at the design, implementation and operational phases of the proposed project to control environmental degradation as this is the only way of simplifying the decommissioning. These measures are recommended elsewhere in the report and in the EMP.

Project Budget

The proposed project is estimated to cost approximately Kenyan shillings **Four hundred & sixty-one million (Kshs 461,000,000.00)**. The period for the mining is not defined since it will depend on the quantities of the rare earth elements to be extracted (availability) subject to prevailing legal provisions and other challenges.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The proposed Alternative

The EIA Study report has been prepared for submission to NEMA; facts, findings and recommendations/proposals of which are based on the proposed site, materials and proposed technologies. This helps in evaluating and examining the foreseeable effects of the project on the environment and therefore assisting in addressing how the proposed development has to ensure that all environmental measures are complied with during the mine preparation, during operational and decommissioning phases.

The alternative consists of the proponent's/applicant's final proposal with the inclusion of the legal guidelines, regulations and procedures as stipulated in the EMCA, 1999 which aims at reducing environmental impacts to the maximum extent practicable. Appropriate Environmental Management Plans have been prepared as per the proposed project.

Relocation alternative

Relocation option to a different site is an option for the project implementation. At the moment, the proponent has no alternative sites for relocation. Looking for the land to accommodate the scale, type and size of the project and completing official transaction on it may take a long period. Besides, there is no guarantee that such land would be available and suitability is another very important factor, which cannot be ignored.

Although monetary costs should not be used to justify a wrong project, this would also call extra costs in terms of money and time for example whatever has been done and paid to date would be a direct loss to the proponent. This may also lead to a No Action Alternative situation. The other consequence is that it would discourage both foreign and local investors. In consideration of the above concerns and assessment of the current proposed site, relocation of the project is not a viable option. The problem is further aggravated by the characteristics of mining in that the minerals location is fixed, and the situation is not like developing a new factory, where there is much more choice in the location of the premises.

The No Action Alternative

The No Action Alternative in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. The anticipated insignificant environmental impacts resulting from design, implementation and operational activities would not occur.

This option will however, involve several losses both to the project proponent/land owner and other stakeholders; the economy; society and Government. The land will remain underutilized. The No Project Option is the least preferred option and it becomes apparent that the No Project Alternative is not the appropriate alternative.

Alternative design and technology

Various alternative designs and technology has been evaluated by the proponent and various professionals involved. After extensive discussions, the various options were assessed and the most optimal layout design, mining method, choice of machinery and equipment and technology were agreed as discussed herein this report.

Alternative land use

The proponent has an option to use the land for other purposes other than the proposed mining. The proponent may decide to use the land for agriculture, residential, commercial development, school or other institutions, hospital, industrial, may opt to sell or use it for the myriad of the alternative other land uses subject to user agreements from KWS. This option however calls for change of use and whatever the type of project, it will still have its potential impacts some even worse than the proposed project depending on their nature for example industrial activity or farming.

The comparison of alternatives

Under the proposed alternative, the project would produce rare earth elements to the fast-growing technology and green-energy industry in the country and in the globe besides creating employment directly and indirectly to the public. It would provide jobs for the workers during implementation, operation and throughout the project cycle. Under the No Action Alternative, there would be no mining at all. There would be no benefits from the site and neither would there be the insignificant environmental Impacts. Other benefits to be missed include the introduction of trees on some parts of the proposed site that would have the effect of modifying the area microclimate.

Provided the Environmental Impact mitigation measures are implemented as well as adoption of sound management practices and best available technologies adopted, negative impacts will be avoided /minimized. However, commitments related to development alternative would ensure that potential impacts are minimized to levels of insignificance as envisaged in the EMP.

Mitigation for the proposed Action

Mitigation measures for the proposed action are included in herein after in this report.

SOCIAL IMPACT ASSESSMENT/PUBLIC PARTICIPATION

This is a very important and an integral part of the EIA process, which is a legal requirement and a very important tool for collection of the data and especially the baseline/background information. The SIA helps bring out the contentious issues and gives a chance to those who may be affected by a proposed project to give their views, inputs and opinions and any significant issue is addressed at the initiation stage. This enables evaluation of the public and neighbours' views and is thus a very important part of the study. The exercise was conducted through public barazas (attended by the area Chief, local community and other stakeholders among others) and oral interviews. There are no residential areas in the immediate neighbourhood neither are there other commercial or human activities save for livestock within the immediate neighbourhood. The neighbours were consulted and none raised any objection or any issue against the proposed project. In liaising with the area residents, the proponent could better the infrastructure and other relevant issues including financial benefits to the community.

While the people are very enlightened, the community is local and some of those on the ground have not been out of the area and are thus not exposed and do not even know what or who is NEMA. Others felt that by signing, they shall have relinquished their right for compensation or legal action should they have claims against the proponent arising from the proposed activities. In conducting the process, we were particularly interested within those within the potential impact area. Their comments were that due care should be taken especially during blasting to avoid fry rock with the potential to damage their properties and cause accidents. In such eventualities they will demand compensation. They also demanded that they be informed prior to blasting. The other issue was the avoidance of spreading the rock debris, chips and other mine waste. The community has no objection to the project but they indicated

that they will demand compensation for any property damage, accidents and direct inconveniences. They all appreciate the proposed project in that it will promote more development in the area, create employment, facilitate improvement of infrastructure particularly roads, among others. That notwithstanding they raised some concerns which include increased dust during operation and transportation, potential effect on the water table, damage to roads, constraints to the existing infrastructure and noise during operation by involved machinery, trucks and blasting. They advised that all disturbances and nuisances should be reduced to the minimum which the proponent is committed to. The people recommended that the access roads be improved with the materials from the proposed mine and watering should be done during operation to reduce dust. They insisted on the need for employment of local people and idlers should be avoided. Further, more trees should be planted as a buffer against dust, beatification and improve microclimate and at the same time best practices should be adopted during blasting and mining. Some recommended use of dust filters to reduce dust propagation. Modern equipment which are more efficient and less polluting should be installed and the latest technology in mining used. They were concerned that the pits left after mining poses a danger to people and animals and potential breeding grounds for mosquitoes. There is great need for to carry out a comprehensive rehabilitation of the mined areas. This shall be done in phases with areas exhausted rehabilitated as mining moves to new sections.

