2024

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED LIMESTONE MINING MINERALS AND LIMESTONE CRUSHING SYSTEM (2 CLINKER LINES AND 30MW CPP) ON PLOT NO. KYUSO/NGAAIE/3420 WITHIN NGAAIE KYUSO, KITUI COUNTY,KENYA

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CERTIFICATION

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Acronyms and Abbreviations

NEMA	National Environmental Management Authority
EIA	Environmental Impact Assessment
EA	Environmental Audit
EMCA	Environmental Management and Co-ordination Act, (CAP 387)1999
EMP	Environmental Management Plan
EHS	Environmental, Health and Safety
CEMP	-construction environmental management plan
GI	Galvanized Iron
GOK	Government of Kenya
Ha	Hectares
SERC	Standards and Enforcement Review Committee
ISO	International Standard Organization
ITCZ	Inter-Tropical Convergence Zone
LR-	land registration number
Km	Kilometers
CGK-	County Government of Kitui
CO	Carbon Monoxide
PCPB	Pest Control Products Board
PRCP	-Progressive rehabilitation and closure plans
MSDS-	material safety data sheet
DOHSS	Directorate of Occupational Health and Safety Services
GOK-	government of Kenya.
KNBS-	Kenya national bureau of statistics
CO2	Carbon Dioxide
NOx	Nitrogen oxide
PPEs	Personal Protective Equipment's
Masl	Meter above sea level
WRA	Water Resources Authority

EXECUTIVE SUMMARY

This EIA report has been commissioned by Simba Cement Company ltd hereby referred to as the proponent that intends to carry out mining for Limestone Minerals in Kitui County. The need for this EIA study is to predict the potential impacts of a proposed project and propose feasible mitigation measures against the negative impacts while enhancing the positive impacts for coexistence and sustainability as the proponent proposed to advance to mining.

The proposed project involves three distinct and interlinked project stages i.e. the planning (site preparation), operation and decommissioning phases.

Project Objectives

The objectives of this project are outlined below.

Carry out Limestone mineral mining within Ngaaie area, Kitui County.

Construction of Limestone Crushing System unit. 2 Clinker lines and 30 MW CPP(Captive Power Plant)

Provide employment opportunities to area residents.

Generate revenue for the national and county government in form of levies and tax by remitting applicable levies.

The main positive impacts associated with the project were identified as

- The project presents numerous of direct and indirect employment opportunities throughout the entire project cycles,
- Wealth and revenue opportunities to both levels of government
- Acceleration of big four agenda –acceleration of manufacturing through Kenya Rich minerals exploitation.
- Technology transfer
- Boosting of support business opportunities in the project locality
- It was also observed that some manageable negative impacts may arise as well. The foreseeable significant negative impacts include;
- Loss of arable agricultural land that will be converted to mining area
- Soil erosion from the disturbed/compacted areas
- Pressure to the existing infrastructure and resources i.e. water, power, surface drains (increased storm water/ run off resulting from the surface compacting by machinery and as a result of decreased recharge areas), access roads that might be established among others,
- impact to soil (though very minimal) especially when quarrying and transport are done,
- Increased noise and vibration mostly during project implementation phase and enhanced potential for social crimes.
- Air pollution (dust particles emanating from excavation and construction activities and exhausts from the involved machinery (though of very small scale as much of the work is automated hence not labour

intensive), health and safety concerns especially to workers and immediate neighbours due to potential accidents, and also pollution (from vehicles, machinery & generator oils and fuels & the exhausts)

- Occupational health and safety concerns related to poor workmanship and poor standards may and chances of accidents
- Waste Generation –The activities will generate solid waste from the camp and its daily operations
- Transport related impacts especially during machinery mobilization and during transport of finished products to the port.
- Exacerbation of social crimes/ills

The proactive ESMP has provided various mitigation measures to ensuring compliance with applicable environmental laws and guidelines.

To minimize air pollution and soil disturbance/erosion, ensure soil compaction and watering of loose soils on all unpaved access paths/roads, parking areas, dust generating construction materials at the construction sites in addition to a dust-proof net around the camp site. Emission of noxious fumes should be avoided or minimized as possible.

To cater for surface drainage impacts, well-designed drain channels have been proposed to harmonize management of the resulting storm water within the project site.

To reduce noise pollution and excessive vibrations, portable barriers to shield compressors and other small stationary equipment where necessary should be installed; engines should be switched off when not in use; machineries well maintained, install silencers whenever possible and ensure that the work is carried out during the day.

To reduce traffic related impacts, Vehicle/machinery idling should be minimized/controlled. Encourage use of cleaner fuels such as low Sulphur diesel and unleaded gasoline. The maintenance should be conducted in appropriate and designated service bays (off-site) to reduce chances of contamination of environment by resulting oils and greases. Any of such oils should be collected and disposed appropriately.

To Manage OSHA related impacts, sewerage and sanitation system for the workers will be properly designed (using approved materials), installed and regularly maintained to effectively manage sanitary wastes and effluent as per water quality regulations standards.

In addition, a fire suppression system shall be designed and installed to manage risks, an adequately stocked First Aid Box will be provided and the employees will be properly trained on how to administer first aid.

Capacity building of the workers and staff was to create awareness towards potential risks and recommended preventive measures on identified risks through training will be done. An EHS policy will be formulated and implemented to ensure that health and safety measures are followed as per OSHA 2007 act and ISO guidelines.

Formal procedures will be put in place for energy and water saving to optimize their use.

Throughout the project cycle, sound waste management systems and procedures must be adopted.

To avoid water pollution, wastewater infrastructure shall be designed taking into consideration all aspects such as the estimated workers population, the peak volumes among others. All the materials should be of high

quality and to the specifications and intended to offer minimal impact to the receiver environment. Regular monitoring should be made during occupation phase to ensure efficiency and effectiveness of the environment management system. All workers should be provided with full protective gear (PPE) and they should be trained and sensitized on health, safety and environmental conservation aspects. The mining site should be fenced off during construction to keep off animals and the general public.

Effective emergency response plans should be adapted both during the entire project cycle. There should be a specific area for hazardous material storage. Strictly, the Building Code and other applicable building standards as may be in force must be adhered to and the OSHA must be enforced. An accident/incident record should be kept on site and under care of responsible person and a first aid kit(s) with all basic requirements and the in-charge be trained.

To prevent social crimes, the workers should be vetted during recruitment and should be closely monitored and movement out of site should be restricted. A complete fire suppression system shall be provided after completion of the project. The equipment should be clearly indicated in the design plan, and in the report. This should be installed or provided at strategic points of the camp site.

During the operation phase, the project manager should put in place effective and efficient waste disposal systems. Waste, including excavated soil though not likely to arise and debris should be properly disposed of by backfilling or dumping in approved grounds by the relevant government offices. The proponent should provide acceptable and standard sanitary conveniences to the workers during the entire project phase.

On completion, comprehensive landscaping should be done to upgrade the site to appropriate environmental standard for areas that are interfered with through the application of the progressive rehabilitation and closure plans.

The analysis of this study findings reveal that the benefits far outweigh the associated negative impacts (costs) and the benefits can further be maximized with strict adherence to the proposed mitigation measures (the EMPs) and closely working with environmental experts and other relevant professionals, NEMA, Kitui County Government and other relevant institutions throughout the project cycle. The importance of liaising is to ensure that variation in predicted impacts is handled appropriately during the project cycle otherwise the major concerns at any point in time should be focused towards avoidance or minimizing the occurrence of negative impacts. The ideal strategy to counter identified adverse effects of such as project is avoidance and whenever not be possible, alternative strategies of reduction, remediation, and compensation may be explored.

Summary of the key negative impacts and proposed mitigation identified are summarized as;

Negative Impact	Proposed Mitigation Measures
Solid waste	Disposal through county government or by authorized refuse handlers. Installation of solid waste bins at the camp site.
Socio-economic issues	Allow access to pasture land and watering points for community. Promote fairness in provision of employment opportunities to the local communities Obtain prior consent to individual land owners before accessing the land for mining operations Have a grievance redress committee setup None locals have respect to local cultures and practices Ensure security in and around prospective sites.
Risk of workers accidents and exposure to hazards during site installations	Proper supervision of construction personnel by a qualified consultant taking into consideration general sources of pollution and mining waste. Ensure strict compliance to OSHA (2007 and EMCA CAP 387 and associated regulations). Proper maintenance of the machinery, equipment and provision of protective gear to the workers during scooping and drilling to minimize or prevent accidents and to ensure workers health and safety.
Risk of workers accidents and exposure to hazards during operations	Personnel training, equipment maintenance, testing, inspection and provision of suitable PPEs. Ensure strict compliance to OSHA (2007) Establish occupational health and safety committee.
Traffic and safety implications	Safety and observation of speed limited for restricted areas. Material not to be heaped on road reserves.
Waste water generated	To be managed as per water quality regulations 2006 and public health guidelines

Surface water/subsurface water pollution	Ensure minimal excavations and complications. Safe systems of work and engineering procedures
Fire and accidents occurrence	Avoid careless lighting of fire to avoid bush fires Safe systems of work Installation of enough fire suppression and containment equipment i.e. fire extinguishers at the camp site Regular training of the personnel to handle fire emergences.
Loss of aesthetics value as a result of increased excavation	Avoid opening up haphazard access roads and path ways Tree cutting and natural vegetation interference discouraged Do excavations on intended site only as last result Landscaping the site after drilling or excavations
Health impacts	Improvement of the health facilities in the local dispensary by the county government Have a HIV/AIDS awareness programmes
Air pollution	Ensure safe systems of work Proper servicing and maintenance of machinery Adopt cleaner production technologies such as use of green energy Application of dust suppressant during scooping/ drilling Watering of dust areas such as access roads

Recommendations

The study also considered various options for the project and settled on the best alternative for the use of land i.e. the mineral mining alternatives that in the interest of sustainable development, and of benefit to the local community the county government and the national government at large. In conclusion it was recommended that the project should be executed as the benefits identified were favorable and far outweighed the negative impacts when the implementation of EMP advanced herein is implemented fully.

CHAPTER ONE: INTRODUCTION

This EIA study report has been commissioned by Simba Cement Company ltd hereby referred to as the proponent who intends to carry out mining for Limestone Minerals in Ngaaie area Kitui County. The need for this EIA study is to predict the potential impacts of a proposed project and propose feasible mitigation measures against the negative impacts while enhancing the positive impacts for coexistence and sustainability as the proponent proposed to advance to mining. The need for EIA study was also informed by the Environment (Impact Assessment and Audit) Regulations 2003 (Amendment) 2019.

1.1 Background and Rationale for the EIA.

Kenya is in the process of getting industrialized. This comes with urbanization, industrial and population growth and as a result various challenges have been witnessed. The notable environmental problems emerging from the above are pollution due to the cumulative discharge of residuals (gaseous, liquid and solid waste) into the environment and destruction of ecosystems for agricultural and residential development.

For this purpose, all activities which are carried out to achieve these developments must take into account the needs of environmental conservation for the principle measure of sustainability. This is guided by Environmental Management and Coordination Act (EMCA), cap 387. The Environment (Impact Assessment and Audit) Regulations 2003, (Amendment) 2019 stipulates that either comprehensive or summary Environmental Impact Assessment (EIA), be carried out on all the projects listed in the Second Schedule. The proposed project is collaborated by the ever-growing demand for industrial minerals exploration in Kenya and with growing economy worldwide that has aggravated demand among others. Besides, the project brings forth various advantages as discussed elsewhere in this report. The rationale for the EIA study 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 taking into account all predictable outcomes and adequately providing for them for sustainability.

The purpose of the study is to identify foreseeable potential impacts (physical, ecological and cultural/socioeconomic) so as to enhance the benefits and at the same time avoid negative impacts (costs) or provide appropriate cost-effective measures to remedy the negative impacts that cannot be completely avoided. Integrating Sustainable Environmental Management principles in the Planning, implementation and throughout the project cycle is vital in reducing/mitigating conflicts and enhancing environmental conservation.

1.2 Objective of the EIA report

The main objective of this report is to provide decision makers with an indication of the likely environmental consequences of the proposed activity. While the specific objectives include:

- To identify and evaluate the significant environmental impacts of the project.
- To evaluate the impacts of the various alternatives on the project
- To propose mitigation measures for the significant negative impacts of the project on the environment.
- To express views and concerns of all stakeholders in regard to the proposed project.
- To incorporate Environmental Management and monitoring Plan (EMMP).

1.3 Overall objective of the project

The proponent intends to mine the available Limestone deposited in Ngaaie area, Kitui County.

1.4 Terms of Reference (TOR)

The TORs for this Project Report is the production of an EIA report to address the effects and impacts (Positive and Negative) of the proposed Limestone mineral mining activities. The experts are under instructions from the project proponents to do a thorough environmental assessment before commencement of the project. This report addresses the following key specific objectives:

- Assessment and description of location/site, objectives, scope, nature of the proposed project.
- Analysis of the proposed project activities during the proposed project cycle; construction, operation, decommissioning phases.
- Establish the suitability of the proposed project in the proposed location, Analysis of the designs, technology, procedures and processes to be used, in the implementation of the works,
- To review existing legal and institutional framework related to the proposed project development.
- To collect and collate baseline information relevant to the proposed mining activities.
- To collect primary data through the public participatory process.
- To identify and assess positive and negative impacts of the proposed project and develop mitigation measures for the negative impacts.
- To identify and analyse alternative options for the proposed project.
- To design an Environmental Management Plan (including cost estimates and the responsible party) and a monitoring framework for the environmental impact of the project.

1.5 Content of report

The report provides the following

- Nature of project
- The location of the project including the physical area that may be affected by the project's

activities.

- The activities that shall be undertaken during the project cycle: construction/installation, operation and decommissioning of the project
- The materials to be used, products and by-product including waste to be generated by the project and the methods of disposal.
- The potential environmental impacts of the project and mitigation measures to be taken during and after the implementation of the project.
- An action plan for prevention and management of possible accidents during the project cycle
- A plan to ensure the health and safety of the workers and the neighboring communities.
- The economic and social cultural impacts to local community and the nation in general
- Any other information that the proponent may be requested to provide by NEMA.

All these aspects will be considered accordingly. This report also seeks to ensure that all the potential environmental impacts are identified, and that workable mitigation measures, management and monitoring plans are adopted. The report also seeks to ensure compliance with the provision of EMCA Cap 387, and Environmental (Impact Assessment and Audit) Regulations 2003, (amendment 2019) as well as other regulations. The report emphasizes the duties of the proponent and contractor during the establishment phase, the operation phase and decommissioning of this project.

1.6 Methodology

1.6.1 Introduction

This EIA study was divided into three phases; deskwork studies and analyses, fieldworks (for scoping and full EIA study) and stakeholders' consultations. The methodology used in this EIA followed these steps during the inception phase (debriefing), scoping phase and project report (or impacts assessment) phase. The EIA process specifically involved the methods presented below.

1.6.2 Environmental Screening.

Environmental screening was carried out to determine whether an EIA study is necessary for this project and at what level of evaluation. This took into consideration the requirements of the Environmental Management and Coordination Act (EMCA), Cap 387, and specifically the Environment (Impact Assessment and Audit) (Amendment) Regulations, 2019 second schedule of EMCA that requires a comprehensive or Summary project report be done before implementation for high, Medium and low impact projects.

1.6.3 Environmental Scoping.

The Scoping process helped narrow down onto the most critical issues requiring attention during the assessment. Environmental issues were categorized into physical, natural/ecological and social,economic and cultural aspects. Impacts were also classified as immediate and long-term impacts.

1.6.4 Desktop Study.

This involved review of project documents, relevant policy, legal and institutional frameworks. Documents

containing climatic, demographic and hydrological data for the Ngaaie area and Kitui County were also relied upon.

1.6.5 Site Visits and Public Participation.

Field visits were meant for physical inspections of the project site in order to gather information onthe state of environment. The study also sought public opinion/views through Consultation and Public Participation (CPP) exercise by pubic Baraza and administering Questionnaires to the public and interviews with the locals. The Baraza minutes, attendance list and questionnaires have been included in this report (annexed).this was conducted on 30.05.2024.

1.6.6 Reporting

In addition to constant briefing on the environmental aspects and impacts pertinent to the project, this Environmental Impact Assessment Project Report was prepared and shared with the client. The contents were presented for submission to NEMA as required by law.

CHAPTER TWO: BASELINE INFORMATION OF THE PROJECT SITE.

This chapter has information on the location, bio- physical, socio and economic aspects of the project has been elaborately discussed in order to identify areas likely to be affected as a result of project activities.

Fig: Limestone mineral exposed at the proposed site in Ngaaie

2.1 Geographic Location

Kitui County is the sixth largest County in Kenya by land area. It is situated in the Eastern part of Kenya, with its headquarters at Kitui town, about 160 kilometres from Nairobi City. The County is resource rich with commercially viable coal reserves in Mui Basin. Other mineral resource includes , iron ore and sand. Forty-six (46) percent of the Tsavo East National Park is in Kitui County and has a great heritage with great untapped tourism potential. Permanent rivers, namely, Tana and Athi flow through the County. The County is divided into eight (8) sub-counties namely, Kitui Central, Kitui West, Kitui East, Kitui South, Kitui Rural, Mwingi North, Mwingi Central and Mwingi West. It is further subdivided into forty (40) wards. (CIDP Kitui County 2018-2022).

2.2 Land and Land Use

The County has a total area of 30,496.4 km^2 of which; 6,369 km^2 of the County land consists of the Tsavo East National Park and is not available for agriculture, 14,137.2 km^2 is arable agricultural land and 6,364.4 km^2 non-arable land. Over 85% of the County's population lives in rural areas. The average population density is 44 persons/km^2 which is sparse. The average size of land holding in the County is 0.12 km^2 per person (12 ha per person).

Most people tend to settle at the foot of hills where agriculture is possible. Usually soil is eroded from the top of the hills and accumulated at the bottom. In this regard, the foothills have deeper soil that is suitable for growing crops. Urban and peri-urban areas also have high densities because of access to

social amenities. Kitui Central Sub County is the most densely populated, followed by areas around Mwingi Town. Kitui East Sub County is the least densely populated because it has drier climate Approximately over 46% of the County land falls in the arable category with 83% of the inhabitants lacking title deeds reason being that most of the land has not been adjudicated. Only about 25% of land owners in the County have title deeds. The process of land adjudication and registration has slightly improved and land owners are constrained with regards to securing investment loans from banks and Micro Finance Institutions (MFIs).