The issues raised and many others foreseeable have been adequately addressed in the report and in the EMP.

The minutes of the meetings are attached in the annex.

DECOMMISSIONING PHASE

Decommissioning is an important phase in the project cycle and comes as the last to wind up the operations/activities of a particular project. The main purpose of decommissioning is to restore/rehabilitate the site to acceptable standards. Reclamation - to occur on mining areas continuously through the project, and reclamation of the staging area, removal of the berm, and reestablishment of topographical elements once the mine is exhausted.

The lifespan of the mine is dependent on the quantities of the mineral deposit, the technologies used to mine and also on the market demand for the final product among other factors. As such, it is not easy to estimate the period of mining which may be shorter or longer but most likely it will be longer. However, the decommissioning may also come earlier due to various other reasons than those mentioned like change in physical planning policy or the discovery/realization of a more optimal use of the land or even lack of market for the products. It is therefore recommended that an EIA be conducted when the time for decommissioning comes so that all aspects will be looked at against the prevailing conditions and requirements. However, the purpose of decommissioning is mainly to rehabilitate the project site to an acceptable standard and all efforts should be geared to making the site as close as possible to its original state before the project was implemented. The decommissioning will in brief involve filling the mine pits, demolitions of the structures, removal of debris and landscaping. The other social implications involve

the laying off workers who may be employed thus will lose their income, issues of safety and health etc. due to the fact that no body knows the future, it is highly recommended that an EIA be prepared when the time comes since quit may come earlier or later due to the natural and man-made causes, vagaries of weather, human behavior and policy changes among other factors and quantification and accurate prediction of the likely potential impacts is quite difficult.

In view of the foregoing and in line with the principles of sound environmental management, it is paramount that the appropriate controls and procedures be put in place at the design, implementation and operational phases of the proposed project to control environmental degradation as this is the only way of simplifying the decommissioning. These measures are recommended elsewhere in the report and in the EMP.

POTENTIAL ENVIRONMENTAL IMPACTS

Positive Impacts (Economic and social benefits)

Provisions for rare earth elements; promotion technological advancement and green-energy development

This is the main purpose for which the mining is proposed to be established in the area is to make available the rare earth elements for use off-site. This is a milestone to any country that is in need of development and promotion of green energy.

Utilization of the land

The proposed site is a portion among thousands of acres of land in the area without being fully utilized. The proposed use will raise the utility of the land though the value part may not be very necessary on its own since it is within a national park. The land is unsuitable for agriculture due to rainfall unreliability/lack of water and the soil type. The proposed site has been identified to have adequate mineral deposits as indicated by the geological survey and should be exploited.

Employment

The proposed project will provide direct and indirect job opportunities to a significant number of the population thus reducing the unemployment and, in the process, provide livelihoods.

Industrialization

The proposed project can be termed as a processing industry as it is a converter of raw materials (raw minerals) into more usable and refined products. This being the case, it can be said that it will facilitate to some degree to the projected industrialization. It is a contributor to the G.D.P hence a booster of the Kenyan economy including earning foreign exchange. Besides, the minerals are required for the various technological advancement activities related to industrialization.

Conversion of the land into better Economic Use.

Apart from the sporadic subsistence agriculture and grazing, there is no other economic use of the land that has been established therefore mining will make use of the valuable mineral – the rare earth elements to develop other areas or for exportation that are of more importance for Kenyan economic growth.

Introduction of trees

The proponent proposes to introduce trees in undisturbed areas of the proposed project site and along the boundary of the project site. Further, on decommissioning, the land will be reclaimed/rehabilitated, landscaped and planted with trees and other vegetation that will definitely the area besides the positive effect of microclimate modification.

Generation of government revenue

The proponent shall pay all charges and levies charged by the national and county government through the various licences and permits e.g. cess and royalties.

POTENTIAL NEGATIVE IMPACTS AND MITIGATION MEASURES

Habitat disruption and effects on wildlife migratory routes

Being a national park, the wildlife is not restricted and thus roams all over. The area in general comprise a migratory route to and from Tsavo that has been disrupted due to human-wildlife conflict caused by various factors among them the overgrazing by the local community in the park, competition for water, human settlements, drought, illegal mining. The main drivers of this include climate change, population growth, habitat loss among others.

Mitigation

The proposed project site is a small section severely affected by livestock overgrazing and past artisanal illegal mining. Specific migratory routes should be identified and a corridor maintained for connectivity. Mining should take a short duration and the land rehabilitated appropriately. Sustainable mining & processing and best practices should be adopted to prevent land degradation. KWS and the proponent must positively engage the local community to prevent and minimize human – wildlife conflict for park restoration and conservation. Partnership and coming together of all stakeholders is crucial in developing an integrated management approach that facilitates both human and wildlife. KWS and other stakeholders should work towards activities and engagements that will benefit the local community so that they can actively participate in conservation. Compensation and offsets for losses from conflicts is an incentive. Economic empowerment shall greatly reduce habitat destruction such reduced activities of cutting down trees for charcoal burning and firewood. KWS and the proponent should initiate mass tree planting programs to restore the damaged

areas. The focus should be on sustainable land use and management practices that benefit both humans and wildlife.

Land degradation/soil erosion

Mining usually make use of both the underlying and overlying hard rock that has the target elements. To pave way for its extraction, the uppermost material (soil) is usually moved elsewhere. The same case is anticipated with the proposed project. The entire top most material including vegetation and soft rocks will be removed and transported elsewhere exposing it to the agents of soil erosion like water, machines (trucks) and wind.

During rainy seasons loose soil particles risk being washed away by the run-off emanating from all over the area potentially leaving the place bare: with rocks out-cropping all over.

This is an environmental hazard since all the top-most material may be taken away and deposited elsewhere causing siltation and clogging of drainage channels not to mention the flooding of rivers/streams due to deposition in river banks/basins. Quarrying/mining, depending on rock composition, may also generate heavy and/or radioactive metals that are toxic to plants & animals e.g. Arsenic, Cadmium, Lead, Chromium, mercury etc.

Mitigation

An iterative design approach enables the site planning and detailed design of the mineral working to be informed by and respond to the process. It should facilitate a high degree of mitigation, in the form of landscape proposals or a landscape strategy. This should be built into the project from the outset so that the potential for adverse effects is substantially reduced. If consideration of mitigation measures is left to the later stages of scheme design, it can result in increased mitigation costs because early opportunities to avoid the need for such measures have been lost.

It is important to carry out tree planting and maintain vegetation cover especially where gully erosion is seen taking place. Presence of vegetation can retard erosion to a significant level. Other physical barriers such as rocks can be used to intercept soil material from being carried away by the run-off.

There is need for analysis of the rock composition to verify presence or absence of heavy metals or toxic substances and also to isolate the proposed mine from off-site runoff.

Air pollution

Dust is anticipated to emanate from plant operations and especially during rock blasting/breaking and transportation. Without proper precautions, the dust particles are susceptible to wind and may be blown by fast moving wind leaving behind clouds of dust creating a hazard and nuisance. Dust particles caused by vibrations of machines and vehicle movement suspends in the air mostly during dry spells. Diesel engines emit black carbon, which absorbs sunlight and warms the atmosphere and micro-particles. Unseen and odourless, microscopic particles of air pollution is very harmful. Exhaust from diesel engines and dust swirl into an insidious cocktail of tiny particles that can spend weeks airborne. The most harmful are the smallest, less

than 2.5 microns in diameter; when inhaled, the lungs or pass directly into the bloodstream and damage arteries. The orange fumes that are sometimes visible after a blast using ANFO indicate the presence of nitrogen dioxide (NO₂), but carbon monoxide and nitrogen monoxide will also be produced. It is due to the incorrect burning of the explosive (ANFO) either due to excess water or incorrect/incomplete mixing. This is more frequent than it used to be, due to the increased use of site mixed ANFO as opposed to factory produced explosives. In most circumstances, the fumes dissipate readily, but if there is a temperature inversion and little wind, then they can linger at the bottom of the site and could be a potential health hazard

The emissions from plant and machinery on site and trucks used for transportation are a threat to the environment since they contain harmful elements such as sulphur, lead etc, which have effects to the health of plants and animals. Generally the impacts of dust diminish as distance from the source increases and the most acute impacts are likely to occur in enclosed spaces (for example the processing plant) or in close proximity to major sources. Impacts resulting from air quality degradation can include those related to health (although these are typically linked to occupational rather than environmental exposure), visual intrusion and, most commonly, nuisance for surround communities, wildlife and the general environment.

Mitigation

Dust can be minimized through constant sprinkling of water to the bare areas. This would make soil particles remain intact hence reducing impact generated by wind. Wind speeds increase with height, and large mounds which project well above ground level can thus be the subject of significant wind erosion and therefore should be avoided.

It is important to assess the quality of fuel consumed by the trucks and evaluate whether it has toxic by-products. This would drastically minimize the generation of such harmful elements.

There is need to locate dust generating activities where prevailing winds will blow dust away from residential properties/sensitive premises/users and protect activities from wind. To control dust generation during blasting, suppression should be used which localizes dust generation. Locating dust generating activities within worked out areas of the site can significantly reduce potential dust impacts off site. Smaller dust particles remain airborne for longer, dispersing widely and depositing more slowly over a wider area and therefore appropriate technology should be adopted to reduce production of fine dust. Other measures include sheltering transfer points from wind, minimizing drop heights, protection from wind, restricting vehicle speed, removal of the dusty material collected from the area of blast prior to detonation and minimizing handling.

It is important to assess the quality of fuel consumed by the trucks and evaluate whether it has toxic by-products. This would drastically minimize the generation of such harmful elements.

Vegetation can as well be introduced to the bare areas. This should be maintained through watering to grow fast as the activity continues. Vegetation i.e. shrubs and tree minimize the impact generated by wind. It reduces wind speed and covers soil from erosion by this agent.

There is great importance of using the correct drill, the right amount of diesel and ensuring that it is thoroughly mixed for blasting to avoid the production of nitrogen dioxide (NO₂), carbon monoxide and nitrogen monoxide

Clearing of vegetation

Vegetation usually protects the ground surface from wind and water erosion. It also provides fuel energy and habitats for shelter to small and large organisms to enable them to sustain themselves as species. It stabilizes other physical environmental attributes such as microclimate, water and soil moisture regimes. So, when vegetation is cleared all these are affected.

Mitigation

Though it is almost impossible to carry out mining without affecting vegetation, it is possible to introduce vegetation in already mined areas. Quality vegetation should be provided through close monitoring to try and restore or even improve physical and Biological environmental attributes. Vegetation would as well contribute in generating soil since is a component of soil formation. Trees should be planted along the site

boundaries and cared for during the entire project operation and decommissioning.

Trees will also serve as barriers to dust transmission during operation phase.

Land deformation/effects on landscape or visual intrusion

Landscape effects arise where a project causes change in the physical landscape. Changes or removal of elements in the landscape (e.g. tree, slope, field boundary vegetation) may give rise to changes in the character of the landscape and how it is experienced. Visual effects arise where a project causes changes in the composition and extent of available views, as a result of changes to the landscape. Landscape effects during the extraction phases are associated with loss of features and temporary changes in local character. Permanent landscape effects arise post restoration. The majority of adverse Visual effects are caused by the extraction phases of mineral working and are therefore temporary.

Soil piling, buildings and structures, stockpiles and mining waste piling all have a negative effect on landscape by causing visual intrusion. Mining activities usually destroy the original landscape of the areas affected leaving behind huge depressions and especially where mass excavation has taken place. The potential effects arise in the form of steep escarpments which pose a safety hazard to humans, domestic and wild animals. There are likely to be deep depressions with the potential of collect water forming artificial lakes. These turn hazardous to the environment. They act as the breeding sites for disease causing organisms like mosquito's and snails; which causes Malaria and Bilharzia respectively not to mention cases of drowning and injuries.