2.3 Physiographic and Natural Conditions

This section briefly describes the major physiographic and topographic features of the County, as well as the ecological and climatic conditions that influence settlement patterns and economic activities of the people in the county.

2.3.1 Physical and Topographic Features

The general landscape is flat and gently rolls down towards the east and northeast where altitudes are as low as 400 meters. The altitude of the Kitui County ranges between 400m and 1800m above sea level. The Yatta Plateau is in the western part of the County and stretches from the north to the south of the County between Rivers Athi and Tiva. The drainage pattern of the county is formed by one permanent river, a number of ephemeral rivers and streams which drain into Indian Ocean. The permanent river is Sabaki River while the seasonal rivers are Nzovuni, Rare, Goshi and Kombeni. The streams include Wimbi, Kanagoni, Masa, Muhomkulu and Mleji.

2.3.2 Climate

The County has an arid and semi-arid climate with rainfall distribution that is erratic and unreliable. However, the highlands namely, Migwani, Mumoni, Kitui Central, Mui, Mutitu Hills and Yatta plateau receive relatively high rainfall compared with lowlands of Nguni, Kyuso and Tseikuru. The lowest annual average temperature is 14 0C and the highest annual average temperature is 24 0C

2.3.3 Geology and hydrogeogy

(a). Geology and Soils

Kitui County has a topographic feature that is the narrow belt, which forms the coastal plain and varies in width from 3km to 20km. The coastal plain lies below 30m above sea level with a few prominent peaks on the western boundary such as Mwembetungu hills. Across this plain are several creeks with excellent marine swamps that are richly endowed with mangrove forests and present great potential for marine culture. This zone is composed of marine sediments, including coral, limestone, marble, clay stones and alluvial deposits that support agriculture.

(b). Hydro-geology. Water resources

The county is endowed with tremendous wealth of both surface and underground water resources. River Sabaki which is the largest river within the Athi River Catchment, along with Rare, Kombeni, Mwandeje and Nzovuni Rivers drain into the Indian Ocean at various points along the coastline. The catchment areas

and annual flows as shown in Table 1.24,indicates the tremendous potential that these rivers have for the construction of multi-purpose dams to meet the water demand of the population. Water pans and earth dams are mostly found in the arid and semi-arid parts of the county with 19.1% of the population in the county depending directly on water pans and earth dams for their water needs. Largely the surface water sources are unprotected and hence prone to contamination.

Name of river basin	Catchment area(Km2)	Annual rainfall (MM)	Annual flow (MCM/Y)
Mwarsuma/kombeni	422	961.4	19.1
nzovuni	749	913.4	27.0
Kufuloni/rare	6,138	690.1	191.7
sabaki	37,750	-	315.4
mwandeje	1,500	-	24.2

Annual flow of rivers in the county (source: coast water board, 2013)

2.3.4 Ecological Conditions

The county is divided into seven Agro-Ecological Zones (AEZ) defining areas with similar production related characteristics such as annual mean temperatures, vegetation and humidity. These zones include the following:-

Upper-Imdland3-4 Zone: This zone covers Kitui central, Kitui East, Mwingi West, and Kitui Rural and has the high potential for crop production in the county. The major farming activities in this area includes coffee, Maize, sunflower, Vegetables, sorghum, avocado, millet, sweet potatoes, cabbage and pawpaw. Upper midland 4 zone: this zone stretches to Kitui central, Kitui rural, Kitui west, Mwingi west and Mwingi north sub county. It has agricultural includes coffee, maize, sunflower, vegetables, Sorghum, Avocado, Millet, Sweet potatoes, Cabbage, pawpaw, banana, mango, fodder and pasture.

Lower-midland 3 Zone: The zone is of lower agricultural potential with annual precipitation. The area is suitable for dry land farming supporting drought tolerant crops and ranching activities. It stretches tp Kitui East and Mwingi North sub counties. The main agricultural development potential include cotton, dry land maize varieties, sweet potatoes and beans.

Other zones include low-midland 5, inner lowland 5 and inner lowland 6 which are distributed in Kitui central, Kitui rural, Kitui west, Kitui east, Kitui south, Mwingi central and Mwingi north. Most of the agricultural practice happening in these areas include livestock, sorghum, millet, dry maize varieties, folder and pasture, sunflower, ground nuts, cow peas and dolichos.

2.3.5 Mining potential

Kitui has vast mineral deposits whose full exploitation could significantly transform the county in terms of poverty reduction and economic development. Mineral deposits and other extractive products found in the county include coal, iron, sand, limestone and. Other minerals extracted include barites, galena, ballasts, rubies, pozzolana, gypsum and limestone (Kitui County Mineral Explorations Management Plan, 2015) Vermiculite has also been found in Kiimani and Mutomo areas within the county.

Type of mineral	Sites
coal	Mui-Zombe Basin
Iron Ore	timboni
Limestone	Mutomo, Ngaaie, mwingi, Kanziko,
Copper Carbonate, zinc and gold	Mithikwani, kwa vonza, kamuwongo
sand	Along many rivers and streams
gemstone	Kathua kanomdo
vermiculite	Mutomo
Others include - silimanite and gypsum deposites, - clay for bricks and ceramic making, - granites and phonilite deposites	

On-going activities

The huge mineral resources have attracted significant investments in the mineral and extraction industry in the county. Significant extractions of especially Limestone, sand harvesting and other mining activities is evident in different parts of the county. Several companies have invested in the county.

2.3.6 Environment and climate change.

The major threat in Kitui county is the climate related disasters which include; Drought, Floods, Diseases and Conflicts. Climate change is thus associated with reduced rainfall, food insecurity, increased incidences of environmental diseases, all of which impact negatively on the health of the community and its ability to participate in productive activities. The effects of climate change are evident across all the sectors including livestock, crop production, environment and many others.

2.3.6.1 Infrastructure

Due to such rapid urban growth, provision of basic infrastructure for all has become an important concern for the towns' service providers and physical planners. Basic infrastructural services that have deteriorated due to such rapid increase in the number of town dwellers are: Solid Waste Management (SWM) system, water and sewage systems, drainage and flood protection, roads, mass transportation, electricity installations and telecommunication. Greater environmental pollution, congestion and other problems have been the result of under-provision of such basic services.

CHAPTER THREE: POLICY, LEGAL AND REGULATORY FRAMEWORK

3.1 Introduction

Policy refers to a general course of action or proposed overall direction that a government is or will be pursuing and which guides on-going decision-making. It is a statement of intent specifying what government wants to be done. Environmental policies cut across all sectors and government departments. While legal and legislative framework are set of rules and procedural within the law in this case pertaining the environment

3.2 Policy Frame work

3.2.1 Kenya Vision 2030

Kenya Vision 2030 is the country's development blueprint covering the period 2008 to 2030. It aims at making Kenya a newly industrializing 'middle income country providing high quality life for all its citizens by the year 2030. The vision has been developed through an all-inclusive stakeholder consultative process, involving Kenyans from all parts of the country. The vision is based on three 'pillars' namely; the Economic Pillar, the Social Pillar and the Political Pillar. The vision 2030 comes after the successful implementation of the Economic Recovery Strategy (ERS) for Wealth and Employment Creation 2003- 2007. The Kenya Vision 2030 economic pillar aims at providing prosperity of all Kenyans through an economic development programme aimed at achieving an average GDP growth rate of 10% per annum over the next 25 years from the year2008. The social pillar seeks to build 'a just and cohesive society with social equity in a clean and secure environment'. On the other hand, the political pillar aims at realizing a democratic political system founded on issue–based politics that respects the rule of law, and protects the rights and freedoms of every individual in the Kenyan society. The proposed Limestone project is in line with the economic and social pillars of Kenya vision 2030 and therefore its implementation will contribute to Kenya's realization of the objectives set in the Kenya Vision 2030.

3.2.2 National Environmental Action Plan (NEAP)

National Environmental Action Plan was a deliberate policy effort to integrate environmental concerns into the country's development initiatives/plans. This assumed a consultative and multi- sectorial approach. Such an approach ensured that environmental management and the conservation becomes integral in various decision-making platforms.

As a result of its adoption and implementation, establishment of appropriate policies and legal guidelines as well as harmonization of the existing ones have been accomplished and/or are in the process of development. Under the NEAP process, Environmental Impact Assessments were introduced targeting the industrialists, business community and local authorities.

3.2.3 African Development Bank Group Kenya Country Strategy Paper 2014-2018.

The Bank's Country Strategy Paper (CSP) 2014-18 for Kenya supports the country's ambitions and addresses its main developmental challenges by promoting job creation as the overarching objective. To achieve it, the CSP is articulated around the following two pillars: (i) Enhancing physical infrastructure to

unleash inclusive growth; and (ii) Developing skills for the emerging labour market of a transforming economy. Building on past achievements and deepening gains, this CSP is a continuation of the CSP 2008-13 that focuses on growth, employment creation and infrastructure development. However, it is innovative in that it mainstreams newly-emerging themes, such as green and inclusive growth, as well as structural transformation. It also mainstreams gender equality. Furthermore, the CSP reinforces the positioning of the Bank as a convener, knowledge-based institution and partner of choice of the government and other stakeholders. Although the Bank's contribution n to the country's overall development financing is small, its support can be catalytic and transformative when financing is combined with knowledge and expertise. To this end, the Bank will increase efforts to carry out high-quality analytic work to underpin both its and the government's investments, and engage in partnerships with Development Partners and the private sector to leverage funding, rather than acting as a sole financier. A mid-term review is foreseen for 2016 to assess progress made in the implementation of the CSP, program resources that become available to Kenya under ADF-14 and, if necessary, to adjust the strategy's focus for the remaining period.

3.2.4 National Policy on Water Resources Management and Development

While the National Policy on Water Resources Management and Development (1999) enhances a systematic development of water facilities in all sectors for promotion of the country's socio- economic progress, it also recognizes the by-products of this process as wastewater. It, therefore, calls for development of appropriate sanitation systems to protect people's health and water resources from institutional pollution. This implies that Industrial and business development activities should be accompanied by corresponding waste management systems to handle the wastewater and other waste emanating there from. The same policy also requires that such projects undergo comprehensive EIAs that will provide suitable measures to be taken to ensure environmental resources and people's health in the immediate neighborhood and further downstream are not negatively impacted by the emissions. As a follow-up to this, EMCA Cap387 of 2015 requires annual environmental audits to be conducted in order to ensure that mitigation measures and other improvements identified during EIAs are implemented.

In addition, the policy provides for charging levies on waste water on the basis of quantity and quality. The "polluter-pays-principle" applies in which case parties contaminating water are required to meet the appropriate cost of remediation. Consequently, to ensure water quality, the policy provides for establishment of standards to protect water bodies receiving wastewater, a process that is ongoing. The standards and measures to prevent pollution to water resources are provided for in the Environmental Management and Coordination (Water Quality) Regulations, 2006 which is a supplementary legislation to EMCA, 2015.

3.2.5 Policy Paper on Environment and Development (Sessional Paper No. 6 of 1999).

The key objectives of the Policy include: -

- To ensure that from the onset, all development policies, programmes and projects take environmental considerations into account,
- To ensure that an independent environmental impact assessment (EIA) report is prepared for any industrial venture or other development before implementation,

- To come up with effluent treatment standards that will conform to acceptable health guidelines.

Under this paper, broad categories of development issues have been covered that require a "sustainable development" approach. These issues relate to waste management and human settlement. The policy recommends the need for enhanced re-use/recycling of residues including wastewater, use of low or non-waste technologies, increased public awareness raising and appreciation of a clean environment. It also encourages participation of stakeholders in the management of wastes within their localities. Regarding human settlement, the paper encourages better planning in both rural and urban areas and provision of basic needs such as water, drainage and waste disposal facilities among others.

3.2.6 Guidelines on Mining

a) Guidelines on Exploration of Minerals

In regional land use planning, usable bedrock resources, their consumption and long-term needs should be taken into account. The areas for excavation should be indicated on the basis of an assessment of the natural landscape values, water and bed rock. The following are the guidelines for exploration of minerals in Kenya:

- Undertake an EIA before any mining procedure starts.
- Maximum area of exploration should not exceed the recommended size by law
- Maximum duration of exploration should not exceed the period specified by law
- In case of trenching and pitting, rehabilitation should be done as recommended in EIA/EA Action plan.
- Time must be indicated as to when rehabilitation starts after exploration ends.

b) Guidelines on Mining (Exploitation)

The following are the guidelines for exploitation of minerals in Kenya:

- Undertake an EIA before mining starts with clear EMP, SIA and adequate compensation mechanisms for the local communities
- The Mode of mining should be based on type of mineral, safety, existing land uses, ecological sensitivity etc.
- Appropriate technology must be used to increase efficiency, control dust, noise and vibration to acceptable levels
- Toxic by-products should be properly managed so as to avoid adverse environmental impacts
- Wastes should be disposed in designated disposal sites

- Sanitary facilities should be provided in mining sites
- Transport of mining products should follow designated roads
- Encourage benefit sharing with the communities.
- Maximum duration of Mining should not exceed the maximum recommended period by law (Mining Act 2016).
- Disused mines should be rehabilitated according to EMP where applicable or as per restoration provisions under EMCA cap 387.

c) Guidelines on Artisanal (small-scale) Mining

The following are the guidelines for artisanal mining in Kenya:

- Intensive small-scale mining should be done in designated areas.
- The Government should facilitate EIA in the designated areas and provide disaster vulnerability profiles for mining sites
- Persons engaged in small scale mining should be encouraged to operate as organized groups and vetted to ascertain capacity to mine i.e. skills, equipment and finances among others
- Disused mines should be rehabilitated according to EIA/EA/EMP where applicable or as per restoration provisions under EMCA, cap 387.

3.3 Legal and Legislative Framework

3.3.1 The Constitution of Kenya, 2010

Article 42 of Chapter 4 of the Constitution of Kenya on the Bill of Rights, confers to every person the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative measures, particularly those contemplated in Article 69, and to have obligations relating to the environment fulfilled under Article 70.

Chapter 5 (part 1) of the new constitution dwells on land, outlining the principles informing land policy and land classification as well as land use and property. Part 2 of the Chapter directs focus on the environment and natural resources. It provides for a clear outline of the state's obligation with respect to the environment. The proponent shall;

- *Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;*
- *Encourage public participation in the management, protection and conservation of the environment;*
- *Establish systems on environmental impact assessment, environmental audit and monitoring of the environment; Eliminate processes and activities that are likely to endanger the environment; and,*
- *Utilize the environment and natural resources for the benefit of the people of Kenya.*

3.3.2 Environment Management and Co-ordination Acts, Cap 387 Laws of Kenya

According to EMCA Cap 387 section 58 and 138, all proposed projects that are likely to have significant impact on the environment according to the Second Schedule will undergo an Environmental Impact Assessment (EIA) while projects already in place will undertake annual Environmental Audits (EA). In its preamble, the Act states that every person in Kenya has a right toa clean and healthy environment. According to section 58 of the Act, the environmental (Impact Assessment and Audit) Regulations 2003, amendment) 2019 all new enterprises and projects must undergo Environmental Impact Assessment (EIA). The EIA study report is submitted to the National Environment Management Authority (NEMA) in the prescribed form. It is in line with this provision that the proponent appointed EIA experts to undertake an Environmental Impact Assessment and prepare a report in respect of the proposed project. This addresses the requirement as the project activities are likely to have negative environmental impacts. This will ensure the Proponent observes continuous improvement on environment, health and safety management and takes appropriate measures to mitigate any adverse impacts to the environment and the surrounding communities that the project may have during its implementation and operation.

Part VII, Section 68 of the same Act requires operators of projects or undertakings to carry out environmental audits in order to determine level of compliance with statements made during the EIA. The audit report should be submitted to NEMA.

Compliance.

The client has initiated the consultant to undertake the environmental impact assessment for the proposed project. An Environmental Audit report ought to be submitted in the first year of operation to confirm the efficacy and adequacy of the Environmental Management Plan.

3.3.3 The Mining Act, 2016

The purpose of the Act is to give effect to the provisions of Article 60 of the Constitution of Kenya, 2010 which sets out the principles of land policy. Plus, Article 62(1)(f) which provides that all minerals and mineral oils form part of public land and shall vest and be held by the national government in trust for the people of Kenya and Article 66(2) that requires parliament to enact legislation to ensure that investments in property benefit local communities and their economies. Also, Article 69 that sets out the obligations of the state with regards to the environment, in particular, the use of the environment in a sustainable manner and Article 71 of the Constitution which requires Parliament to enact legislation to ensure that investments in property benefit local communities and their economies.

The new Act seeks to provide clear guidance on mining activities in Kenya. It introduces amongst other things legalization of Artisanal Miners and Transparency and Accountability through use of the online mining cadastral portal for licensing and for management of mineral rights and permits. It also introduces community development agreements, mandatory for all holders of large scale mining rights, and sharing of royalties among the national government, the county governments and the local communities. The Act is intended to streamline the country's mining sector and open the gates for its development as well as ensure

environmental conservation and sustainable development in the mining sector. It also seeks to address the key gaps in the Mining Act of 1940 and align the sector to the latest global trends such as value-addition and the use of technology to spur investor interest. The Act has provisions to ensure the health and safety of persons working at the mines. It provides that the holder of a mineral right will comply with the Occupational Health and Safety Act, 2007 with regards to the safety of workers and mine operations. The Act embraces technological advancements by providing for a computerized mining cadastral and registry system which includes an online transactional facility to enable applications for the granting and renewal of mineral rights to be submitted online.

The Act establishes several institutions which in essence breaks the concentration of decision making in the office of the Cabinet Secretary.

These includes

National Mining Corporation

Mineral and Metal Commodity Exchange

Mineral Rights Board

Directorate of Mines and Directorate of Geological Survey

Compliance

The proponent has applied for a mining license from the director of mines. It is in this view that he has undertaken the EIA as this is one of the requirements for granting of the mining license.

3.3.4 Climate Change Act, 2016.

The act is established to ensure streamlining of climate change in all government programmes and development in the country. The proponent is thus ensured to employ measures that ensure environmental sustainability by among others minimizing or avoiding greenhouse gas emissions and deterioration of carbon sink

Compliance.

The client should ensure minimal emission of greenhouse gasses during operation. The machinery should be maintained and serviced regularly and on time to reduce emission.