Some of those sites have claimed lives of many people and animals. People and especially children go swimming in these deep pools of water and eventually drown. The same happens when animals such as cattle move-in in search of water. Features associated with landscape include landform, vegetation, settlement

pattern and visibility. If the mine can be designed within that framework, respecting local features, then it will be more successfully accommodated

Mitigation

The retention of existing features, including woodland ridgelines for example, will help to substantially reduce adverse effects. There needs to be an adequate standoff, with protective suitable fencing if necessary, to avoid damage to these important features. Hedgerows should be allowed to grow in height to increase their potential for screening.

To mitigate effects on diseases, it would be prudent enough to refill the depressions after mining. This would significantly reduce the steep escarpments and discourage settlement of water i.e. there would be no significant water stagnation. Again, it would weed out the possibility of drowning of people and animals. Before refilling, the areas should be fenced to deny access to people and animals.

Wherever possible, site plant, haul routes, soil stockpiles etc. should be located away from sensitive landscape and visual receptors. Visually intrusive material should be located at the base of extraction where appropriate and it is usually preferable to work towards visual receptors to minimize the visibility of the mine face. The stockpiles, soil and overburden, mine wastes and tailings should be reduced to reasonable height below the skyline else they cause visual intrusion and become an eyesore.

Biodiversity disruption; destruction of habitats; deforestation

Mining and processing of minerals may have a detrimental impact on biodiversity and habitat destruction or disruption. The activities may severely damage the landscape and destroy forests.

Mitigation

- Conduct biodiversity assessment
- Avoid ecologically sensitive areas
- Develop biodiversity management plans
- Develop wildlife conservation plans and programs
- Phased and progressive mine rehabilitation plans using native plant species
- Avoidance of wildlife migratory routes and breeding areas
- Regular monitoring and evaluation

Noise and vibration

Noise is defined as unwanted sound. Environmental noise results when some other, unnatural process results in high levels of unwanted sounds beyond the ambient or background level. Noise is likely to emanate from drilling and blasting, machinery and equipment on site, processing and transportation. Those at risk may not only be those operating noisy machines but those working nearby i.e. general staff, visitors and neighbours. It is unfortunate that noise is an inevitable consequence of the working of mines and quarries.

Noise may cause hearing problems and stress depending on the nature, level and the duration of exposure. Noise in the proposed site is potentially likely to emanate

from explosions/ blast machinery, from crushing plant, earthmoving equipment and trucks.

The noise level above which people are likely to complain is about 70 dB (A). Much of the machinery and equipment used in mining and quarrying exceeds this level and in deed it even exceeds 100 d B(A) at the proximity of the source. The degree to which noise becomes of concern depends to a large extent on the distance from the source.

Vibration may lead to the creation of dust, cracks and even the weakening of very close buildings. It also facilitates annoyance and disturbance to the environment and especially people.

Mitigation

- The operating hours should be strictly limited to daytime i.e. between 8.00 am to 5.00 pm when there is no much difference from the background noise and no working on Sunday. Acoustic screening is the main method of noise control that can be implemented on the site. The primary method of screening operations is to use baffle moulds using material such as soils and overburden that has to be removed to allow access to the mineral deposits and/or rocks. They are generally located on the site boundary and are usually designed to provide screening for noise-sensitive properties. There are sometimes practical limitations on screening all working areas, particularly on sites on hillsides like the proposed site. In some situations, there may be difficulties in providing a mound on the site boundary and a noise fence can be used
- There should be warnings before blasting and control of blasting practices
- use rubber linings in chutes, dumpers, trucks, transfer points and keep lorry tailgates closed where possible
- The proponent/management should regularly conduct noise assessment studies and keep records of the assessment. To facilitate adequate record keeping, the noise assessment report should describe the scope of the assessment and the dates on which it was carried out. It should identify by whom it was done.
- Ear protection is necessary during operations using earmuffs.
- Conduct awareness and training to the staff on the risks of noisy environment

Public safety, traffic, Occupational Safety and Health (OSH)

Mining and quarrying activities pose potential threats to the health and safety especially to the operators. This may be in the form of dust and fumes, accidents from machinery and equipment and fry rock.

Mitigation

- Provide properly fitting personal protective equipment (PPE) depending on tasks being performed to avoid injuries and illness including working boots,

overalls, helmets, goggles, earmuffs, masks, gloves etc. the use of the PPEs should be enforced

- OSHA abstract should be posted at a strategic point on site. The requirements of the **OSHA** and other relevant regulations should be strictly adhered to. Only specialised machine operators should operate machinery and specialised equipment and all moving parts should be provided with appropriate guards. A first aid kit should be provided within the site. This should be fully equipped at all times and should be managed by qualified persons.
- Properly design to allow for deceleration and acceleration to the site. Clearly indicate direction of traffic throughout the project cycle. Internal driveways should also be erected with bumps to control speed and thus reduce potential accidents. There should be careful design and layout of the site entrance and access, providing adequate visibility
- Adapt effective emergency response plans during all project phases.
- Safety awareness may be gained through regular safety meetings, safety training or personal interest in safety and health. This awareness will increase ability to respond if, some day in future, one is a bystander in an emergency.
- The proponent should have workmen's compensation cover. It should comply with workmen's compensation Act, as well as other ordinances, Regulations and union Agreements.
- Sanitary facilities should be provided (for each sex where conditions warrant). Standard cleanliness of the facilities should be maintained.
- Local individuals preparing food for the workers at the site should be controlled to ensure that food is hygienically prepared.
- Workers should always be sensitized on social issues such as drugs, alcohol, diseases etc. There should be training programs to facilitate this.
- Proper waste management of domestic waste to prevent vectoral diseases.
- Public awareness campaigns on the prevention and management of prevalent diseases such as malaria, STDs and HIV AIDS and equipment of the proposed health centre to manage the same.
- Ensure (consistently) good water quality through regular water analysis to ascertain compliance to public health standards.
- Provision of adequate security shall control unauthorized public and animals from coming to the project site thus effectively preventing them from potential safety and health hazards

Accident prevention and Emergency Response Plans- ERPs

Emergencies and disasters are a reality of everyday life. Workers/ people must therefore be sensitized and prepared on how to react. Absence of ERPs may be risky since there would be no guidelines to handle or control emergencies should they occur.

Mitigation

- The proponent should initiate and develop effective ERPs to cater for various eventualities such as fire outbreaks, flooding, fuel and chemical spills, tailings dam failure, landslides and pit collapse and other accidents/incidents that are likely to occur. Training is prerequisite in planning ahead. Such plans must be properly documented and made available to all
- Regular drills should be conducted on possible incidences ▪ Strict adherence to the OSHA and due diligence

Absence of ERPs may be risky since there would be no guidelines to handle or control emergencies if they occur. The proponent and the contractor shall take all necessary steps to prevent accidents in the entire project cycle. All work safety procedures shall be followed as discussed elsewhere in this report while measures to prevent and manage

fires shall be taken as discussed elsewhere in this report. For further management of any foreseeable accidents, the proponent shall develop an ERP which shall be documented and all the residents and business operators shall be provided with the requisite training and annual drills conducted. Chances of accidents and other safety hazards can be considerably reduced by adherence to set standards and use of the right quality materials to the specifications and observance of safety procedures.

The ERP shall typically contain all information on all likely types of emergencies likely to be encountered mainly accidents and fires. The ERP shall include actions to be taken in case of emergencies and shall display emergency contacts (ambulance, doctors, police and fire engines) telephone list; simple instructions on do and don'ts in various emergencies such as fires, LPG incidents, etc. On traffic safety, the roads shall be constructed to adoptive standards and all entry and exit points provided with clear views. Bumps shall be erected to control speed. The ERP shall also provide for basic First aid training to some of the potential workers. The ERP shall also promote good neighbourliness which shall go a long way in emergency response. Such plans must be properly documented and made available to all. A fire assembly point must be identified and clearly marked for example.

Flyrock, Air Overpressure and ground vibration

Blasting has the potential to send some rocks flying precariously within and even without the proposed site and this is likely to cause death, accidents and damage to property. Flyrock is produced when there is too much explosive energy for the amount of burden, stemming is inadequate, or the explosive energy is too rapidly vented through a zone of weakness. In a hard rock mine it is necessary not only to loosen the rock but to fragment and move it away from the face of the mine to produce a muck pile. Because of this more energy is lost to the atmosphere so the air overpressure will probably be greater. Overpressure may vibrate buildings but damage would seem to be rare. It is clear that the main reason for complaints of vibration is not usually structural or even cosmetic damage, but fear of damage and/or nuisance. The threshold of human perception (sometimes as low as 0.5mm/s) is well below the levels at which damage occurs and below the levels currently recommended.

Mitigation

The basis of good blasting design is to achieve the desired degree of fragmentation in the rock, safely and economically. Flyrock should be avoided altogether outside the site. If the assessment of the danger zone suggests it may extend beyond the site boundary, then a controlled space should be created, where people/animals are either excluded or protected, and not endangered by the blast and the subsequent fly rock. Flyrock incidents may be significantly avoided or reduced both in severity and frequency if the whole operation is supervised by a person with knowledge of explosives, blast design, controlled drilling and careful observation of mine faces, and adherence to accepted blasting practices.

Correct blast design ensuring appropriate burden to avoid over-confinement of charges which may increase vibration by a factor of two; the setting-out and drilling of blasts should be as accurate as possible and the drilled holes should be surveyed for deviation along their lengths and, if necessary, the blast design adjusted; correct charging is obviously vital, and if free poured bulk explosive is used, its rise during loading should be checked. This is especially important in fragmented ground to avoid accidental overcharging; correct stemming will help control overpressure and fly rock and will also aid the control of ground vibration. Controlling the length of the stemming column is important; too short and premature ejection occurs, too long and there can be excessive confinement and poor fragmentation. The length of the stemming column will depend on the diameter of the hole and the type of material being used. There should be monitoring of blasting and re-optimising the blasting design in the light of results, changing conditions and experience should be carried out as standard.

Particular care is necessary with a first blast at a mine. It may otherwise give rise to abnormally high overpressure and vibration because there is no free face to give relief to the forces produced. Problems may occur at any time in the life of the working because of faults in the strata and other forms of heterogeneity; blasting in tight corners; blasting near to made ground; excessive burden; and manufacturers' tolerances/errors in explosives or detonators or operator's errors resulting in simultaneous detonation of more than one charge/hole/deck. Avoid using surface detonating cord and, if it has to be used, cover it adequately. Avoid blasting in adverse weather conditions (will increase levels of overpressure significantly) which include, significant temperature inversions; moderate to strong winds towards sensitive areas; foggy, hazy or smoky conditions with little or no wind; a still cloudy days with a low cloud ceiling; periods when the surface temperature is falling in the middle of the day; periods when strong winds accompany the passage of a cold front; and before mid-morning or after sunset on clear calm days.

Accident prevention and Emergency Response Plan (ERP)

Emergencies and disasters are a reality of every day life Stakeholders must therefore be sensitized and prepared on how to react during all the phases (the implementation, operational and decommissioning). Absence of such plans may be risky since there would be no guidelines to handle or control emergencies if they occur. The proponent and the contractor shall take all necessary steps to prevent accidents in the entire project cycle. All safety procedures shall be followed. For further management of any foreseeable accidents, the proponent shall develop an ERP which shall be documented and all the operators/workers shall be provided with the requisite training and annual drills conducted.

The ERP shall typically contain all information on all likely types of emergencies likely to be encountered mainly accidents and fires. The ERP shall include actions to be taken in case of emergencies and shall display emergency contacts (ambulance, doctors, police and fire engines) telephone list; simple instructions on do and don'ts in various emergencies that may occur. On traffic safety, the road shall be constructed to adoptive standards and all entry and exit points provided with clear views. Bumps shall be erected to control speed along the driveway and the parking. The ERP shall also provide for basic First aid training to some of the potential residents. The ERP shall also promote good neighbourliness which shall go a long way in emergency response. Such plans must be properly documented and made available to all. A fire assembly point must be identified and clearly marked for example.

Waste management

Fuel, Oil and Grease Spillage/leakage

The heavy plant and machinery, earthmovers and trucks involved in the mining, transportation and mineral processing have the potential to leak fuels, oils and greases while working especially if not well maintained. Other sources of leakage and spill may be from on-site maintenance of the machinery and poor on-site storage of the oils and greases.