3.3.5 The Occupational Safety and Health Act, 2007 (No. 15 of 2007)

The act requires all employers to register their workplaces by making an application to the Director of occupational Health and Safety Services before they start operations. The act also sets minimum standards that are to be maintained in such workplaces to safeguard health, safety and welfare of workers. All this is aimed at elimination of hazards from workplaces. The act further requires all workplaces to display the abstract of the act for all workers to read and remind themselves on how to protect themselves from hazards. The act also prohibits emission of dust, fumes or particulates into the atmosphere without proper treatment to prevent pollution or other ill effects to life to persons working in factories and property in addition; the act requires that no discharge should be made into the environment from factories and workplaces without proper treatment that renders them harmless to the environment. OSHA act also gives guidelines on first aids rules, handling of hazardous substances rules and noise prevention and control rules. In particular, the noise and prevention and

control rules of 2005 sets the minimum noise levels that should emanate from a facility to public/neighboring areas during the day or night.

Compliance

This act makes provisions for safety, health and welfare of all persons who shall be engaged in an occupation. This ensures the workers are protected and safeguarded against risks or hazards to safety *and health arising out of the proposed project activities. Administrative, Engineering and Human controls measures should always be put in place at all times so as to ensure safety and health of the workers at all times. This act and the delegated legislations provided by the same act will be used as guideline to ensure health and safety of workers is guaranteed. The client must provide PPE to its entire staff and insure them against accidents at workplace.*

3.3.6 The Public Health Act (Cap. 242)

Part IX section 115 of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires Local Authorities to take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable for injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 and include nuisances caused by accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbor rats or other vermin.

Compliance.

The client will be required to abide by these provisions throughout the mining operations. Specifically, the client must properly locate facilities for sanitary facilities. Provision of water and soap or other equipment for drying hands and their use should be done and supervised. All liquid wastes will be directed to the septic tank or exhausted to municipal sewer through NEMA licensed liquid waste handlers.

3.3.7 The Land Control Act, Cap 406

This law provides for the control of transactions of land, especially the machinery of the Land Control Boards. However, it is of environmental interest that one of the points to consider in granting or refusal of consent by the Board is what impact the transaction is likely to have on the maintenance or improvement of land use standards. Such a situation would constitute a basis for denying consent to a transfer or subdivision of any land. 13

Government land is land owned by the Government of Kenya under the Government Lands Act(Cap 280). This includes, for example, gazetted national parks and reserves. The Government Lands Act allows the President, through the Commissioner of Lands, to allocate any un-alienated Government land to any individual. In practice, such allocations have often been made without proper regard to social and environmental factors. Trust land is land held and administered by various local Government authorities as trustees under the Constitution of Kenya and the Trust Land Act (Cap 288). National reserves and local sanctuaries as well as county council forest reserves, fall under trust land. Individuals may acquire leasehold interest for a specific number of years in trust land and can be dispossessed by the local authorities should the need arise. Local authorities should retain regulatory powers over trust land. Private land is land owned by

private individuals under the Registered Land Act (Cap 300). On registration as the landowner, an individual acquires absolute ownership on a freehold basis. The use of private land may, however, be limited by provisions made in other legislation, such as Agriculture Act (Cap 318). For instance, to protect soils the clearing of vegetation may be prohibited or the planting of trees required. Land preservation orders issued by the Director of Agriculture can cover a whole range of other measures

3.3.8 Persons with disability (amendment) act 2015

Section 21 of the act states that Persons with disabilities are entitled to a barrier-free and disability friendly environment to enable them to have access to buildings, roads and other social amenities, and assistive devices and other equipment to promote their mobility. *The proponent will make such provisions on site.*

3.3.9 Spatial Planning act 2015

Section 18 of the Physical Planning gives the County Executive Committee member responsible for physical planning responsibility to- (a) formulating county and urban physical development policies, standards and guidelines which respect and accord with national policies and standards on physical planning; (b) supervision of the implementation of county and urban physical development policies, standards and guidelines; (c) enforcement of physical planning standards; and (d) development control.

The proponents is required to acquire all the necessary approvals with regard to the development before commencing the project.

3.3.10 National Construction Authority Act No. 41 of 2011

The National Construction Authority (NCA) was established under an Act of parliament to oversee the construction industry and coordinate its development. Section 15 (1) of the Act states that, "A person shall not carry on the business of a contractor unless the person is registered by the Board under this Act".

Section 24 states it clear that the Board established under the Act shall have power to suspend any contractor if such or: -

Is convicted of an offence under this Act;

Is found guilty of any act or omission amounting to improper, disgraceful conduct or gross professional misconduct, after due inquiry held by the Board; or

Has breached the regulations or by-laws of the Authority.

Section 25 (4) states that, "A contractor whose name has been deleted from the register under this section shall, with effect from the date of the deletion, cease to be registered for the purpose of this Act, and shall be obliged to immediately surrender to the Board the certificate of registration for cancellation". The proponent of the proposed project will therefore select a contractor who is registered with the National Construction Authority Section 31(1) states that

''The Minister may, by notice in the Gazette, impose a levy to be known as the construction levy on construction work carried out by persons registered under this Act'' and (2) states that

''The levy shall be in an amount not exceeding an equivalent of 0.5%, of the value of any contract whose value exceeds five million shillings.''

At the moment the levy has been suspended and the proponent is not going to pay any monies to NCA. Penal Code Act (Cap.63) Revised Edition 2009

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

Section 219 states that it is the duty of every person who has in his charge or under his control anything, that in the absence of care or precaution in its use or management, could endanger the life, safety or health of any person, to use reasonable care and take reasonable precaution to avoid danger. Whether the object is living or inanimate, moving or stationery, the individual will have been deemed to have caused any consequences which adversely affect the life or health of any person by reason of any omission to perform that duty. This therefore means that the proponent will have a duty of care under this Act as well as OSHA.

3.3.11 Hazardous Substances Rules, 2007

These rules were promulgated by the Minister of Labor on April 16th 2007 and apply to the Proponent as they are expected to handle chemicals that can potentially expose their employees to hazardous substances. The Rules state that the Proponent shall ensure that where chemicals come into contact with employees, the exposure limits set out in the First Schedule of the Regulations are not exceeded. Where employees may be exposed to two or more chemicals in the workplace the Proponent shall work out the combined exposure using the narrative given in the Second Schedule of the Regulations. The Minister of Labor is empowered to change the exposure limits given in the First Schedule of the Regulations.

It is the responsibility of the Proponent to ensure that all employees exposed to chemicals in the work place are protected adequately from exposure to hazardous substances that may be present in them using the hierarchy of hazard control methods. Such methods include elimination of the chemicals, substitution of the chemicals with less hazardous ones, engineering controls, administrative controls, use of PPE and emergency response planning. If engineering controls are applied, the Proponent will undertake the maintenance and testing of the engineering controls once every 24 months by a DOSHS licensed Engineering Controls Examiner who will submit his report to the Director DOSHS within 30 days.

Regulation 11 requires Proponents to ensure that their employees are adequately protected from radioactive substances. For example, if radiography is used to check the integrity of pipe welds the Proponent will be required to issue a permit to- work (PTW) for such work.

Regulation 12 – 15 requires Proponents to have a Hazard Communication program implemented at their workplace.

The Proponent is required to maintain an inventory of all MSDSs for the chemicals stored in their workplace. As a minimum the MSDS shall comply with the format indicated in the Third Schedule of the Regulations and will be disclosed fully to the employees handling the chemical by the Proponent. All unused, obsolete or expired chemicals must be disposed off in an environmentally sound manner. All

containers containing chemicals must be labelled appropriately as indicated in the MSDS for that chemical. Training of employees on the hazards associated with handling chemicals safely in the workplace will be provided at the Proponent's cost.

Regulation 16 requires the Proponent to monitor chemical exposure levels in the workplace annually by engaging a DOSHS registered Air Quality Monitor. The cost of the exposure monitoring survey will be borne by the Proponent. The Air Quality Monitor shall submit a report to the DOSHS Director within 30 days.

Regulation 19 requires Proponents that use hazardous chemicals in the workplace\ to subject those employees exposed to medical examinations in accordance with the requirements of Legal Notice 24: The Factories and Other Places of Work (Medical Examination) Rules 2005.

Occupational Health and Safety act (OSHA) 2007

The act requires all employers to register their workplaces by making an application to the Director of occupational Health and Safety Services before they start operations. The act also sets minimum standards that are to be maintained in such workplaces to safeguard health, safety and welfare of workers. All this is aimed at elimination of hazards from workplaces. The act further requires all workplaces to display the abstract of the act for all workers to read and remind themselves on how to protect themselves from hazards.

The act also prohibits emission of dust, fumes or particulates into the atmosphere without proper treatment to prevent pollution or other ill effects to life to persons working in factories and property in addition; the act requires that no discharge should be made into the environment from factories and workplaces without proper treatment that renders them harmless to the environment. OSHA act also gives guidelines on first aids rules, handling of hazardous substances rules and noise prevention and control rules. In particular, the noise and prevention and control rules of 2005 sets the minimum noise levels that should emanate from a facility to public/neighboring areas during the day or night.

Compliance

During operations, workers will be involved. This act makes provisions for safety, health and welfare of persons upon which provision of their protection will be based. This will protect them against risks or hazards to safety and health arising out of the proposed mining activities. Administrative, Engineering and Human controls should always be put in place at all times so as to ensure safety and health of the workers at all times. This act will be used as a guideline to ensure health and safety of workers is guaranteed. The client must provide PPE to its entire staff and insure them against accidents at workplace. Other compliance requirements of the act as follows;

The significant provisions of the act include;

Part II of the Act provides the General Duties that the Occupier must comply with in respect to health and safety in the workplace. Such duties include undertaking S&H risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences, etc. A number of sections under this part shall be applicable to the proposed project.

Part III of the Act provides the Administrative framework for supervision of the Act.

Part IV deals with the enforcement provisions that the DOHSS has been provided with under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of

OSH officers. This part of the Act will be mandatory for the Occupier to comply with for the proposed project. Part V of the Act requires all workplaces to be registered with the DOHSS. This part will be applicable for the proposed project as the Occupier will have to apply for registration of their project with the DOHSS on completion of the construction phase and before the operational phase of the project.

Part VI of the Act gives the requirements for occupational health provisions which include cleanliness, ventilation, overcrowding, etc. This part of the Act will apply to the Occupier especially during the operational phase of the project.

Part VII of the Act contains provisions for the safe operation of machinery and includes all prime movers and transmission equipment. Additionally, this part includes the safe operation of cranes, chains, ropes, lifting tackles, pressure vessels and their statutory examination by DOHSS Approved Persons. This part of the Act will apply to the Occupier during the operational phase of the project. Part VIII of the Act contains provisions for general safety of a workplace especially fire safety. This part of the Act will apply to the proposed project during the design, construction and operational phases respectively of the project.

Part IX of the Act deals with Chemical Safety. This will be applicable to the proposed project as it will handle and transport hazardous materials. The occupier will require MSDS sheets for all chemicals handled in the workplace including labelling all receptacles containing such hazardous materials.

Part X of the Act deals with the General Welfare conditions that must be present during the operational phase of the project. Such conditions include first aid facilities, supply of drinking water, etc.

Part XI of the Act contains Special Provisions on the management of health, safety and welfare. These include work permit systems, PPE requirements and medical surveillance. All sections of this part of the Act will be applicable to the proposed project during the operational phase.

Part XII of the Act deals with Special Applications such as platforms erected over water and workplaces where steam boilers or hoists and lifts are used. This part of the Act may not be applicable to the proposed project.

Part XIII of the Act stipulates the various fines and penalties associated with noncompliance of the Act. It includes those fines and penalties that are not included in other sections of the Act and will be important for the Occupier to read and understand the penalties for non-compliance with S&H provisions.

Part XIV of the Act is the last section of the Act and contains miscellaneous provisions which are not covered elsewhere. Most of the sections under this part of the Act will be apply to the proposed project and it in the interest of the Occupier to read, understand and ensure compliance with it. Some of the important subsidiary legislations which operationalize the Act and are applicable to the proposed project are described below.

The Safety and Health Committee Rules 2004

These rules came into effect on April 28th, 2004 and require that an Occupier formalize a Safety and Health (S&H) Committee if there are a minimum of 20 persons employed in the work place. The size of the S&H Committee depends on the number of workers employed at the place of work For the Proponent and Contractor, the Occupational Safety and Health Act and the S&H Committee Rules 2004 are important as they require compliance with the following measures:

Posting of an Abstract of the Factories and Other Places of Work Act in key sections of each area of the factory or other workplace;

Provision of first aid boxes in accordance with Legal Notice No. 160 of 1977;

Ensuring that there are an appropriate number of certified first aiders trained by approved institutions and that the certification of these first aiders is current;

Provision of a General Register for recording amongst other things all incidents, accidents and occupational injuries;

Appointment of S&H Committee made up of an equal number of members from management and workers based on the total number of employees in the company;

Training of the S&H Committee in accordance with these rules; vii. Appointment of S&H management representative for the Proponent;

The S&H Committee must meet at least quarterly, take minutes, circulate key action items on bulletin boards and send a copy of the minutes to the DOSHS head office.

Appropriate recordkeeping including maintenance of all current certificates related to inspection of critical equipment such as air compressors, lifts, pulleys, etc. Such inspections need to be undertaken by a competent person certified by DOSHS

3.3.12 The County Government Act, 2012

This law also requires public participation in the planning and development of a county. Section 105 (1) states that ‘’A county planning unit shall be responsible for – ‘’ and then sub-section (a) states ‘’Coordinating integrated development planning within the county; ‘’

Section 115. (1) States that ‘’Public participation in the county planning processes shall be mandatory and be facilitated through— ‘’

Part (b) states ‘’provision to the public of clear and unambiguous information on any matter under consideration in the planning process, including— sub-section (ii) states ‘’clear environmental impact assessment reports; ‘’ *This EIA is prepared to comply with this Act too.*

3.3.13 Water Act, 2016.

Part II, section 18, of the Water Act, provides for national monitoring and information systems on water resources. Section 73 of the Act allows a person with license (licensee) to supply water to make regulations for purposes of protecting against degradation of water sources. Section 75 and sub-section 1 allows the licensee to construct and maintain drains, sewers and other works for intercepting, treating or disposing of any foul water arising or flowing upon land for preventing pollution of water sources within his/her jurisdiction.

Compliance.

The proponent is the area water supply as none is in existence while liquid waste disposal (read soil and waste water) is to a wastewater treatment system. However potable safe drinking water shall be provided to workers through trucking. The proponent will be required to ensure that all wastes as a result of mining do not get into any surface or underground water body. Adequate wastewater management strategies should be put in place as per the NEMA waste management regulations of 2006. In addition, maintenance of fuel powered equipment and/or vehicles should be done off-site and at designated garages within nearby town.

3.3.14 Kenya Electricity Grid Code, 2008

Chapter 3 under Network Connection section 3.2.4 "Obligations of a consumer" requires a consumer to submit an application to connect in respect of new or altered equipment owned, operated or controlled by the consumer and enter into a connection agreement with a network service provider in accordance with clause 3.3 prior to that equipment being connected to the network of that network service provider or altered (as the case may be); (2) comply with the reasonable requirements of the relevant network service provider in respect of design requirements of equipment proposed to be connected in accordance with clause

3.4 and schedule 3.3; (3)

The proponent will therefore ensure that he adheres to these regulations and apply for connection to electricity from KPLC Ltd.

3.3.15 Work Injury Benefits Act 2007

This Act provides guideline for compensating employees on work related injuries and diseases contacted in the course of employment and for connected purposes. The act includes compulsory insurance for employees. The act defines an employee as any worker on contract of service with employer. This Act is triggered by the proposed project thus it is recommended that all workers contracted during the project implementation phase have the required insurance covers so that they can be compensated in case they get injured while working.

3.3.16 Occupier's Liability Act Cap. 34

The act regulates the duty that an occupier of premises owes to his visitors in respect of dangers due to the state of the premises or to things done or omitted to be done on them. It requires that the occupier warn the visitors of the likelihood of dangers within his premises to enable the visitor to be reasonably safe.

3.3.17 Kenya Roads Act, 2007

This Act protects against destruction of road and its accessories like culverts and drainage system. Section 50 (1) (a) of the Act states that "wherever road is damaged by reason of any vehicle passing over it in contravention of the provisions of any rules made by an authority made by this Act he

/she will be liable for the damage".

Compliance

The proponent will ensure the trucks are not overloaded in manner to damage the drainage utilities and culverts along access routes and main roads

3.3.18 Forest Conservation and Management Act, 2016.

The Act provides establishment, development and sustainable management including conservation and rational utilization of forest resources for socio economic development of the country. The Forest Act, 2015 was formulated and enacted to provide the establishment, development and sustainable management including conservation and rational utilization of forest resources for the socio-economic development of the country. The key role of formulating and enacting the Acts was to;

Ensure stabilization of soils and ground water thereby supporting agricultural activities. Protect water catchments areas and moderating climate by absorbing greenhouse gases. Provide the main locus of Kenya's bio diversity and major habitat for wildlife.

Provide essential raw materials for wood-based industries and a variety of non- wood forest products in addition to wood fuel.

The proponent shall devise measures meant to avoid degradation/destruction of significant forest vegetation.

Other Laws Related to Land and Natural Resources Management

Policies and legislation highlighting the legal and administrative requirements pertinent to this study and relating to land and natural resources, water management, forests and public health are briefly summarized below.

Lakes and River Act Chapter 409 Laws of Kenya: This Act provides for protection of river, lakes and associated flora and fauna. The provisions of this Act may be applied in the management of the project.

Wildlife (Conservation and Management) Act. The Act governs conservation of wildlife within and outside protected areas. It also supports community initiatives towards conservation and plays an advisory role to the local communities by providing regulations that enable the generation of optimum returns from wildlife. The policy, however, does not allow consumptive utilization of wildlife resources within the parks, only non–consumptive uses such as recreation and tourism.

The Workmen's Compensation Act Cap 236.

The National Hospital Insurance Act Cap

255. The National Social Security Fund Act Cap 258

The regulation of wages and conditions of employment Act Cap 229.

3.4 Regulatory framework.

This is mainly developed from EMCA 1999 (Revised 2015). They include:

3.4.1 The Environmental (Impact Assessment and Audit) Regulations 2003, (amendment)

2019 Section 4(1) requires that no proponent shall implement a project likely to have a negative environmental impact or for which environmental impact assessment is required unless environmental impact assessment has been concluded and approved in accordance with these regulations.