Mine waste, tailings and other Solid Waste

Mine wastes are a largely unavoidable by-product of the rare earth elements extraction process and are defined as wastes because no market currently exists for them, but depending on the rock formations, some are generally inert and non-hazardous while others may be hazardous. Materials that may be classified as mine wastes include overburden and interburden (material of limited value that occurs above or between layers of economic material) and processing wastes (non-marketable, mostly fine-grained material from and processing activities) and tailings. The type and amount of waste depends on the nature of the operation and composition.

Hard rock mines produce variable amounts of mine waste. Some produce small amounts of overburden while others may have large amounts of overburden and interburden.

The mining usually produces bulk of mine dust not commonly used for construction and may be piled within the site. If left on the site after completion of mining activity, this will have created a hill and thus change of the orientation of the land.

There may be other solid materials such as scrap metals, wood, tins and cans, as well as non-biodegradable materials (e.g. PVC and polythene bags) all of which need appropriate disposal.

Mitigation

Oils and grease should never be allowed to come into contact with environment (i.e. water and soil). If stored on site, proper storage facilities for new and used oil should be provided in the workshops. Machinery maintenance should not be carried

on site unless proper garage facilities are established and oil interceptors provided. Oil is classified as toxic and should be contained and disposed off appropriately as per the requirements of the Waste Regulations.

Adapt a process of waste identification, characterization and qualification as a basis for sound waste management strategy and focus on possibilities on waste recovery, re-use and recycling. Waste materials should be segregated/ separated i.e. Scrap metals, wood, non-biodegradable, tins and cans etc.

Mine wastes and fines should be reduced to the minimum practicable. This shall bring in benefits in the form of maximising revenue in the form of saleable products, and the need to avoid resource sterilization within the mine boundary through fines disposal. The mine waste (including fragmented rocks, dust) and sand materials piled at the site as by-product/ waste should for instance be used to refill (restoration) the excavations that have been generated after mining. The mine waste and fines should be reduced at source by sound design and operation. Equally, the need to minimise fines is driven in part by the environmental and social consequences of their production and the costs of dealing with increasing volumes. Such consequences may represent a substantial business risk for companies, not least through damage to corporate reputation when impacts occur. Mine waste tips must be designed, constructed, operated and maintained to avoid instability or movement that might give rise to health and safety risks. Surface run-off from waste tips should be captured and treated to remove suspended solids prior to discharge.

Tailing dams should be well constructed, lined and well managed.

Ground and surface water

Removal of confining strata can cause the floor to heave (break up) and water seepage. The hydrological and hydro geological regime can be affected by the four distinct aspects of surface mineral extraction and associated activities such as the physical presence of the excavation, contamination of groundwater and/or surface water, dewatering of workings that operate below the water table all of which are not mutually exclusive for example can arise either from operations within the mine itself, or as a result of the modified groundwater flow paths induced by large-scale dewatering, which may bring polluted groundwater in from an external source.

Mitigation

All activities should be undertaken with due regard to the protection of ground and surface water. This can be achieved by ensuring that no excavations to the level of the water table, oils/grease and fuels spills and leakages should be avoided and natural contaminants such as acid rock. The proponent should work closely with the environmental consultants and hydro geologist who should monitor periodically to ensure that the excavations do not go to the depth of the water table and that all potentially negative impacts are avoided. Rock deposits and dumping of mine waste and other wastes in the area nearby must be avoided and all measures taken to protect the general area. All forms of pollution especially from oils must be avoided.

Loss of grazing land/ change in land use

The proposed site is within a national park though area is semi-arid receiving little and unreliable rainfall for meaningful commercial farming and therefore are mostly used for grazing livestock and feeding the wildlife. Some sections of the proposed

site have rock deposits and outcrops which makes the land unsuitable for vegetation growth in its current state. The problem is further aggravated by unreliable rainfall. In its current state, the land has no good potential for vegetation growth due to the presence of rock outcrops on many sections. The proposed activities are likely to generate dust which may not be contained within the site. Coating of vegetation and contamination of soils (in the environs) could possibly reduce the yield and value of grazing land. Although generally inert, the chemical nature of the dust will sometimes influence the severity of the impacts upon soils and vegetation. Dust may have physical effects on plants such as abrasion of plants, shading, and cumulative effects e.g. drought stress. The chemical effects of dust are likely to be more important than any physical effects. Dust deposited on the ground may produce changes in soil chemistry, which may in the longer-term result in changes in plant chemistry, species competition and community structure.

Mitigation

Rehabilitation/restoration of the mine after extraction of mineral turning the land back to viability for vegetative growth. Dust should be controlled so as not to pollute or affect other land sections and flora. There is sufficient land for use for pasture and agriculture in the immediate neighbourhood which have the necessary factors for productivity but has unfortunately been lying idle though used for grazing when there are rains.

ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS

The environmental management plan involves risk management strategies that should be undertaken by the project proponent and all the stakeholders to ensure environmental enhancement. They are approaches to monitor, control, reclaim and restore the environment to sustainable state. EMPs for projects thus provide logical frameworks within which the identified issues of environmental concern can be mitigated or monitored i.e. provide a checklist for project monitoring and evaluation.

Environmental monitoring involves measurement of relevant parameters, at a level of details accurate enough, to distinguish the anticipated changes. Monitoring aims at determining the effectiveness of actions to improve *environmental quality*.

The environmental management and monitoring plans have been developed and outlined to bring home the key findings of the *Environmental Impact Assessment*; recommending necessary mitigation actions, defining roles, monitorable indicators and the estimated cost.

The EMPs outlined here after addresses the identified issues of concern (potential negative impacts) and mitigation measures as well as roles, costs and monitorable indicators that can help to determine the effectiveness of actions to upgrade the quality of environment; as regards the proposed *project/new mine*. The EMPs have considered the entire project cycle.