The proponents have initiated the process environmental impact assessment and this report is being prepared for submission and approval by the National Environment Management Authority before implementing the project.

3.4.2 Environmental Management (waste management) Regulation, 2006

The regulations are formed under sections 92 and 147 of the Environmental Management and Coordination (Amendment) Act, 2015. These regulations have the objective of ensuring sustainable management of wastes. Under the regulations, a waste generator is defined as any person whose activities produces waste while waste management is the administration or operation used in handling, packaging, treatment, conditioning, storage and disposal of waste. They emphasize on waste minimization, cleaner production and waste segregation at source. These regulations have classified various forms of waste and recommended appropriate disposal methods for each waste type (Part 11) and the proposed project will be required to comply with its requirements. Key stipulations pertinent to the proposed project include: -

Part 11 Section 1 prohibits the disposal of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle.

Part 11 Section 2 places responsibility of disposal of waste to the requirement of the regulations on the waste generator. In this case it will be the proposed project.

Part V Section 34 prohibits the disposal of pesticides or toxic substances other than at a designated site or plant approved by the authority. The proposed project will be required to comply with this because they are using anti-termite.

The proponent shall ensure that the disposal of waste and garbage adheres to the above set regulations

3.4.3 The Environmental Management and Coordination (water quality) Regulations, 2006.

These regulations were drawn under section 147 of the Environmental Management and Coordination Act 1999, (Amendment) 2015. Section 12(1) requires that every local Authority or person operating a sewerage system or owner or operator of any trade or industrial undertaking obtain an effluent discharge license as stipulated under the EMCA and shall comply with standards set out in the third and fourth schedule to these regulations. A discharge monitoring record shall be maintained. In accordance with the regulations, every person shall refrain from acts that could directly or indirectly cause immediate or subsequent water pollution and no one should throw or cause to flow into water resources any materials such as to contaminate the water. The regulation also provides for protection of springs, streams and other water sources from pollution.

Compliance

It is in line with these provisions that the proponent sought the services EIA/EA experts to undertake *an Environmental Impacts Assessment and prepare an EIA study Report in respect to the mining activities This addresses the requirement as the activities are likely to have associated negative environmental impacts such as water and air quality deterioration, noise and vibration, solid waste generation, waterborne disease outbreak and increased demand for power and water. This will ensure continuous improvement on environmental, health and safety management and takes appropriate measures to mitigate any adverse impacts to the environment and the surrounding communities that the project may have during its implementation and operation. The 7R's for waste management should always be adhered at all times during the project cycle.*

3.4.4 Environmental Management and Co-ordination (Noise and Excessive Vibrations) pollution (control) Regulations 2009

The regulations define noise as any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment. The regulations prohibit any person from making or causing to be made any loud, unreasonable, unnecessary or unusual noisewhich annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Article 13 2(d) of the regulations allows for construction work at night for public utility construction, construction of public works, projects exclusively relating to roads, bridges, airports, public schools and sidewalks, provided noise generated is not caused within a residential building or across a residential real property boundary where such noise interferes with the comfort, repose, or safety of the members of the public.

Compliance

The proponent will ensure that noise and vibration levels are within the required limits at any workplace. In this regard, he will ensure proper maintenance of machinery and equipment at alltimes. Adequate PPE's will be provided and their use enforced at all times when working

The second Schedule of the Regulations provides for the maximum permissible level of noise at construction sites.

	Maximum Noise level permitted (leq) in dB (A)	
Facility	Day (6.01am- 6.00pm)	Night(6.01 pm- 6.00am)
Health facilities, educational institutions, homes for disabled and residential areas	60	35
Other areas	75	65

Table 1: Minimum and maximum permissible noise levels

These measures will save the proponent the costs of applying for noise licenses from the Authority as under r*egulation 16 (1)* as stated below.

''Where a sound source is planned, installed or intended to be installed or modified by any person in a manner that such source will create or is likely to emit noise, or excessive vibrations, or otherwise fail to comply with the provisions of these Regulations, such person shall apply for a license to the Authority.''

3.4.5 The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009.

This law applies to management of wetlands and wetland resources in Kenya whether occurring in private or public land.

The Objectives of this regulation include-

- To provide for the conservation and sustainable use of wetlands and their resources in Kenya;
- To promote the integration of sustainable use of resources in wetlands into the local and national management of natural resources for socio-economic development;

- To ensure the conservation of water catchments and the control of floods;
- To ensure the sustainable use of wetlands for ecological and aesthetic purposes for the common good o all citizens;
- To ensure the protection of wetlands as habitats for species of fauna and flora;
- Provide a framework for public participation in the management of wetlands;
- To enhance education research and related activities;
- To prevent and control pollution and siltation.

Compliance

The proponent will ensure that no mining is carried out on any marshy areas, near rivers or any other water bodies. Adequate buffer zones will be maintained in line with Water Act of 2016.

3.4.6 Environmental Management and Coordination (air quality) regulation 2014.

The objective of the Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. It provides for the establishment of emission standards for various sources such as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, cap 387. It also covers any other air pollution source as may be determined by the Minister in consultation with the Authority. Emission limits for various areas and facilities have been set. The regulations provide the procedure for designating controlled areas, and the objectives of air quality management plans for these areas. The emission standards for mobile sources are however stipulated under KS 1515.

Compliance

The proponent will ensure any emissions from excavation or trenching equipment are within the stipulated levels through undertaking the necessary engineering and administrative control measures

3.4.7 The Environmental Management and Co-ordination (Controlled substances, access to and benefits sharing) Regulations, 2006

Part II on Conservation of Biological Resources states that a person shall not engage in activities that may • Have an adverse impact on any ecosystem. Lead to introduction of any exotic species which include species of plants or animal microorganism whose natural range does not or did not in the past exist in a specific part of, or the whole of Kenya and which out-competes any all other life forms. Lead to unsustainable use of natural resources including soils and water. Any person wishing to carry out such activities which may lead to the above must first obtain an EIA license.

Compliance

The proponent will comply with these acts by ensuring least disturbance of natural vegetation. In addition he should put in measures to re-vegetation affected sites and proper decommissioning of mining sites.

3.5 International Conventions and Treaties

Kenya has ratified or acceded to numerous international treaties and conventions. Those that have implications on the project are described below:

- Convention on biological diversity (CBD) 1993.
- *United Nations framework convention on climate change 1992.*
- *United Nations convention to combat desertification 1994.*
- Minamata convention
- Ramsar convention

CHAPTER FOUR: DESCRIPTION OF THE PROPOSED PROJECT

4.1 Introduction

This chapter gives the details of location, designs, nature and site layout/plan of the mining grounds. It presents the activities that will be involved during all stages of project; how wastes/by- products that will be generated from all project phases shall be handled as well as details on supportive resources i.e. man power and utility requirements.

Project Location Description

The proposed Limestone Mining site in Ngaaie mining will be as per the GPS Coordinates of the proposed sites as provided by the Mines and Geology department. The proposed Limestone mining project will target areas that have been found to contain substantial quantities of Limestone deports on the proposed land parcel. Below are the proposed location sites.

The project will also involve a construction of a Limestone Crushing System which will include,

Two (2) Clinker lines and 30MW Captive Power Plant

1.Stockyard to Block loading which will be used for loading Limestone.

2.Loading unit for the product

3.Limestone crusher

4.Crusher Systems.

The site can be viewed from the mining cadastral portal. The applied block measures about $2km^2$

The proposed mining block is defined by the GPS coordinates ;(attached)

Below; Fig: map of the sites for the Limestone mineral part of which defines the mining area

1. INTRODUCTION

Confirmation of control points and setting out carried out on Approx.430 ACRES. The land is located Off, THIKA –GARISA highway in NGUNI MWINGI West KITUI County.

Authority: CEMTECH LIMITED.

2. DATUM

Registry Index Map

2

4.1 Proposed Mining activity and Processing Technology brief

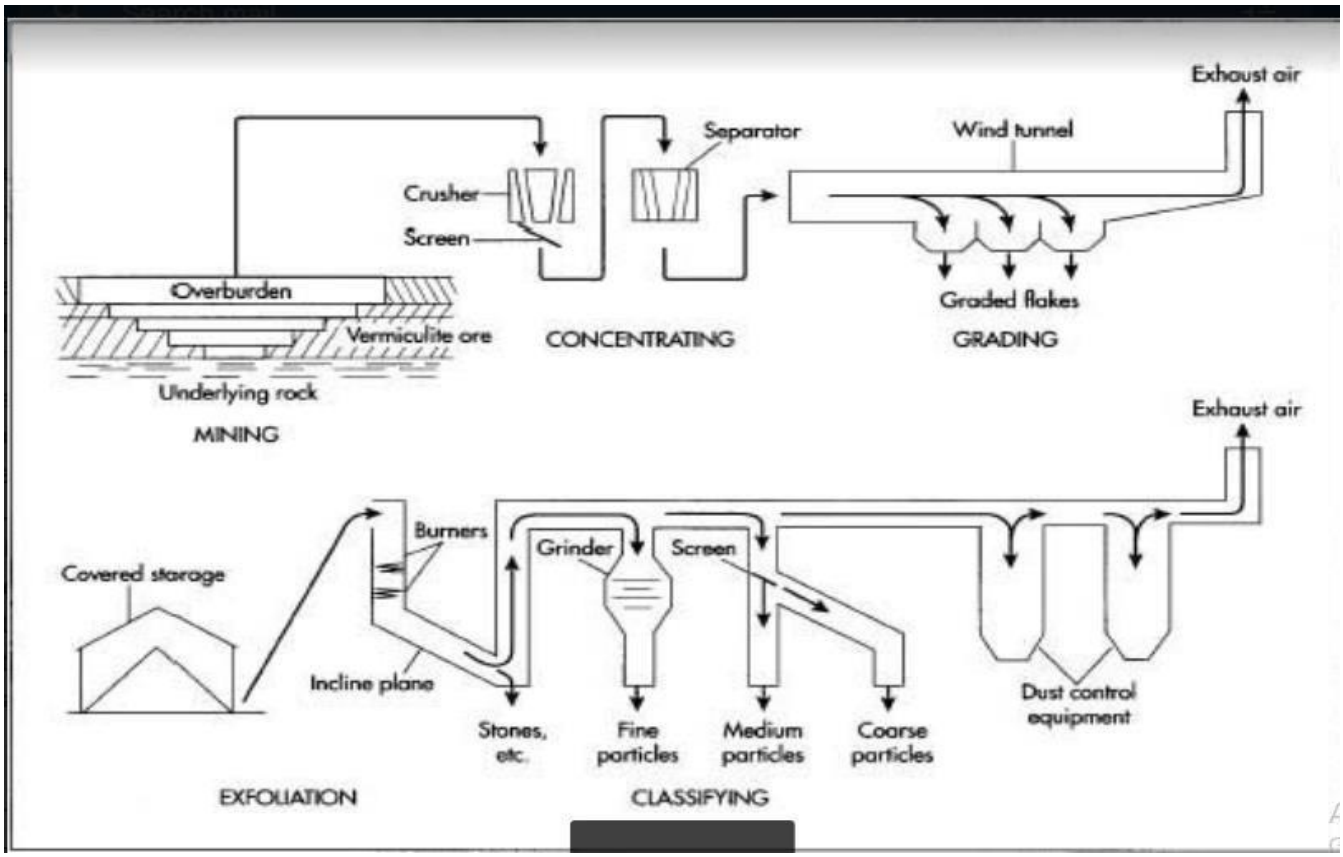
The proposed Limestone deposits are found at or near the earth's surface and will be mined by open pit methods or quarrying. In the proposed project the rocks containing Limestone are dug from a huge open pit in the ground. The soil on top of the rocks, called the overburden, is removed and the rock containing Limestone are extracted. The crude is loaded on trucks and transported to the processing or to stockpiles. The mining normally uses a combination of bulldozers, scraper-carriers, power shovels, and trucks to remove overburden and the crude material.

Processing Technology.

The particular Limestone being mined tends to form a high percentage of large flakes, the flakes are slightly crushed to delaminate them and reduce their size. The Limestone rocks are fed through a series of crushers and screens. The Limesone is separated from the surrounding rocks and dirt using sieving techniques. Other techniques may include froth flotation, gravity separations, winnowing, or electrostatic separation. In this techniques, the Limesone itself is trapped and separated from each and other materials until the resulting Limestone flakes are about 90% pure by weight. The Limestone flakes extracted from various sections of the mine may be blended together before further processing to ensure uniformity of the product.

The separated Limestone flakes are sorted by size. This is done with a series of screens or it may be done in a long enclosed wind tunnel. In the wind tunnel, the flakes are fed into the upstream end of the tunnel and are carried along the length of the tunnel by the flow of air. The larger flakes, being heavier, fall out of the air stream first and are caught in a hopper at the bottom of the tunnel. This separation by weight continues down the length of the tunnel until all the flakes are caught in hoppers.

By controlling the length of each hopper opening and the velocity of the air, the flakes can be sorted into various sizes, or grades, ranging from about 0.63 in (16 mm) down to about 0.02 in (0.8 mm) in diameter. The graded Limestone flakes are dumped into large plastic bags or other containers for shipping to various exfoliation plants.



Typical mineral processing illustration

Stage 1;

A screener is used to screen the mineral to different sizes.

Stage 2

After the screening, the ore enters the wind concentrator for beneficiation. This is a typical mechanical separation. Since the ore is very light compared to the overburden rocks and stone, wind power can easily separate the ore and stone.

Stage 3;

This step uses a gravity concentrator that adopts a mechanical gravity separation process. Its working principle is to push ores and stones forward. The stones with larger specific gravity will be thrown farther. The ores will stay very close to the machine because they are very light where they can easily have collected and bulked.

Stage 4

A small crusher crushes the ore to a diameter of less than 12cm where it is then packaged ready for sale

Pre-establishment and planning Phase

Before beginning of the operations, the ground has to be prepared. This involves clearing of a unavoidable vegetation such as shrub vegetation and grass. This project phase will also involve construction and installation of the campsite, processing machineries and systems, garage/transport parking area, generators and other associated equipment's and facilities on site.

The client will seek all approvals from the relevant approval authorities for the key installations during this phase. Other activities include

- Site reconnaissance and collection of geological information
- Community and stakeholders participation
- Environmental Impact Assessment
- Design/plan approval and licensing
- Relevant teams and consultants identification and mobilization
- Recruiting workers

4.1.1 Operation Phase

The proposed Limestone mining project will involve design and seeking approval of the campsites and processing site by relevant agencies, quarrying of the Limestone, separation of ore and classifying and shipping of the final product.

OPEN CAST QUARRYING.

The quarrying site will be cleared off any vegetation and materials not required. Once the surface is exposed, will be excavated using some combination of bulldozers, scraper-carriers, power shovels, and trucks to remove overburden and the crude material. It is important to note that explosives will not be used on site. The Limesone ore in the soil will be taken to the processing and grading area here it I crushed and graded according to the size the processing sites will be sited a close distance from the mining fields to limit impacts.

During excavation some of the activities include;

- Loading and transportation the product.
- Transportation of Limestone ore deposits to the processing site.
- General maintenance of equipment, machines, access road and the site
- Record keeping of the daily production, inputs, incidences and accidents.
- Haulage/transport of the mineral.
- Once the mineral are processed, they are classified and packaged for sale.

4.1.2 Decommissioning Phase

This phase will involve;

4.1.2.1 Demolition works for the camp site

4.1.2.2 Dismantling of equipment and fixtures and their removal from site

Site restoration through back filling of trenches and drilled sites with overburden for replenishment of the topsoil and re-vegetation

Maintenance of road drainage facilities and access roads.

Landscaping the site as per the recommendation of relevant authorities and planting of vegetation. 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.

4.2 Land Ownership

The proposed Limestone sites are located in Ngaaie area of Kyuso , Kitui County. The parcels of land to be mined are owned by Simba Cement Company Limited

4.3 Site Environment Characteristic and Vegetation

The vegetation on the proposed quarry site is mainly natural vegetation especially shrub,

4.3.1 Soil Types

The soil type at the proposed site is mainly not uniform with part having sand/rocky soils.

4.3.2 Air Quality

Limestone mining activities may have an impact on air quality especially during operation and loading of the product. This may impact negatively to workers and neighbors. The proponent will ensure all possible measures will be addressed including using wetting of dusty areas, planting screening trees along the site and providing workers with PPEs.

4.3.3 Noise Levels

The sources of noise are mining machine and vehicular movement at the site. Noise is also expected from the excavators at the site and other machinery. The proponent will ensure engine idling is discouraged so as to maintain conducive environment. The proponent will also operate during day time only in addition to providing adequate PPEs to workers.

4.3.4 Sensitive sites

There are few homestead in the far neighborhood. a buffer zone of about 50m from residential homes towards each of the prospective sites should be created so as to cushion this homestead from excessive vibrations and noise and related nuisances if ever present. In addition the processing site will be cordoned off or fenced so to keep any passersby away and ensure safety of passersby.

4.4 Infrastructures

The available infrastructures are roads and communication utilities which are relatively remote bur fairly reliable. The site is easily accessible from the main tarmac road .

4.4.1 Sewage

The mineral mining and processing sites will be fitted with bio-digester sanitation system for use as the vast area has no sewerage system while segregation of waste and proper disposal methods will be adopted.

Power and Energy

The area is relatively served by electric power and as well the proponent will install emergency backup of diesel power and solar generators to generation of energy to run the machines and light the compound respectively.

4.5 PROJECT INPUTS AND BY PRODUCTS

The project input includes the following;

Equipment

Geographic information system (GIS) technology

Mechanical excavators– removal of overburden soil on site and loading it to the trucks to transport to the processing site.

Drilling rigs for mineral tests

Vehicles to transport workers and collected samples.

Energy

Electricity, Solar, diesel will be used mainly by the machinery. And for lighting Materials

Warning signs and reflectors- to be placed at strategic points within the prospective sites so as to warn the public and keep off idlers

Water

Consumption by workers

Wetting dusty areas

Processing of the ore

4.6 PROJECT OUTPUTS AND BY-PRODUCTS WASTE

During the planning phase of the proposed project, several waste products are expected to be generated. These shall include:

a) General Site Waste

The workers are expected to be supplied with various forms of foodstuffs which may be packed in environmentally friendly plastic free or occasionally in plastics or other types of containers. These wastes are expected to occur within the site area and in the immediate vicinity. The management of such waste will need to be incorporated by the proponent in the Construction Environment Management Plan (CEMP).

Other forms of waste include sanitary waste and therefore the provision of sanitary facilities will need to be considered for the site construction workers

The project will generate waste from the site construction activities which includes:

- Excavated soils and vegetation;
- Limestone ore stockpiles
- Construction equipment and maintenance wastes;
- Dust and fumes;
- Scrap metals;
- Packaging materials, etc.
- Decommissioning Phase

By-products -However, the by-products during decommissioning phase will include: Metal generated from the decommissioning of camp site infrastructure; Foundation materials which can be donated to individuals for reuse

Waste

During the decommissioning phase of the proposed project, several waste products are expected to be generated. These shall include:

- Metals and plastics from infrastructure works
- Demolition wastes from the mining sites.
- Scrap metals; Dust
- The excavation activities will generate a considerable amount of dust and other particulates that will be released into the atmosphere.
- Smoke Emissions

The excavation machinery, equipment and trucks brought in by the contractor are expected to generate smoke emissions. The concentration of emissions will depend on the maintenance levels of the equipment, machinery and trucks used by the contractor.

4.7 Health and safety measures

The operations of the contractor should be well designed in nature to mitigate and or deal with Incidents and accidents. The project proponent and the contractor should take care of Health and Safety of the workers and the neighboring community by undertaking the following measures during construction:

Human traffic to be directed away from the excavated areas using appropriate signage.

Restricting activities to day time hours

All workers to be provided with suitable personal protective gear including overalls and safety boots.

Basic building materials such as sand, ballast and stones to be deposited in designated areas but away from human traffic and in a manner that will contain siltation.

Suitable solid waste containers for temporary accumulation of solid waste to be provided at strategic locations and workers encouraged to use them.

A standard First Aid kit will be maintained at the site throughout the construction phase to allow access by the workers in case of an Accident.

No idlers will be allowed access to the site at all times.

A record of incident and accident to be maintained on site.

4.8 Decommissioning EIA

To meet requirements of Environmental Management and Coordination Act 1999, (cap 387), the environmental assessment will consider the potential impacts of the project to:

Water quality and workers safety;

Socio- economic values

Quarry rehabilitation plan

Additional factors that will be considered on the likelihood of the project causing significant adverse environmental effects are:

Cumulative environmental effects, current land use and resources;

Effect of environment on project;

Accidents and malfunctions

Project decommissioning process /work will constitute:

Decommissioning EIA;

Decommissioning design;

Rehabilitation of quarry site;

Re-installation of machineries

Disposal of materials;

Clean up and rehabilitation of overall site-*see site comprehensive PRCP in annexes*;

Re-vegetation of former project area.

4.9 Project justification.

The proposed project is collaborated by the ever-growing demand for industrial minerals exploration in Kenya and with growing economy worldwide that has aggravated demand among others, thus the need for increase in the proposed facilities. Besides, the project brings forth various advantages as discussed elsewhere in this report making it a good project to benefit the proponent, community and the country at large.

The proposed project was justified based on the following considerations; Project Access to

transportation facilities-road and rail. The mining area location is in a rural setting. The project has access all-weather road that can be used for haulage of the processed minerals for export to the port of Mombasa through the main Kitui-Mombasa highway.

Expected social benefits: The mine has a service life of up to 15 years and potential to provide over 100 direct job opportunities and thrice the number of indirect employment opportunities. Due to the development of the local economy in mine development, it is expected that there will be 200- 300 other indirect job opportunities. The company promises to give priority to hiring workers from the local Sokoke /Nyari community, and at the same time, it can promote the economic development of local related economies. The company will also engage in CRS projects for the benefit of local community as well that will be prioritized by the local community liaison committee. Economic Benefits

Preliminary technical and economic analysis shows that the beneficiation process recommended by the laboratory beneficiation test is adopted. Which is economically viable and presents a favorable payback period to the local community, the investor and the government of Kenya-National and County. The project was found economically viable and thus recommended as guided by the findings of the prospecting report.

Sustainability of the mining operations

The mining site selection is entirely on a local economy that has remained underdeveloped, for centuries. The local community were dependent on mainly on subsistence agriculture and fishing This project thus presents a new leaf of hope in form of alternative livelihood source to the local community already disadvantaged by the vulgarities of climate change. The population density in the proposed mining area is low, mainly agriculturists. There are no significant designated cultural relic protection zones, nature reserves and tourist resource protection zones in the proposed mining area as the existing ones in the ward has been specifically excluded from the proposed mining sites

. Most of the mining area belongs to local community. The mineral excavation technology through open cast mining and utilization of mineral deposits have limited impact on the environment, and it is easy to restore and manage the mine after development. This eliminates blasting thus limiting disturbances to the local community as well. Energy efficient technologies shall be implemented at all project cycles. A rehabilitation plan and EMP annexed in the report provides assurance on project sustainability as well. Water reticulation system makes the process water efficient. Annual Water and energy auditing will be incorporated in the operation phase of the project.

Project viability

The project was geologically found viable based on the justification of the prospecting study report that was carried out in the area.

4.10 Proposed commencement period

The project is scheduled to commence immediately upon securing the authorization permits and licenses to quarrying/mining and processing works from Ministry of Mine and Geology, NEMA license and other relevant offices.

4.11 ANALYSIS OF ALTERNATIVES

The No Action Alternative

The No Action Alternative in respect to the proposed project implies that the status quo is maintained i.e. no mining activity to take place. This option is most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. However, the need for such development is high and the anticipated insignificance environmental impacts resulting from such mining has have already been experienced elsewhere. This option will however, involve several losses both to the project proponent, local community and the Kenya society and Government. The mineral will remain unexploited, under-utilized or neglected. The No Project Option is the least preferred from the socio-economic and partly environmental perspective since if the project is not done: -

The economic benefits especially during quarrying/processing i.e. provision of jobs for skilled and non- skilled workers will not be realized.

The social-economic status of Kenyans and local people would remain unchanged.

The local skills would remain under utilized

No employment opportunities will be created for Kenyans who will work in the project area.

Discouragement for investors to produce this level of project.

4.11.1 The relocation Alternative

Relocation option to a different site is an option available for the project implementation. At the moment, there are no alternative sites for the proposed development since the proposed sites were what has been found to contain Limestone deposits. In addition mining rights license by the ministry of energy issued to specific sites that are geospatially defined in the mining cadastral portal. Relocation by this particular proponent is not therefore feasible. This means that the proponent has to start prospecting afresh if relocation is proposed. Looking for another suitable land to accommodate the project and completing official transaction on it may take a long period and hence hinder the proponent from achieving the objectives Limestone mining in time. In addition, it is not a guarantee that such mineral would be available elsewhere. It's also worth noting that the said project is already underway in terms of seeking development approvals in various government departments. The project proponent would spend another long period of time on design and approvals of the plans by the relevant government departments. The project design and planning before the stage of implementation would call for costs; already incurred in the proposed mining activities i.e. whatever has been done and paid to date would be counted as a loss to the proponent. In consideration of the above concerns and assessment of the current proposed site, relocation is not a viable option. From the analysis above, it becomes apparent that the No Project Alternative is not the appropriate alternative to the local people, Kenyans, and the Government of Kenya.

The proposed location is the best option especially because the area is sparsely populated as well as presence of rich Limestone deposits. As well the materials conformity tests done for the site minerals performed satisfactory compared to other potential sites investigated. The material will thus be processed to quality minerals providing revenue to County and National government. The proponent has already obtained a consent to lease land for the project from the local community members with commitments for rehabilitation after use.

Alternative of relocating the proposed processing facility

The alternative of proceeding with the mining and siting the processing facility elsewhere was also considered.

However this option was ruled out based on the following considerations

- The area is ideal based on the scattered population thus less impacts to population
- The road infrastructure is other sites is poor that the transport of raw materials will be expensive
- The project will operate for a limited period as determined by minerals age and later, decommissioned and rehabilitated thus site for the processing will be temporary.
- The county hosting the mineral will lose on the benefits associated with siting the processing facility there
- Site rehabilitation will be expensive due to transportation of large volumes of overburden/ore elsewhere.

4.11.2 Alternative to Materials and Processing Technology.

The facilities will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. The equipment used are wheelbarrows, mattocks, excavators, spades, hoes, saws, elevated power operated trucks, back hoe trucks and dumpers. These are best suited for the work. All risky operations will be highly automated and mechanized to limit hazards exposure to workers. The campsite will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Energy and water saving devices should be given the first priority without compromising on cost. All the materials used should meet the Kenya Bureau of Standard requirements. Heavy use of timber during construction is discouraged because of the destruction of forest. Where possible, exotic species should be used in preference to indigenous ones during the construction phase.

The project proposes to employ open cast mining option as opposed to tunneling which is cheaper and poses less risks. Open cast mining also is less distractive as the mining fields can easily be rehabilitated after mining is over. The method also avoids the use of explosives associated with tunneling since it's only the overburden that is removed and later restored back and ground rehabilitated.

Alternative mineral processing method.

4.11.3 Solid Waste Management Alternatives.

Throughout construction, the project will produce wastes such as soil, wood chips, metal scraps and paper

wrappings among other. Wastes to be generated during operation phase are mainly waste soils and any other waste from the occupational areas. Thus, a solid waste management awareness program should be created. Recycling, re-use and compositing of the waste should also be considered. This would call for segregation of the waste depending on the waste type and material. Licensed waste collectors should then take the waste and dispose it appropriately. This will call for a source separation programme to be put in place. The recyclables will be sold or given out to waste buyers within the surrounding areas.

4.11.4 Alternative Land Use

Limestone mineral exploitation is the better land use than the proposed development as the land currently lying idle with no development taking place. This will project will be of financial of benefit to the land owner and the local community by improving their economic status.

4.11.5 Waste water management alternatives

The most suitable and available technology is discussed below: -

Alternative one: Connection sewer system, the most preferred alternative

Connection to a main sewer line will solve the waste water management issue at a very minimal cost and in an environmental efficient manner. The proponent cannot have a sewer connection at the moment since the area is not served with any sewer line and hence will connect to the second best.

Alternative two: Use of septic tanks

This involves the construction of underground concrete-made septic tanks to store the sludge with soak pit. This alternative is feasible at the moment and thus recommended as an alternative since the area is not served by a sewer line.

CHAPTER FIVE: ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES.

5.1 Introduction

Execution of projects poses various impacts some of which may be negative. It is in the interest of the proponent as guided by the lead expert to make sure the design of the project poses no adverse impacts to the environment. The nature of project proposed however poses insignificant negative impacts most of which are manageable using various mitigation strategies outlined in this chapter This Section identifies both positive and negative impacts associated within the Proposed Project. These impacts are identified at three distinct phases of the project i.e. Preparation and Construction Phase, Operation Phase and Decommissioning Phase. This chapter therefore outlines the present and likely negative and positive impacts associated with the project. The impacts may be direct, indirect, synergetic or cumulative.

Four factors need to be considered when assessing the significance of impacts, namely:

Relationship of the impact to temporal scales – the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.

Relationship of the impact to spatial scales – the spatial scale defines the physical extent of the impact.

The severity of the impact – the severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party. The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word 'mitigation' means not just 'compensation', but also the ideas of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.

The likelihood of the impact is occurring – the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur(e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.

Each criterion is ranked with scores assigned to determine the overall significance of an activity. The criterion is then considered in two categories; Effect of the activity and the likelihood of the impact.

The total scores recorded for the effect and likelihood are then read off the matrix presented to determine the overall significance of the impact either negative or positive. This section however gives much weight in the identification and proposition of mitigation measures of the significant negative impacts associated with the project .This has been discussed as follows;

5.2 Potential Environmental Impacts and Mitigation Measures.

5.2.1 Positive impacts of the proposed project

The following are the positive impacts of the proposed development.

5.2.1.1 Simulation of industrial development coherent with Kenya's Vision 2030

Mining ensures industrialization and development through the utilization of the country's mineral resources to catalyse diversified industrial development. This is in line with the Kenya Vision 2030 which aims at harnessing the mineral resources for industrial development and transforming Kenya into a newly industrializing middle income country.

5.2.1.2 Mitigating national and regional demand for metallic products

The establishment of the quarry will increase production of Limestone ore which will help mitigate the deficit in national and regional demand as well as provide adequate raw materials for various industries.

5.2.1.3 Creation of employment opportunities

This proposed project will provide short term and long term employment opportunities for various experts and person(s) that will be hired during the planning and implementation activities. This will include both skilled and unskilled personnel especially from the local population. Hence, the experts and the local community members will derive income from the project.

5.2.1.4 Source of revenue to the government

Both the County and National government will generate revenue in form of taxes generated during the acquisition of licenses and operations of the facility and also PAYE remitted from the employees' salaries.

5.2.1.5 Source of income to the proponent

The proposed facility through its operations will accrue income to the proponent enabling expansion of business and creating more employment opportunities for Kenyans.

5.2.1.6 Increased business opportunities

The large number of project staff required will provide ready market for various goods and services, leading to several business opportunities for small-scale traders such as food vendors around the site.

5.2.1.7 Land use intensification

The project will contribute to highly valuable use of land and thus diversify the revenue streams.

5.2.1.8 Improvement of local infrastructure

The area which is fairly developed will benefit from the improvement of local infrastructure so as to support the project activities thus benefitting the locals.

5.2.1.9 Spur housing facilities

The activities will create demand for housing for the workers engaged thus spur development of the nearby urban centres.

5.2.1.10 Enhanced Security

The project will enhance security in the area due to the installation of critical infrastructure in the area that will call for enhanced security. The security will thus benefit the locality.

5.3 Negative Environmental Impacts

Alongside the project benefits, there will are potential negative environmental impacts at the three phases of the project cycle. These are pre-establishment and establishment, operational and possible decommissioning phases. The proceeding sections discuss each of these phases' impacts on the environmental and the livelihoods of the local community.

5.3.1 Pre-establishment phase/site mobilization impacts

5.3.1.1 Change in land use

The land is minimally utilized with cashew nut and coconuts trees. However, the proponent proposes to set up a Limestone ore mine which is inconsistent with the current land use.

Mitigation measure

- The proponent will apply and obtain a change of user from the County Government of Kitui.

5.3.1.2 Environmental risks of obtaining raw materials

Installation of the mining equipment and other construction activities will require raw materials such as aggregate, cement and sand among others which will be sourced from the environment. These materials will have an impact at their points of origin.

Mitigation measures

- Procure quantities that are sufficient for the intended works and recycle as far as practical to curtail wastage
- Source raw materials from sites that are licensed as per the Environmental Management and Coordination Act Cap. 387 Laws of Kenya

5.3.1.3 Occupational safety and health

The workforce and visitors to the site will be exposed to potential health and safety risks such as injuries that may result from accidental falls and the use of construction tools and equipment with a potential to cause injury, permanent disability or death. Further, workers may be exposed to high noise levels and dust which may cause health problems.

Mitigation measures

- Register the site as a work place with the Directorate of Occupational Safety and Health Services (DOSHS)
- Provide adequate and appropriate PPE and enforce their use
- Provide employees with correct tools and equipment for the jobs assigned and train on their use
- Obtain insurance cover for the workers at the site
- Provide first aid services and an emergency vehicle at the site
- Regulate the entry of visitors to the site by deploying adequate security measures
- Ensure moving parts of machines and sharp surfaces are securely protected with guards to avoid unnecessary contacts and injuries during construction phase

- Comply with the provisions of the Occupational Safety and Health Act 2007

5.3.1.4 Water demand and effluent generation

The processing activities will utilize substantial quantities of water which will lead to an increased demand for water. Reticulation system will be installed to reuse process water and limit effluents. Any effluent discharge during the process will be treated accordingly.

Mitigation measure

- Procure and deliver to the site mobile toilets from a NEMA licensed waste contractor for use by the workers during the construction phase of the project cycle
- Comply with the Environmental Management and Coordination (Water Quality) Regulations, 2006

5.3.1.5 Solid waste generation

The workforce at the site and activities undertaken during site preparation and construction of auxiliary facilities are expected to generate significant quantities of solid waste such as cuttings, plastic materials and rejected materials among others. The proponent will therefore ensure proper management of solid waste to avoid potential risks associated with poor disposal.

Mitigation measures

- Procure and strategically place adequate solid waste collection bins with a capacity for segregation within the construction site
- Create awareness on best waste management practices among the workers i.e. on the process of solid waste collection, segregation and proper disposal
- Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste
- Procure the services of a NEMA licensed waste handler to dispose the solid waste
- Comply with the Environmental Management and Coordination (Waste Management) Regulations, *2006*

5.3.1.6 Air pollution

Sources of air pollution during the construction and installation activities and installation of the plant will result mainly from excavation works, mixing of aggregates and from movement of vehicles carrying construction materials. If generated in large quantities, dust may present a respiratory hazard, cause eye irritation or visual intrusion. It will potentially affect the workers, visitors to the project site and the neighbors if it is in excess of 100 µg/m3.

Mitigation measures

- Restricting the speed of trucks and other vehicles accessing the project site to 40km/hr
- Sprinkling water on excavation areas
- Provision and enforcement of appropriate PPE to workers such as dust masks

- Develop and implement an air quality monitoring plan to ensure compliance with the limits set under Schedule 1 of the Environmental Management and Coordination (Air Quality) Regulations, 2014.

5.3.1.7 Noise pollution

Noise and vibration emanating from vehicle accessing the site, excavation works and machinery operations may be a concern during operations at the site. Noise may lead to hearing impairments which will reduce the workmanship of the employees and also affect their finances due to treatment and medication. Construction sites such as the proposed mine which are near residential areas can only emit noise levels of up to 60 dB(A) during the day and 35dB (A) during the night as per the Second Schedule of the Environmental Management and Coordination (Noise And Excessive Vibration Pollution) (Control) Regulations, 2009. Some of the project activities such as use of heavy machinery and equipment may produce noise levels which are above these limits and are a health hazard. While the noise at this stage is inevitable its impact can be mitigated in the following ways Mitigation measures

Provision and enforcement of appropriate PPE to workers such as ear muffs

Truck drivers will be sensitized to avoid unnecessary hooting or running of vehicle engines

Minimizing the frequency of transport of construction materials

Compliance to the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009

5.3.2 Operational phase impacts

5.3.2.1 Land degradation

This mainly results from stripping of the vegetation to expose the soil strata. This will tamper with the soil structure exposing the site to possible landslides and soil erosion as well as interrupting the continuity of open space.