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN (IMPLEMENTATION AND OPERATIONAL PHASES)

Potential Environmental/ Social Impact	Proposed Mitigation and Aspects for Monitoring	Responsibility	Estimated costs (Kshs)	Time Frame	Monitoring means
Air pollution	• Create suitable earth moulds; Shelter transfer points from wind & protect exposed material from wind; cover friable material loads during transportation • Minimize the need to transport and handle materials by placing adequate storage facilities close to processing areas • Spray water to exposed dusty surfaces • hard surfacing of vehicle areas, Water un-surfaced roads and paved roads and restrict vehicle speed • use trees or shrubs around the edge of the mine site • locate dust generating activities where prevailing winds will not blow dust to sensitive receptors/users • minimize the height of fall of material • remove dusty material collected from the area of blast prior to detonation and minimize handling • use right blasting to avoid the production of NO₂, CO₂ and NO	Proponent	1,000,000	Continuous throughout project cycle	• Earth moulds around mine • Proper plant siting & orientation • Reduced dust
Land degradation/soil erosion/runoff	• isolate the proposed mine from off-site runoff • avoid removing vegetation where unnecessary • use barriers such as vegetation and rocks to control erosion, terracing and slope stabilization • construction of drainage channels & sediment traps and regular monitoring of erosion control measures • minimize land clearance to required areas only; progressive land rehabilitation & reforestation	Proponent	100,000	Continuous throughout the project cycle	• Isolated mine • Retained vegetation • Erosion control measures

Noise and vibration	- Control blasting and issue warnings before blasting - switch-off equipment when not in use, avoid unnecessary revving of engines - minimize material drop heights from lorries or plant - use of conveyors to transport material as compared with dump trucks; minimize distance between loading and emptying dragline buckets - use rubber linings in chutes, dumpers, trucks, transfer points	Proponent	2,000,000	Continuous throughout project cycle	- Controlled blasting - Minimal drop height - Minimal distances - Rubber linings - Off-switched
	& keep lorry tailgates closed - sound maintenance for plant and machinery/equipment - Use temporary bunds and portable screens - Controlled blasting & restriction of working hours; Adherence to Noise and Excessive Vibration Pollution (Control) Regulations, 2009				equipment when no activity
Visual intrusion/landscape effects	- Retention of existing features, including ridgelines. Vegetation allowed to grow in height to increase potential for screening - Locate structures/buildings, stockpiles at a lower elevation & limit the height of stockpiles. Site plant, haul routes, soil stockpiles etc. to be located away from sensitive landscape and visual receptors; Keep heights below skyline - Locate visually intrusive material at the base of extraction to minimize the visibility of the mine face.	Proponent	750,000	From day 1 to decommissioning	- Suitable layout - Reasonable stockpile height - Trees and hedges - Heights below skyline
Biodiversity & habitats disruption; Flora & fauna	- Retain existing trees at the boundary and plant more indigenous vegetation - Establish buffer zones around sensitive ecosystems; controlled access; avoid ecologically sensitive areas; development of biodiversity management and wildlife conservation plans; progressive rehabilitation with native plant species	Proponent / land proprietor	20,000	Continuous throughout the project cycle	Trees and other vegetation

Solid waste, Mine wastes and tailings	- Minimize mine waste at source by adopting optimal production technology; sound management of tailings - Use waste to ameliorate the impact of workings on the landscape through use in screening banks, backfilling, replication or simulation of natural landforms and to prepare ground for re-vegetation and restoration. Soil materials should be stored in a manner that protects their physical, chemical and biological aspects until required for restoration & rehabilitation - Proper storage of new and used oil, grease and fuels. Machinery should be maintained in designated area outside the site - Reduce mine wastes and tailings as well as other types of waste and segregate. Pile mine waste at the site for use in restoration while other wastes should be handled as per the waste Regulations with a bias towards recycling & reuse - Wastes should be disposed as provided by Waste Regulations and the Sustainable Waste Management Act, 2022	Proponent	200,000	Continuous throughout the project cycle	- Minimal wastes - Waste records
Ground and surface water contamination	- Avoid oil/greases and fuel & chemical leakages/spills; avail spill kits and spill management plan - Avoid excavations to the water table level & lining of tailings storage areas - Install wastewater treatment system(s), lined settling ponds & proper fuel & chemical storage to prevent spills; regular surface & ground water monitoring	Proponent	1,000,000	Continuous throughout the project cycle	- No leakages - excavations above water table level

Public health, occupational health and safety	• Train workers on occupational health and safety • Proper pit design & stabilization • Provide full protective gear & workmen's compensation cover in addition to the right tools and operational instructions & manuals • Adopt sound waste management system • Provide sanitary facilities & access to clean water • Engage the services of qualified personnel and/or ensure training especially in charge of blasting • Ensure use of standard practice and materials • Ensure machinery and equipment servicing and maintenance as per schedules & legal requirements • Ensure adherence to OSHA Abstract & provide material safety data sheets; regular medical examinations • Provide fully equipped First Aid kits; train staff on its use & Develop emergency response plan • Phased out & progressive rehabilitation of mined areas to reduce pits & related risks	Mine foreman/proponent	200,000	On commencement	• Appropriate PPEs • Training records • Compliance with OSHA requirements
Fly rock, Overpressure and ground vibration	• create a controlled space where people/animals are either excluded or protected if need be • operation should be supervised by a person with knowledge of explosives, blast design, controlled drilling and careful observation of mine faces, and adherence to accepted blasting practices • setting-out and drilling of blasts should be as accurate as possible • correct stemming will help control overpressure and fly rock • Avoid surface detonating cord or cover adequately. • Avoid blasting in adverse weather conditions	Mine foreman/Proponent	500,000	Continuous after commencement	• Qualified person in charge of blasting • Few incidences of fry rock & ground vibration
Constraints to infrastructure & services	• Use of state-of-the-art mining & processing technologies • Conservation of resources; use of renewable resources; rain water harvesting & storage; installation of solar energy systems	Proponent	1,000,000	Continuous	• Solar power systems • Water conserving taps
	• Use of recyclable materials; Installation of water conserving taps & facilities • Drilling of borehole subject to necessary approvals • Ensure electrical equipment, appliances and lights are switched off when not needed • Plan to provide for adequate natural lighting & ventilation				• & sanitary facilities • State-of-the-art equipment