Mitigation measures

- Treat the mine faces by initializing stabilization of the quarry pits walls through stepping of the faces to
- Restore the affected areas through rehabilitation of decommissioned mine pits and planting of indigenous plant species which create a stable final landform with acceptable post-mining land use capability

5.3.2.2 Removal and disposal of mine overburden

Establishment of the quarry will result in generation of overburden comprised of top soils, vegetation and rock rumble. If inappropriately disposed, the overburden becomes an eyesore apart from harboring insects and disease causing vectors.

Mitigation measure

- Reusing overburden as backfilling material during site rehabilitation and restoration

5.3.2.3 Effects on landscape and visual intrusions

Stockpiles and quarry waste piling have a negative effect on the landscape by causing visual intrusion. Quarry/mining activities usually destroy the original landscape of the affected area leaving behind huge depressions and a potential point of collecting water forming artificial ponds. These water pools have a potential to be hazardous and pose a threat to health. There is also a huge possibility that many of the surface features that were present before mining activities cannot be replaced after the process has ended.

Mitigation measures

- Take into consideration the existing landforms and vegetative cover in sitting before excavation
- Locate stockpiles, overburden, mine waste & haul routes away from sensitive landscape & visual receptors
- Backfill the mine pits where applicable using the overburden generated during excavation

5.3.2.4 Impact on biodiversity

Sections of the proposed site will be cleared to pave way for excavation and other quarrying activities. Quarrying activities disrupts the macro habitat and the species they support. There are species that are resistant to such disturbances while others are adversely affected to the extent of completely disappearing from the mining zone. Endemic plant and animal species are most affected since they are very sensitive and they require specific environmental conditions, even the slightest disruption of their habitats can result in extinction or put them at high risk of being wiped out. Dust produced will also have physical effects on the surrounding vegetation such as blocking and damaging internal structures hence impacting on their physiological activities. Vegetation provide habitat for organisms. They also protect ground surface from wind and water erosion and stabilizes other physical environmental attributes such as microclimate, water and soil moisture regimes which in turn influence organisms' abundance.

Mitigation measures

- Retain vegetation cover where possible within the site
- Rehabilitate the quarried open areas and plant appropriate indigenous trees or approved exotic ones in collaboration with the Kenya Forest Service

5.3.2.5 Occupational health and safety

Mining activities pose potential threats to the health and safety of workers on site. This may be in the form of dust from excavation works, fumes from machinery and vehicles accessing the site, accidents from machinery and equipment, injuries that may result from excavation activities and accidental falls. The pits may also pose a threat to community health and safety as they may become important breeding grounds for disease causing pathogens especially during the rainy seasons, and accidental falls of both human and livestock in the water pools could lead to drowning.

Mitigation measures

- Register the site as a workplace with the Directorate of Occupational Health and Safety
- Provide adequate training to staff on health and safety

- Provide and enforce appropriate PPE among workers and visitors to the site
- Provide a fully equipped first aid box, first aid services and emergency vehicle at the site
- Provide the correct equipment to employees for the jobs assigned and trained on their use
- Designate a fire assembly point within the facility
- Set-up a fire safety plan for the facility
- Regulate access to the site by deploying adequate security measures and fencing where appropriate to protect workers, local community members and livestock from potential accidents
- Backfill the quarried areas to reduce the risk of becoming breeding ground for disease causing pathogens
- Ensure compliance with the provisions of the Occupational Safety and Health Act, 2007

5.3.2.6 Water demand and effluent generation

The mine will exert pressure on water for processing process, washing of vehicles and machinery, sanitation purposes, dust suppression and general housekeeping around the area during operations. 70% of the domestic water use will be generated as effluent while the rest will seep into the ground areas within the site. Effluent generated will need to be disposed off appropriately.

Mitigation measures

- Install a bio-digester to manage effluent
- Undertake quarterly analysis of the effluent
- Compliance with Environmental Management and Coordination (Water Quality) Regulations, 2006

5.3.2.7 Energy demand

The operations of the mine will increase the demand on energy for running the machinery and equipment and for lighting and powering of electrical appliances. Energy supply for development will be obtained from generators and solar systems.

Mitigation measure

- Maintenance of machinery and equipment in a serviceable and good working order to maximize their efficiency on fuel

5.3.2.8 Solid waste generation

The facility will generate solid waste mostly in form of explosives packaging, oil and grease containers used for maintenance of machinery and overburden among others. These have a potential of pollution if not disposed of appropriately. The proponent will therefore ensure proper management of solid waste during the operation of the quarry through the following measures.

Mitigation measures

- Procure and strategically place adequate solid waste collection bins with a capacity for segregation within the site
- Create awareness on best waste management practices among the workers i.e. on the process of

solid waste collection, segregation and proper disposal

- Procure a sizeable central solid waste collection bin with chambers to accommodate separated waste
- Procure the services of a NEMA licensed waste handler to dispose the solid waste
- Re-use mine waste and soil materials piled at the site to refill (restore) the excavated areas that exist as a result of mining
- Complying with the Environmental Management and Coordination (Waste Management) Regulations, 2006

5.3.2.9 Air pollution

Dust from mining activities is a major source of air pollution. Mining requires soil to be removed which eventually causes the particles to become airborne through road traffic and wind erosion. The unrefined particles can be composed of toxic materials and ultimately affect the human health causing respiratory diseases.. In addition fumes and hydrocarbons produced by the heavy commercial vehicles and heavy machinery may lead to respiratory complications.

Mitigation measures

- Sprinkling water at the site to suppress dust
- Provision and enforcement of appropriate PPE to workers such as dust masks
- Retaining existing vegetation in areas which are not earmarked for open cast mining to act as dust screens and a buffer zone between the quarry area and the settlements
- Develop and implement an air quality monitoring plan to ensure compliance with the limits set under Schedule 1 of the Environmental Management and Coordination (Air Quality) Regulations, 2014

5.3.2.10 Noise pollution

Mining involves several activities that generate significant amount of noise. These include use of powered machineries to transport the aggregates and processing plants that will crush and grade the materials. Excessive vibrations are mainly from drilling and crushing of the boulders is a nuisance and cause further disturbance to the environment.

Mitigation measures;

- Limit crushing and loading activities to normal working hour's i.e. 0800Hrs - 1700Hrs.Noisy operations activities can be scheduled or limited to certain times of the day.
- Use wet crushing methods as a dust control measure
- Workers should be provided with adequate PPEs such as ear muffs and gloves.
- Workers should be regularly health screened.
- Installation of silencers on machines and equipment including trucks
- Mounting compressors or generators on anti-shocks to reduce vibrations
- Mounting vibrating machines on absorbent material to reduce spread of vibrations from the workstations

- Installation of the machine in a way that the adjacent households receive minimal noise as possible. The proponent intends to dig a trench and install the machine below the surface
- Training of staff on health and safety issues so that they can keep off from such hazards.
- Monitor noise levels from machines and equipment and regular servicing of the same
- Have a occupational noise control programme.
- Conduct pre-employment medical check for all staff and regular annual monitoring programmes
- Do a noise mapping for the entire operations and design and implement adequate mechanical engineering or management controls

5.3.2.11 Ground and surface water pollution

Mining activities present potential ground and surface water pollution. The hydrogeology regime will be affected by the distinct aspects of surface mineral extraction and associated activities which will result in groundwater pollution. Removal of the rock strata can cause the floor to heave and allow for water seepage. Sometimes quarries are dug below the water table and hence toxic materials could seep into the ground water. The activities of the proposed quarry will have a potential to pollute the river that lies approximately 1km from the proposed site. Surface water pollution can be caused by acid mine drainage and loading of Sediment, debris and impurities from soil erosion or surface runoff.

Mitigation measures

- Ensure that quarrying is not undertaken to the water table level
- In the event of flooding, water will be pumped out of the mines to avoid acid rock drainage and dissolution. In case of any contamination, pumped water will be treated to neutralize the contaminants
- Secure the site with an impermeable boundary wall to ensure that the mining tailings and overburden are contained within the site
- Maintain maximum existing vegetation coverage and plant more trees along the boundary wall to act as buffers
- Impact of heavy trucks on roads
- Once the mine begins operations, there will be heavy commercial vehicles ferrying aggregates to different areas. Overloaded trucks may cause damage on the roads.
- To mitigate this impact the proponent and truck drivers will adhere to the axle load limits set by the Kenya Roads Board/KeNHA.

5.3.2.12 Gaseous Emissions to Ambient Air

Emissions emitted during the crushing, drying activities will depend on the machines and equipment used. Cleaner energy sources such as electricity will produce less emission as compared to other sources such as fossil fuel propelled generators. Emissions at the proposed site will include fumes released from the earth moving and crushing machines, generators and trucks. However, regular maintenance of machines and trucks should be

carried out. In addition, engines should be switched off when the machines are not in use.

Sources of Gaseous Emissions

The mechanical heating/drying of the stone-dust mixture produces a lot of dust which has a high pollution potential. The plant will be fitted with a dust extraction (Cyclone) or scrubber system which when fully operational prevents any escape into the environment. The trapped dust will then be recycled into the mixture. Excess dust will be dropped into a heap in the yard.

The use of industrial diesel as fuel may produce smoke due to incomplete combustion owing to the nature of the diesel and if emitted into the breathing environment may be a major pollutant. The main pollutants of complete combustion are carbon dioxide, carbon (13%), water (13%) and nitrogen from the air mixture (73%). Incomplete combustion results in emission of carbon monoxide, un-burnt fuel and lubricating oil oxidation and nitration products of the fuel and lubrication oil are also produced in small amounts.

Emission of the various compounds of exhaust fumes are a function of several factors including engine type, operating conditions, fuel and lubricating fluid compositions and emission control system if any. Main hazards are nuisance fumes and suffocation by carbon dioxide and other gases. This is however mitigated by adequate ventilation and emission of the fumes way above breathing space via chimney stack or a scrubber

Apart from particulate matter, the most common air pollutants are:

- Sulphur Dioxide (SO2)
- Nitrogen Oxides (NOx)
- Volatile Organic compounds (VOCs)
- Carbon Monoxide (CO)SO2

The burning process in the dryer is the main SO2 source, influenced by the sulphur content of the fuel. SO2 is absorbed by certain mineral aggregate, e.g. limestone, and the alkaline dust-layer in the dust filter. Other mineral materials, e.g. furnace slag, can increase the SO2-emission.

NOx

Emission of NOx mainly originates from the burner in the drying drum. The emission depends on the nitrogen content of the fuel, the amount of excess air, flame temperature and burner type.

VOCs

Volatile Organic Compounds emission consists of a large group of substances generally described as hydrocarbons. Their molecular structure is characterized by the combination of carbon and hydrogen atoms. Additionally these substances can also contain oxygen, nitrogen, sulphur and phosphorus. These are referred to as TOCs (Total Organic Compounds). When measured as emissions from asphalt plants the individual carbon elements are added together to give a figure for Total Carbon. The emission of hydrocarbons finds its origin in the use of organic constituents and organic fuels in the production process. Especially by the heating or combustion emissions, these substances take the form of vapor or of reaction products. The most important source of emission of hydrocarbons is the incomplete combustion of fuel. Type of fuel, operating conditions and vapors from bitumen in the mixing process (which may be present in some cases) result indifferent compositions of the waste gases in respect of their organic constituents. The hydrocarbons that find their origin

in the combustion are mainly emitted by the stack; these emissions can be reduced by regular maintenance of the burner and optimization of the combustion volume.

CO

Emission is mainly associated with the combustion process in the dryer. The spaces for generation and utilization of the heat have a smooth transition in the dryer and the drums, so the combustion of the fuel is influenced by the direct contact of the burner flame with mineral material. An unfavorable drum geometry where a combustion space is too small also leads to incomplete combustion of the fuel.

Impacts of Gaseous Emissions

The impact of NOx, CO and particulate emissions on the human health, depending upon the degree of exposure, have been correlated with nausea, localized pains, weakness in extensor muscles, tremors, palpitations, indigestion, dizziness, irritation of the eyes, nervousness and anxiety. The impact of atmospheric pollution on the environment is characterized by acidification of the atmosphere and of an eventual build-up of its concentration in the atmosphere. This may result in extreme cases in the production of acid rain which can have very devastating consequences on the environment including flora, fauna, water bodies and particular buildings made from limestone. The most common and immediate consequences of uncontrolled emissions of pollutants in the atmosphere is the production of smog.

Table: Air Quality Standards (Gaseous)

Pollutant	Maximum limits (µg/m3)	Average Timing
SO2	350 200 50	1 hr 24hr Annual average
NOx	200	24 hr
CO	25,000 10,000	1 hr 8 hr

SO2

The SO2 emissions are primarily influenced by two factors: the sulphur content of the fuel and the rate of absorption in the alkaline dust layer formed on the filter. By using fuel with lower sulphur content or achieving a higher degree of absorption, a reduction of SO2 emissions can be accomplished. The use of basic minerals as e.g. limestone in the particulate collectors can help to absorb SO2. However, it should be noted that the emissions of SO2 will be minimal and therefore do not pose any environmental threat.

NOx

The formation of NOx is predominantly determined by burner and flame characteristics (flame temperature, burner type, and amount of excess burning air). Also the nitrogen content of the fuel influences NOx emission. The emission of gas-fired plants is lower than for oil-fired plants. Improved burner

technology of the plant will substantially reduce NOx emissions from the plant. CO

An incomplete combustion results among other things in the formation of CO. Abatement of CO emissions therefore require improvement of the combustion process. The correct air -fuel mixture and appropriate retention time should be adopted in order to ensure complete combustion thereby limiting CO production.

VOCs

The emission of VOCs finds its most important origin in the incomplete combustion of fuel. The kind of fuel and the burner characteristics as well as the geometry of the drying drum influence the eventual amount and composition of the organic emission. Another source is the heating of bitumen materials. The emission can be reduced by several different measures which are as follows:

Proper operating conditions

Sufficient flame volume

Clean combustion

No contaminants in the process

Mitigating Measures

It is of importance to note that since the proponent is installing a brand new plant and that the unit will be fitted with the latest pollution control equipment, the latter does not envisage any severe impact on the air quality on the proposed site and within its vicinity.

5.3.2.13 Fire risks and hazards

Due to use of equipment's and flammable material, the possibility of a fire outburst at the plant will always exist. Such an occurrence will inevitably have an environmental bearing and safety of visitor and workers.

Mitigation measures

- Provide, regularly inspect and maintain fixed and portable fire equipment through a licensed and reputable company.
- Provide a programme of drills and exercises to prepare staff for the major risks of fire and accident likely in the premise, and keep records of the training provided.
- Provide fire emergency response plan and procedures. The plan should be visible, easy to understand, documented and regularly tested in line with fire codes applicable to industrial settings
- Establish a documented plant shut down procedure
- Emergency telephone numbers should be prominently displayed in various work stations.
- Signs such as "NO SMOKING" must be prominently displayed within the premises, especially in parts where flammable materials are handled.
- Install fire alarm and detention systems
- Provide operation instructions on all the equipment such as power generators.
- Provide emergency and evacuation through provision of proper signages and appointing/training an evacuation team led by fire marshals

- Provide and maintain a proper fire team assembly points.
- Establish communication with CGB Fire Department

5.3.2.14 Socio economic impacts

The development of the mine in a rural remote setting will present several social impacts and increase pressure on provisioning natural resources e.g. water.

For mitigation it's important that;

- -adequate awareness be carried out prior to operations
- -that individual land owners give consent on access of their land
- -A grievances redress committee be set up Community liaison committee is established.

5.3.3 Decommissioning phase impacts

The lifespan of the mining is dependent on the quantities of the Limestone deposit, technology used to mine and financial sustainability of the business. Other circumstances that may warrant decommissioning include withdrawal or expiry of licenses issued by government agencies, closure by government agencies, court orders and natural calamities. The proponent will prepare and submit a due diligence decommissioning audit report to NEMA for approval at least three (3) months in advance.

The impact at this phase will include the following:

- Creation of an ecologically vulnerable land
- Economic decline
- Insecurity
- Safety and health risks
- Waste generation

5.3.3.1 Creation of an ecologically vulnerable land

At this phase, destruction of various fauna and flora at the site is evident. Quarrying activities also have a direct impact on the land by leaving pits and heaps of waste material. Excavation, drilling and quarrying will tamper with the soil structure exposing the site to possible landslides and soil erosion. Additionally, the terrain of the site would be against the topography of the area.

Mitigation measures

- Construct contour banks to protect disturbed areas from erosion prior to stabilization
- Rip along the contoured slopes and immediate re-vegetation to increase slope stability
- Promote re-vegetation through the encouragement of the natural process of secondary succession

5.3.3.2 Economic decline

Employment opportunities and the County and National economic gain from the investment activity will be lost in the event of decommissioning of the proposed project.

Mitigation measures

- Train employees on alternative livelihoods prior to decommissioning
- Pay terminal benefits to all employees

- Comply with the Labor laws

5.3.3.3 Insecurity

Insecurity will result from the site when it's abandoned succeeding the decommissioning. Unoccupied structures and uncovered pits within the site will act as criminal dens and the security boost that had been provided by the facility to the local community would be lost.

Mitigation measure

- The proponent will contract a reputable security firm to man the site.

5.3.3.4 Safety and health risks

Any remaining structures will collapse and the open pits will accumulate water overtime. There will be environmental hazards stemming from the exposed left over substances which may cause soil and water contamination and/or generate noxious odour. Possible dust emission and accidents during rehabilitation of the site could also pose a health and safety hazard to workers and general public.

Mitigation measures

- Ensure the process of rehabilitation is supervised by competent personnel
- Install signage to warn person(s) of the on-going activities
- Provide adequate and appropriate PPE and enforce their use
- Ensure first aid kit are be available on site
- Ensure workers are given the correct hand tools and equipment for the jobs assigned

5.3.3.5 Waste generation

Demolition activities will result in generation of both solid waste and effluent. The main sources of solid waste will include demolition waste from the auxiliary facilities. Effluent generated will also need to be disposed off appropriately.