ENVIRONMENTAL MANAGEMENT/MONITORING PLAN FOR THE DECOMMISSIONING PHASE

Expected Negative Impacts	Recommended Mitigation Measures	Responsibility Party	Time Frame	Cost (ksh)
1. Machinery/structures & wastes				
Scraps and other debris on site	• Use of an integrated solid waste management system i.e. through a hierarchy of options: recycle, re-use • Wastes generated as a result of mine decommissioning activities will be characterized in compliance with standard waste management procedures. Disposal locations will be selected by the contractor based on the properties of the particular waste stream. • All buildings, machinery, equipment, structures and tools that will not be used for other purposes should be removed and recycled/ reused say in other projects • Where recycling/reuse of the machinery, equipment, implements, structures, tools and other waste is not possible, the materials should be disposed to approved dumpsites.	Proponent	One-off	1,000,000
Potential Pollution	• procedures for finding contaminated material during excavations will be established • covering and damping of excavated materials • appropriate storage of contaminated material if found. Ground contamination and storm water contamination will be limited on site by proper handling and storage of materials and equipment.	Proponent	One-off	500,000

2. Rehabilitation of project site				
• Vegetation disturbance • Land deformation: soil erosion, drainage problems • Restoration of site	• Backfilling of all the depressions and the mine with overburden, soils and mine waste • Implement an appropriate re-vegetation programme to restore the site to its original status • During the re-vegetation period, appropriate surface water runoff controls will be taken to prevent surface erosion	Proponent	One-off	3,000,000
	• During the re-vegetation period, appropriate surface water run off controls will be taken to prevent surface erosion; • Monitoring and inspection of the area for indications of erosion will be conducted and appropriate measures taken to correct any occurrences; • Fencing and signs restricting access will be posted to minimize disturbance to newly-vegetated areas; • Carry out soil tests foe contaminants & if need be scoop out any contaminated soils and replace with uncontaminated soil from another source Comprehensive Landscaping			
3. Safety of the project				
Occupational hazards	• Ensure that occupational and health safety measures have been effectively integrated and positioned in respective areas of the project to control and manage safety and health risks	Proponent	One- off	250,000

4. Safety and Social-Economic impacts				
• Loss of income • Reduced ability to support dependants • Loss of quality of life • Loss of benefits i.e. medical, insurance cover etc	• The safety of the workers should surpass as a priority of all other objectives in the decommissioning project • Adapt a project – completion policy: identifying key issues to be considered. • Assist with re-employment and job seeking of the involved workforce. • Compensate and suitably recommend the workers to help in seeking opportunities elsewhere. • Offer advice and counselling on issues such as financial matters. • Encourage workers to register with retirement benefits scheme of their choice	Contractor, Proponent/property manager	One- off	5,000,000

CONCLUSION AND RECOMMENDATIONS

The desire to implement any project is normally driven by the potential foreseeable/predicted benefits. However, all human activities are associated with some shortcomings whether significant or insignificant thus the need for subjecting to the EIA process is to identify potential negative impacts with the intention of avoiding them at the design and planning stage or if not possible; provide for appropriate remedies or compensation.

The proposed project has various many benefits as indicated herein the body of this report notably the income cash flows to the proponent, employment creation, production of rare earth elements for use in technological advancements and green energy promotion, reduction reliance on the current world producers, opening up the area and infrastructure improvement among others. These benefits notwithstanding, the proposed project will bring forth some negative impacts such as disturbance and interference with wildlife habitats, damage to grazing land for livestock and wildlife, increased dust (air pollution), noise, health and safety risks, pressure on existing infrastructure, potential pollution to water and soil, visual intrusion and landscape effects, removal of vegetation and increased waste (solid and liquid) generation among others.

The proposed project design should integrate mitigation measures with a view to ensuring compliance with the applicable laws and procedures in the operations. All activities should be conducted as per the laid down legal framework and regulations particularly EMCA 1999, Wildlife Conservation Act, Mining and Minerals Act (Cap 306) and the Explosives Act (Cap 115). Throughout the proposed project cycle, sustainable environmental management should be ensured; avoiding inappropriate use of natural resources, conserving nature and guaranteeing health and safety of all people, working on the project, general public and inhabitants of the project. Mining of the deposits of rare earth elements in KNP may fragment the land and alter the ancient animal migratory routes (already affected by the human-wildlife conflict in the area). The mine's footprint is however not to be very expansive.

The proposed project site is a section severely affected by livestock overgrazing and past artisanal illegal mining. Specific migratory routes should be identified and a corridor maintained for connectivity. Mining should take a short duration and the land rehabilitated appropriately. Sustainable mining and best practices should be adopted to prevent land degradation. KWS and the proponent must positively engage the local community to prevent and minimize human – wildlife conflict for park restoration and conservation. Partnership and coming together of all stakeholders are crucial in developing an integrated management approach that facilitates both human and wildlife.

KWS and other stakeholders should work towards activities and engagements that will benefit the local community so that they can actively participate in conservation. Compensation and offsets for losses from conflicts is an incentive. Economic empowerment shall greatly reduce habitat destruction such as reduced activities of cutting down trees for charcoal burning and firewood. KWS and the proponent should initiate mass tree planting programs to restore the damaged areas. The focus should be on sustainable land use and management practices that benefit both humans and wildlife.

KWS and all stakeholders should identify the critical habitat and protection areas and source for funding. KWS should also engage the community and all stakeholders in all conservation programs and programs that provide livelihoods to the community.

At the same time, a proactive monitoring and evaluation program should be developed and implemented.

We also recommend that the proposed mitigation measures should be implemented. The project proponent should also work closely with NEMA, KWS, KFS, NGOs environmental Experts, the County & National government, Ministry of Mining and other agencies and stakeholders to enhance the facilitation of the issues of concern. This will also help in solving any problem arising and which may not have been foreseeable during the EIA study report. This will ensure that environmental concerns are integrated into the project at every stage of the project cycle. The various service providers e.g. power must assess the respective requirements of the project. Conservation of resources such as energy and water within the project should be encouraged. Sound operational practices aimed at environmental conservation should also be adopted and special attention should be paid to conservation of the environment. Wastes should be reduced to the minimum and the little generated should be disposed in accordance with the provisions of the waste regulations and the Sustainable Waste Management Act, 2022.

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ATTACHMENTS

1. Copy of Land lease agreement
2. Copy of BOQ
3. Copies of minutes of public participation meetings and lists of attendance
4. Copy of EIA licence for exploration