Mitigation measures

- Contract a licensed construction company to carry out demolitions
- Reuse and recycle demolition waste and equipment as far as practical
- Contract a NEMA licensed waste handler to handle and dispose both solid waste and effluent generated

General Mitigation of the decommissioning negative impacts

The decommissioning and alternative land-use options need to be facilitated by appropriate professional personnel incorporating environmental experts.

ii. Mitigation for decommissioning phase impacts will follow general guidelines discussed in this report and in the decommissioning report to be prepared before decommissioning.

iii. The proponent should prepare and submit to NEMA a decommissioning report three months before decommissioning takes place.

A detailed EMP for the decommissioning phase has been provided

CHAPTER SIX: PUBLIC & STAKEHOLDERS CONSULTATION AND PARTICIPATION

6.1 Introduction

One of the key information sources used during the Environmental Impact Assessment Study exercise was public participation exercise. Sought Public participation basically involves engaging members of the public and stakeholders to express their views about a certain project. Emphasis was done in the targeting of the respondents so as to get the views of the project impacted persons and their views incorporated in this report. This ensure that due consideration will be given to public values, concerns and preferences when decisions are made.

The main objectives of consultation included;

1. To disseminate and inform the stakeholders about the proposed project with special reference to its key components, location and expected impacts.
2. To gather comments, concerns and suggestions of the community likely to be affected by the proposed project.
3. To ensure their concerns were known to the management at an early as pre establishment phase

Consultation and public participation for this EIA study was conducted in respect of the proposed development through the following methods;

- Key informant interviews and discussions.
- Public barazas
- Administering of household questionnaires

Public consultation approach and methodology used to gather feedback, views and issues regarding the project. This involved the following interlinked steps.

Step 1: Overview of the proposed project

The purpose of this step is to provide basic information with regard to the economic and social aspects of the proposed mineral quarrying.

Step 2: Orientation and Baseline Profiling

The study commenced with client consultations on the particulars of the project, its goals and objectives.

Step 3: Impact Assessment

The impact assessment exercise refers to identification and evaluation of socioeconomic impacts resulting from the execution of the proposed mining of Limestone minerals in the Ngaaie area. The analyses of impacts were performed for the three project phases, i.e. planning phase and the phase and operational phase and decommissioning phases. The main objective of this step was to determine the loss/gain to the local communities' welfare, as well as extent of the impact to the economy in the area. It included the identification and assessment of positive impacts and opportunities for enhancing the socio-economic well-being of the people who live and work in the project's area of influence.

Step 4: Implications and recommendations

The purpose of this step was to highlight the implications of the mining project on the area on the social welfare of the local communities and the regional economy. The Interpretations were based on the outcomes

of the impact assessment exercise. This step concluded with a list of recommendations that specified possible mitigation measures to maximize the positive effect and minimize adverse effects during the construction and operations phase. An EMP was developed for the operation phase to ensure that the project is run in a socially acceptable manner. It included mitigation measures that could not be included in the design phase of the project.

Public and stakeholder's consultation approach and methodology

The following approach was used;

Public and stakeholders consultative meetings where a public Barraza were held as follows;

An open Baraza held at Kiimani Village on 30th May 2024 chaired by expert with participation of over 90 community members/leaders, proponent and stakeholders where all endorsed the project.

Community interviews using semi structured questionnaires that also targeted the following public leaders/community and their responses gathered;

The responses has been attached in the annexes of the report.

Relevant key stakeholder ere also visited and their opinion on the proposed project sorted. Lead agencies interviews through semi structured questionnaire/feedback form

6.2 The Analysis of the Consultation

From the discussion and analysis of the questionnaire administered, it was found that the surrounding community had no problems with the proposed Limestone mining as they considered it as a good idea and a good project as existence of such a facility within the area. The responses from both the interaction stage during Baraza and the administered questionnaires reflected a similarity on the needs of the society.

The summary below shows their reactions concerning the Limestone mining project.

Positive impacts

Various significant positive impacts and benefits were identified during the consultation exercise. The impacts ranged from positive environmental, socioeconomic and cultural impacts and the key ones were;-

a) It will boost development of the area, boost road & communication networks,

b) create employment opportunities for them,

c) boost the area economy,

d) revenue collection to the government,

e) Source of income to the locals, improve the living standards and economy of the villages and enhance local security and integration.

f) Others were identified as; the area infrastructure and communication will also be improved, Ngaaie will develop and the sub location benefit from company CSR such as which the community agreed to make a formal proposal to the investor

Negative impacts

However, the sited the negative impacts; in that,

a) It will cause land dereliction and ugliness,

b) Loss of farming land,

c) Displacement of flora and fauna,

d) Immorality and socialills associated to youth exposure to visitors who might lure them,

e) Soil erosion and possible contamination and pollution of water,

f) Health hazards like diseases may arise as well such as incidences of disease.

Recommendations cited

They suggested that the proponent should

- fill up the holes on the mining site and re- vegetation of the area after completion of the intended project,
- ensure high hygiene standards,
- Proper management of wastes during the mineral ore harvesting phase and sprinkle water on the area that might generate dust during material transportation on the site.

The analysis of the questionnaires and the interviews in the Baraza showed that even though the community had concerns, they had no objections on the proposed Limestone mining project hence they welcomed it as it has positive objective towards development of the area. They endorsed it for implementation on the assumption that their concerns will be taken into account during the project cycle.

During the consultation baraza held all the participants present by show of hands endorsed the development of the project in the area having considered the numerous benefits expected by the project in the area that is poorly developed. It was however recommended to have a committee to be in charge of community liaison, mining issues

The following mitigation measures were proposed during the exercise;

- Control the noise from the workers at the construction site
- Control human and vehicular traffic.
- Cover construction materials to control dust from polluting the air
- Put up signage to show construction work is going on
- Use machines minimally and the rest to be done manually to create jobs
- Restore land after decommissioning.

The questionnaires and respondents consulted has been provided in the appendix of the report

Photo: The public member harmoniously showing their support for the project. During a consultation exercise at Site 30th May 2024

(The full minutes for the proceedings of the public consultation has been provided in the annex of the report).

CHAPTER SEVEN: ENVIRONMENTAL SOCIAL MANAGEMENT AND MONITORING PLAN

7.1 Introduction

This chapter discusses some of the measures that should be adopted by the proponent to monitor and manage the environmental impacts with the aim of either **minimizing, avoiding or compensatin**g for the **potential negative impacts and hazards** associated with the project activities.

Within the chapter the following has been discussed;

- **The Environmental Management Action Plan**

  This provide a framework to monitor its progress and ensure continual improvement to meet environmental regulations and sustainability obligations by the proponent.

- **The Environmental Management Plan**

  This documents the project's environmental risk management strategy. It provides comprehensive mitigation measures for all the anticipated negative impacts associated with various project activities across the implementation and operation phases.

- **Environmental Management and Monitoring plan** (EMP) provides a logical framework within which identified negative environmental impacts can be mitigated and monitored. In addition, EMP assigns responsibilities for action to various actors, and provides time frame within which mitigation measures can be done. EMP is a vital output for an environmental impact assessment as it provides a checklist for project monitoring and evaluation.
- Environmental monitoring plan for significant Environmental parameters
- Dust Monitoring and Control Plan
- Progressive rehabilitation and Closure Plans for Mining sites.

The EMPS prepared has been outlined in the three stages of the project;

- **Mobilization**
- **Operation phase**
- **Decommissioning phase**

The measures proposed in the EMP presented in the table below are aimed at ensuring that the total environment is not adversely affected by the implementation of the proposed project.

7.2 ENVIRONMENTAL MANAGEMENT ACTION PLAN FOR PROPOSED LIMESTONE MINING.

Commitment	Planning	Proposed Actions	Time frame	Cost (Kshs)
1. Preparation of comprehensive environmental sustainability policy	Objective	• Environmental and Social negative impacts reduction plans • Provide a framework to monitor its progress and ensure continual improvement to meet environmental regulations • Be utilized to meet pollution prevention goals which follow the hierarchy of: prevention, recycling/reuse, treatment and disposal	Immediately	Part of project cost
	Target & indicator	• To create more environmental awareness to the workers and other members of the staff		
	Method for achievement	• Form a committee responsible for the preparation of the policy through guidance of an expert		
	Action by	• The management		
2. Training of workers on environmental/ occupational health and safety	Objective	• Enhance the environmental performance of the projects	Continuous	Part of project cost
	Target & indicator	• More efficient operations and environmental consciousness		
	Method for Achievement	• Allocate funds and hire an expert to train the workers		
	Action By	• The management		

3. Compliance to the sector laws and regulations	Objective	• To lessen conflicts with the area residents and uphold national development	Through out the project life	Part of project cost
	Target & Indicator	• Acquire licenses, permits and certificates as required by the law • Compensation of affected parties as per the mining act		
	Method of achievement	• Pay levies or charges as required		
	Action item	• The management		
4. Promotion of public health and a safety	Objective	• Create workers and public confidence	Through out the project life	Part of project cost
	Target & indicator	• To safeguard workers and the public health and safety		
	Method for Achievement	• Continued environmental performance of the facility • Continued provision for protective gear to the workers • Identification and management of Environmental Aspects		
	Action by	• The management		
5. Environmental quality assurance	Objective	• Promote sustainability through reduction of noise, dust, vibration and safety of workers and area residents	Through the project cycle	Part of project cost
	Target & Indicator	• Enhance noise and vibration reduction in addition to minimal dust emission which does not affect air quality of the environs		
	Method of achievement	• Implementation of Asbestos Detection and Control Protocol for Limestone Mining and Milling • Continued environmental performance of the project • Continued provision of protective gear to the workers		

		• Replenished first aid kit • Well maintained machinery		
6. Corporate social responsibility	Objective	• Promotion of good neighborhood devoid of human conflict	Through out the project life	Part of project cost
	Target & Indicator	• Participate in community activities and social welfare • Contract agreement with the area residents on operation mode		
	Method for Achievement	• Employment of area residents and where possible, provision of some basic services to area residents as per their need		
	Action by	• The management		
7. Public Consultation and grievances redress	Objective	• To reduce or control potential human conflicts and grievances arising from operations	Through out the project life	Part of project cost
	Target & Indicator	• Lack of conflicts and regular meetings with the area residents through their representatives		
	Method for achievement	• Household visits		
	Action by:	• Management		

7.3 ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

7.3.1 Environmental Management and monitoring Plan for MOBILISATION/INSTALATION phase of the project

S. No	ENVIRONMENTAL CONCERNS	POTENTIAL IMPACTS	POTENTIAL SOURCE OF IMPACTS	PROPOSED MITIGATION AND ASPECTS FOR MONITORING	RESPONSIBILITY FOR MITIGATION AND MONITORING	TIMING OF MONITORING	ESTIMATED BUDGET IN KSH
PREPARATION AND SITE PREPARATION PHASE (Timing of Mitigation -During Preparation and site preparation Phase)							
1	Social impacts	Increase of conflicts and communicable diseases	Workers interaction with locals	Quick response to grievances Awareness programme Covid vaccination to workers	Proponent and project manager	routinely	Part of project cost
2	Mobilization Works induced traffic	traffic impact and related incidences during the mobilization of plant and equipment	carelessness and lack of controls	Issue notices / advisories of pending traffic inconveniences and solicit tolerance by local residents before the commencement of construction works Assign flag persons to control vehicle movement during times of material delivery10.00am and 3.00pm; and avoid morning and evening peak period.	proponent and project manager and workers	daily	50,000

				The construction materials to be delivered at the time of low traffic flow, which is between Establish speed control measures within the sites and use notices and signs where necessary. -Discourage overloading -Erect warning signs on the road to warn other motorists -Ensure only qualified drivers are recruited.			
3	Waste and debris generation and accumulation	Increased generation of solid waste and debris	Construction debris, Excavated soil	Immediate removal /storage Dispose off debris at sites designated by the County Government	Proponent/ Proponent	daily	50,000
4	Release of Environmental pollutants	water pollution	contamination of underground water sources with wastes and debris and from other nonpoint sources and	adhere to safe practices and the provisions of public health and water quality regulations	proponent/Proponent	daily basis	factored in project costs

			accidental spills from machinery				
		Noise and Auditory Nuisances	Mechanical machines, vehicles, banging.	Restrict noisy construction/installation activities to normal working hours (8am – 5pm). Inform local residents beforehand, via notices and advisories, of pending noisy periods and Solicit their tolerance well before the commencement of piling works. Workers experiencing prolonged noise levels during construction of more than 75 dBA during the day and 65 dBA during the night should wear earmuffs. (Time frame: Day: 6.01 am – 8.00 pm (Leq, 14 hours), Night: 8:01 pm – 6:00 am (Leq, 10 hours)) Limit pickup trucks and other small equipment to an idling time of five minutes, observe a	Proponent /Proponent/ Drivers	daily	factored in project costs

				common-sense approach to vehicle use, and encourage workers to shut off vehicle engines Whenever possible. Avoid unnecessary driving & idling			
5		Dust and Particulate substances release	Transport and excavation works	Covering of all haulage vehicles carrying sand, aggregate and cement Stockpiles of fine materials (e.g. sand and ballast) should be wetted or covered with tarpaulin during windy conditions. Access roads and immediate exposed ground must be wetted in a manner and at a frequency that Effectively keeps down the dust. Workers in dusty areas on the site should be issued with dust masks Appropriate signage should be used to warn of dusty areas Use of speed limiters, covering transport load, maintain cleanliness)	Proponent/ Proponent	weekly	20,000

6		Oil spills (Soil/water contamination)	Mechanical equipment, vehicles	Vehicle maintenance be restricted to authorized service garages Have an accidental spill control plan	Proponent/ Proponent	daily	20,000
7		Air pollution	Vehicle exhaust systems	Avoid idling of mechanized equipment or vehicles	Proponent/ Proponent	monthly	factored in project costs
8	Soil Erosion and land degradation	Soil erosion	due to site disturbance and excavations	Stage site clearance works so as to minimize the area of exposed soil at any given time. Levelling of site to reduce run-off velocity and increase infiltration of storm water into the soil Temporarily bund exposed loose soil and redirect flows from heavy runoff areas that threaten to erode or result in substantial turbid surface runoff to adjacent drainage waters Monitor areas of exposed soil during periods of heavy rainfall throughout the phase	Proponent/ Proponent	weekly	within project budget

				Phase of the project to ensure that any incidents of erosion are quickly controlled.			
9		Impact of stability of landscape	Not adhering to safe systems of work	-keep vegetation disturbance to the minimum Control of the compaction -Install drainage structures properly -restoring sites after decommissioning Control and manage excavation activities -Control activities especially during rainy conditions -Provide soil erosion control and conservation structures/means where necessary. -reforestation of all affected zones -support regeneration of affected pasture lands	proponent	daily	10000

10	Occupational Health and safety issues and incidences	Injuries, Diseases, Mortality	Sick workers, contaminations, Carelessness, Accidents, ignorance	-employ safe systems of work/procedures at all times -Strict adherence to OSHA 2007 and rules -establish a health and safety committee -Train staff/workers on occupational health and safety - Provide full protective gear & workmen ‘s compensation cover in addition to the right tools and operational instructions & manuals during construction - Engage the services of qualified personnel .-Avoid undesirable, substandard, hazardous or unauthorized materials during construction & maintenance -Have access to work/permit to work controls procedures for risky jobs -adherence to material safety data sheets - Sensitized staff on social/health issues such as drugs -Ensure machinery and equipment servicing and maintenance as per schedules & legal requirements	Proponent/ Proponent/ health dept	daily	100,000

				-Post strategically the OSHA Abstract & provide material safety data sheets - Post clear warning signs e.g. _No unauthorized use of machines, ensure there are guards on moving parts e.t.c -Provide incident register and a fully equipped First Aid kits & train staff on its use -Ensure certification and issuance of occupation certificates from DOHS before commencement of operations			
11	Loss of terrestrial Vegetation and land degradation	Land clearance and excavations	Loss and removal of natural vegetation	The proponent will ensure proper demarcation of the project area to be affected by the project and contain disturbance of flora to the actual project area and avoid spill lover effects on the neighboring areas After mobilization and installation phase, soils should be loosened using deep ploughing techniques to allow aeration and normal re-sprouting			

				Soils with hardening components such as cement should be diluted and fertilized to encourage Aeration			

7.3.2 Environmental Management Plan for operation/commissioning phase

OPERATION PHASE/ (Timing of Mitigation -During Operation Phase)							
	Environmental Concerns	**Potential Impacts**	**Potential Source Of Impacts**	**Proposed Mitigation And Aspects For Monitoring**	**Responsibility For Mitigation And Monitoring**	**Timing Of Monitoring**	**Estimated Budget In Ksh**
11	Waste Management	accumulation of Solid waste	excavation works and drilling and campsite general solid waste	-Excavated soils should be used to backfill excavated pits/trenches or store where it can be accessed when required. -Overburden can be used to maintain the feeder roads.	Proponent	Daily	100,000

				-Segregate solid waste and employ appropriate disposal mechanism through licensed waste disposal firms. -Provide sanitary facilities to workers. -Provide waste bins, restrict dumping, encourage recycling debris restricted disposal as per county government approvals			
		Solid Waste sludge accumulation and release	Solid Waste sludge from the processing	provide waste handling facilities such as waste storage Chamber/receptacles for temporarily holding solid waste generated at the site. Develop an in-house system for the management of wastes (i.e. waste separation, waste movement, waste documentation, waste storage and waste disposal). Raise awareness among staff about waste management Waste sludge will be recycled Waste sludge should be disposed at landfill by appropriate waste carrier	Proponent	Weekly	200,000

				Domestic waste will be stored in designated bins and carted away by NEMA licensed waste firm proper waste disposal			
		Scraps and other debris at camp site and working sites	Improper disposal of debris from machinery and tools	-strict adherence to waste management regulations -Use of an integrated solid waste management system i.e. through a hierarchy of options - All machinery, equipment, structures and tools that will not be used for other purposes should be removed and recycled/ reused say in other projects elsewhere to avoid creating an eye sore -Where recycling/reuse of the machinery, equipment, implements, structures, tools and other waste is not possible, the materials should be disposed as per the approval of NEMA or sold off as scrap metal.	proponent	One off	200,000
13	Increased use of Natural resources	loss of biodiversity	Haphazard Clearing of natural vegetation	-Use only designated routes to access the site. -limit disturbance to vegetation and allow zero tree-cutting operations -Plant indigenous trees and other shrubs upon decommissioning of the project	proponent /project manager	weekly	100000

				-map out sensitive zones for avoidance of operations within such areas			
		Increased soil loss/erosion	Soil and land compaction from machinery lack of adequate soil conservation practices, exposing previously covered land and removal of vegetation, mechanized operations and associated excavations destruction by machinery Rain water, Unattended runoff water blockage from soil debris washed from operation sites	-Introduce adaptable vegetation to generate surface covers -Maintain a buffer zone of 10m from the edge of the trench. -Trenches should be at an angle instead of vertically. -Enhance soil erosion control measures -Avoid loose hanging rocks on the cliff. -Avoid burrowing and tunneling.	proponent and project manager	monthly	100000

		increased Energy consumption	lack of energy conservation policy, Ignorance	employ energy saving policy Monitor unnecessary usage, buy and install star rated machinery and equipment for energy efficiency Energy auditing to enhance efficiency	Proponent / Tenants	monthly	factored in project costs
		Enhanced water use	ignorance, wasteful practices	Possible Extraction of water from local rivers River during construction should not be in conflict to maintenance of environment flow. Complying with abstraction requirements of WRM rules of 2007 Employ water resources conservation policy among all workers, effective use detergents to use less water, install roof catchments water harvesting.	Proponent / Tenants	daily	factored in project costs
14	Environmental Pollution	Water and Soil contamination	contamination of water sources with wastes and debris and from other nonpoint sources and	Adhere to safe practices and the provisions of public health and water quality regulations.	proponent	daily	factored in project costs

			accidental spills from machinery and sanitation waste Soil and water contamination from the mine wastes and camp site wastes	Implementation of safe mining practices such as Asbestos Detection and Control Protocol for Limestone Mining and Milling segregate and bulk empty oil /fuel drums for recycling by NEMA licensed hazardous waste handlers/recyclers Segregate waste by separating hazardous waste from non-hazardous waste for appropriate disposal Contract a NEMA licensed waste firm or CGB to collect solid waste from the site for dumping at an approved site Use rejected and overburden material in rehabilitation of the quarry			
		Noise and excessive vibrations from the quarrying, crashing Transportati	from operations of machinery eg compressor and core drill and excavation of overburden	Provide workers with PPEs such as earplugs and earmuffs, train them on the need, proper fitting and provide continuous monitoring of employee noise-exposure levels if possible. Minimize noise and vibration in the project site and surrounding areas through sensitization of	project manager	daily	200,000

		on of raw materials		drivers to switch off vehicle engines while not in use. Ensure machineries are kept in good condition in order to reduce noise generation. Conduct audiometric test for workers conduct risk assessment, health and safety audit Use of natural dampers to attenuate noise Use quiet equipment (i.e. equipment designed with noise control elements). Noise should be checked by occasional maintenance of the plant. Provide clear signage warning employees and visitors of areas with high noise levels Job rotation between workers working at a particular noise source with high noise levels should also be practiced Machines which vibrate should be mounted on heavy, rigid bases to prevent vibrations Obtain a vibrations permit from NEMA Working hours should be from 8.00 a.m to 5.00 p.m			

				Provide buffer zone to the nearest residential area Ear-muffs should be provided those working on the plant Enclose noisy machine parts with punctured metal plates, best in several layers so that sound can get "trapped" Position workers away from noise sources as much as possible Provide workers with PPEs such as earplugs and earmuffs, train them on the need, proper fitting and provide continuous monitoring of Employee noise-exposure levels if possible. Collaborate with experts in occupational health and safety for advice Minimize noise in the project site and surrounding areas through sensitization of drivers to switch off vehicle engines while Offloading/loading materials unless they are tipper types.			

				Ensure vibration do not exceed levels recommended in the mining act, Ground vibration must be below 5mm/s in at least 95% of cases and must not exceed 10mm/s. Ensure construction machineries are kept in good condition in order to Reduce noise nuisances			
		Gaseous emission	Gaseous Pollution Sulphur Dioxide (SO2) Nitrogen Oxides (NOx) Carbon Monoxide (CO) Volatile Organic compounds (VOCs) from machinery and generator, Vehicle	correct air-fuel mixture and appropriate retention time Use proper operating conditions, sufficient flame volume, clean combustion Install a scrubber system for the plant Maintain system and monitor flue gases/emissions. Secure control room from flue gases. Use of ear muffs and protective air masks Comply to air quality regulation by obtaining an emissions license when found necessary	Proponent	Daily	factored in project costs

			exhaust,, refrigerators,				
		Fuel, Oil, fats & greases pollution	Vehicle exhaust, generator, and servicing	Proper storage, handling and disposal of new oil and used oil wastes - Maintain plant and equipment to avoid leaks -Maintenance of all vehicles and machinery to be done in designated service bays and garages not at the site.	Proponent and project manager	Daily	600000
		Pollution of surface or ground water	Pollution of surface or ground water due to oil spillage	Bund wall should be erected around all on site fuel storage tanks Oil skimming should be done frequently to prevent carryover of contaminants to the storm drains plant should be equipped with latest pollution control unit Put in place efficient storm water and waste management systems that will prevent accumulation of rain water and uncontrolled waste, as well as an efficient collection system and off-site disposal. The Proponent's facilities should be located in areas which are free from flooding and clear of	Proponent	Daily	factored in project costs

				any natural watercourses and storm water courses No construction materials should be stockpiled within area prone to flooding. Hazardous materials should not be stored above flood level and should be at least 40 meters from any water body. Water containing such pollutants as bitumen, cement, concrete, lime, chemicals and fuel should be discharged into conservancy tank for removal from site. All fuels and oil should be stored in a fuel store or in an appropriate bundle and secured Avoid spills and collect and dispose spillages			
16	Sanitation and Wastewater	Increased demand for sanitary services	High human population as result of planned operations and existence of , inadequate facilities	Ensure toilet facilities are adequate and clean Regular monitoring and exhausting of the septic tank adhere to public health act sanitation standards and thr Water quality regulations 2006	Proponent and workers	weekly	100,000

17	Escalation of Risks and Hazards	risks for fires and other minor disasters	Fire, panic situations, explosions, and risk to workers accidental injury and community health and safety	Compliance to OSHA 2007act strict adherence to fire risk reduction rues avoid carelessness Install appropriate systems, and conduct emergency drills at appropriate intervals. have an emergency response team in place Awareness to all workers on safe systems of work and on fire safety Provide and regularly maintain fire safety equipment through licensed company. Provide a programme of drills and exercises to prepare staff for the major risks of fire and accident and keep records of the trainings Provide fire emergency response plan and procedures. The plan should be visible, easy to understand, documented and regularly tested. Signs such as “NO SMOKING” must be prominently displayed within The site, especially in parts where flammable materials are handled. Install fire alarm and detention system	Proponent / Emergency response team	daily	factored in project costs

				Provide operation instructions on all the machineries/equipment. Provide emergency and evacuation through provision of proper signage to DOSH standards. Appoint and train an evacuation team led by fire marshals Provide and maintain a fire team assembly points. Provide a scraping yard and establish proper scrapping procedures			
18	High Energy Consumption/ Demand	High Energy Consumption/Demand	Vehicles, generator, electricity	Maintenance to consume less fuel, procure over 3 star rated machinery for energy efficiency e.g. mortars, generators etc	Proponent / Proponent	monthly	costs factored within project budget
	Loss of terrestrial Vegetation and land degradation	Land clearance and excavations	Loss and removal of natural vegetation	The proponent will ensure proper demarcation of the project area to be affected by the project and contain disturbance of flora to the actual project area and avoid spill lover effects on the neighboring areas	Proponent / Proponent	monthly	costs factored within project budget

	Increased traffic and associated impacts and Nuisances		-Movements of trucks roads may often cause concern to local residents and community and for safety and general comfort health and safety	Mark the roads inside the site by dipping the small boulders in white lime and placing them along the curb of the road to provide better visibility and guidance Restrict unauthorized entry of vehicles and undue parking inside the site and restrict parking of the vehicles along the road and on the slopes Drivers should not move the vehicle when persons are standing on the top of the truck Provide warning signals & speed limit indicators to vehicles moving inside the site Vehicles entering the site must have the proper validation of the vehicles and certificates of road worthiness Driver should have valid licenses of heavy vehicle driving in addition to possessing proper training in driving including safety training for safe driving on public roads.			

				All vehicles should be fitted with fog lights to drive in the dusty conditions at night Ensure identification of the number and type of vehicle movements, traffic routes, hours of road use and control measures, such as speed limitations, assessment of the impact of increased vehicle movements on road safety, local nuisance and road maintenance, and proposals for road works, if required. Erect visible and clear signs to control the movement of vehicles in and out of the site. Notices should also be placed at visible locations near the site to warn the public of ongoing construction activities and presence of heavy vehicles. Ensure all vehicles used for the project are in good working condition both legally and commensurate to their intended use Ensure strict enforcement of on and off -site speed limits as well as limiting unnecessary traffic.			

				Ensure the trucks do not damage the road structures and existing drainage system during transportation. Instruct drivers to avoid un necessary gunning of vehicle engines or hooting especially when passing through sensitive areas such as churches, residential areas and hospitals Take all precautions to safe guard the safety of motorized traffic and none motorized traffic Ensure strict enforcement of on and off -site speed limits as well as limiting unnecessary traffic within the project site Provide parking areas for the trucks and avoiding parking on the road sides. Provide entry and exit points into the sites. Erect proper warning signs at a safe distance on the access roads to warn motorist of heavy vehicle turning.			

				Ensure trucks do not damage the road structures and drainage systems. Use only serviceable trucks during transportation hence less break downs			
	Negative Social and community health impacts	social impacts	Negative impacts associated with societal interactions and migration of new workers to sites	Provide adequate separate sanitary facilities for males and females in Accordance with Sec. 52 of OSHA, 2007. Create awareness on HIV/AIDs among workers and area residents Have regular health and medical camps Conduct trainings Respect local culture crest awareness on drugs and substance abuse Have a gender policy at work place	Proponent	Daily	factored in project costs
	Occupational health and safety Impacts	Occupational health and safety Impacts	Due to occurrence of occupational risks and hazards related to operations eg Due to dust and noise	Carry our pre-employment health check/monitoring for workers Carry our risk mapping for all trades and have permit to work for hazardous work	Proponent	Daily	factored in project costs

			generation from mine area and processing zone	Workers must wear full body protection when handling hot bitumen Continuous and Regular health check should be provided for employees in operation Safety signs should be posted at entry of site Suitable PPEs should be adequately provided to the employees. Post an abstract of the OSHA 2007. Register the site under the OSHA 2007. First aid kit should be provided, and easily accessible, with personnel trained in first aid. Provide workers with insurance cover for example workmen's compensation. Provide training to all employees to ensure they are apprised of the basic plant rules. Training should consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate.			

				Hazardous areas within the premise should be marked appropriately. Signage should be in accordance with international standards and easily understood by workers, visitors and the general public Provisions for reporting incidents, accidents and dangerous occurrences should be in place. This shall be done in prescribed forms obtainable from the DOHSS office Provide a well-designed/documented emergency preparedness plans Wholesome drinking water should be provided as required under Sec 91 of OSHA, 2007. Provide changing rooms as required under Sec. 93 of the Occupational Safety & Health Act, 2007 (Welfare – General Provisions). Provide adequate separate sanitary facilities for males and females in accordance with Sec. 52 of OSHA, 2007.			

				Implementation of safe mining practices such as Asbestos Detection and Control Protocol for Limestone Mining and Milling			

7.3.3 Environmental Management Plan for Decommissioning phase

S/N	ENVIRONMENTAL CONCERNS	POTENTIAL IMPACTS	POTENTIAL SOURCE OF IMPACTS	MITIGATION	RESPONSIBILITY	TIMING OF MONITORING	ESTIMATED COST
DECOMISSIONING PHASE							
	Presence of excavation pits	Risk of trips falls and accidents	Excavation and decommissioning of active pits	Implementation of the progressive rehabilitation and closure plan	Proponent	Monthly	2M
18	Impact to authentic land value	loss Authentic value of the land	Land degradation/improper reclamation	-Use overburden to backfill the excavated site -Do re-vegetation of the site in the excavated pit and restore for other uses. -Landscape as necessary	project manager	monthly	Provided in project cost
19	Environmental Pollution	water pollution	as in above section	as in above section	project manager	daily	Provided in project cost

		Solid waste	as in above section	as in above section	Proponent/project manager	daily	Provided in project cost
		Dust	as in above section	as in above section	Proponent/project manager	monthly	Provided in project cost
		Noise/vibration	as in above section	as in above section	Proponent	weekly	Provided in project cost
	Collapse of the trenches and safety issues	Collapse of the trenches and safety issues	unsafe practices during decommissioning	-Excavating on soil and soft rock shall be done in terraces/ benches or at a safe angle of slope. -Undercutting and tunneling should not be done when trenching -Stabilize the surrounding land with adaptable trees -All loose rocks and loose hanging rocks shall be removed /brought down after the project is over			Factored in project costs
21	socio-economic impacts		Decommissioning of occupied spaces.	The safety of the workers should surpass as a priority of all other objectives in the decommissioning project	Proponent	monthly	150,000

		Loss of income, Reduced ability to support dependents Loss of quality of life Loss of benefits to workers		-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 on financial management literacy - Encourage workers to register with retirement benefits scheme of their choice -encourage savings plan for the workers e.g. saving in existing Sacco in nearby towns -discourage paying workers in cash but rather through bank accounts			

	Occupational health and safety impact	Occupational risks related to decommissioning of site	Demolition and decommissioning works	Carry our risk mapping for all trades and have permit to work for hazardous work Workers must wear full body protection when handling hot bitumen Continuous and Regular health check should be provided for employees in operation Safety signs should be posted at entry of site costs Suitable PPEs should be adequately provided to the employees. Post an abstract of the OSHA 2007. Register the site under the OSHA 2007. First aid kit should be provided, and easily accessible, with personnel trained in first aid.	project manager	daily	Provided in project cost

				Provide workers with insurance cover for example workmen's compensation. Provide training to all employees to ensure they are apprised of the basic plant rules. Training should consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Hazardous areas within the premise should be marked appropriately. Signage should be in accordance with international standards and easily understood by workers, visitors and the general public Provisions for reporting incidents, accidents and dangerous occurrences should be in place. This shall be done in prescribed			

				forms obtainable from the DOHSS office Provide a well-designed/documented emergency preparedness plans			

6.4 ACTION PLAN FOR DECOMMISIONING PHASE		
ISSUE	**PROPOSED ACTIONS**	**TIMING**
Sloping of steep cliffs and or development of quarry benches, face, floor, access for restoration, slopes, banks and drainage	To avoid steep slopes, the proponent can either need to slope the any steep cliff or use bench methods. In case of bench methods rehabilitate as follows: Develop sections of horizontal ground between successive mine faces, each face being no more than 5 metres in height. The overall slope of the mine side walls should have a stepped appearance alternating between steeply sloping mine faces and near horizontal, or gently sloping, benches. Strictly control the removal or narrowing of benches and ensure safe access for restoration activities Provide edge protection, in the form of a bank of material or large boulders along the crest because of the risk of 'break-back'. Plant vegetation on wider benches to soften the appearance of mine faces once benches have been developed. Establish the long term drainage arrangements. Any futures built development on the mine floor must not be too close to mine faces so that appropriate rock fall protection measures can be put in place	Progressive

	Ensure there are no large beach-like areas and the establishment of bush-type vegetation Ensure safe and stable slopes, both within the excavation and for any artificial screening banks. Minimize adverse environmental impacts, including the visual appearance of the site, dust, noise, etc. Provide un-worked area as a buffer zone between the mine and the buildings. The buffer zone should be rehabilitated by planting trees to improve the appearance of the site. Use simpler alternatives to rock fall/surface protection measures including face scaling and rock traps. Divert permanent water courses or surface run-off outside the rim of the quarry excavation. Divert surface run-off on benches using lined ditches. Wherever possible these should run along the bench, not across it. Allow for drainage gradients on benches and the mine floor. On benches these gradients should dip towards a lined ditch at the base of the next higher quarry face, and not towards the edge where the water may cause erosion. **See also detailed** -PROGRESSIVE REHABILITATION AND CLOSURE (PRC) PLANS ATTACHED IN ANNEXES OF THE REPORT.	
Management of Open cut Pits	Ensure that the pit walls are structurally stable and allow for the placement and long term stability of the rock fill (overburden) and soil required for re vegetation. The shaping of the final pit walls should involve either battering or benching or a combination of these See also detailed -PROGRESSIVE REHABILITATION AND CLOSURE (PRC) PLANS ATTACHED IN ANNEXES OF THE REPORT.	progressive

Landscaping and Screening	Seal major cracks with clay to avoid infiltration behind a mine face. Use drainage holes to relieve pressure build up. These are drains that run from behind a mine face out onto a bench, and should ideally link up with a lined ditch running along the length of the bench to avoid ponding. All drainage measures should be periodically inspected to ensure free flow. Hence, they should be located where access is safe. During rehabilitation consider critical views and incorporate landscaping, screening, buffers and a site layout which may minimize views of exposed faces, un-vegetated waste heaps, stockpiles and plant. Thoughtful banding, vegetation screening, progressive rehabilitation and selection of working directions can all reduce visual impact. Angular or straight landforms, flat surfaces and steep faces should be avoided where possible. Landscaping should leave a final landform visually compatible with the surrounding natural Landscapes. Ensure that the land is stable and will not erode, and provide an adequate substrate for re-vegetation. Ensure erosion does no result where slopes are too steep or too long. In area with soft, readily erodible material recommended slopes should be 1V:3H or shallower. Long slopes should be broken by benches.	progressive
Soil re-spreading	Consider the approximate depth of re-spread soil and its location. Consideration may also need to be given to the re-spreading techniques used, with a view to minimizing soil compaction that can inhibit later re-vegetation.	Progressive

Re-vegetation	Re-vegetation is usually the primary objective of rehabilitation and is often the measure of its success. Re-vegetation with native species involves direct seeding, planting tube stock, natural regeneration or any combination of these. A variety of seeding techniques should be used, including hand broadcasting, mechanical broadcasting or drilling. Species should be local to the area and suitable for the on-site conditions, such as soil type and drainage. In areas of native vegetation, species should reflect the original vegetation.	Re-vegetation during Rehabilitation
Site safety and Security	Leave the quarrying sites in a condition that ensures the safety of the public. Limit public access by fencing and barring of vehicular access tracks. Where applicable, the safety and stability of the pit faces should be addressed.	Progressive
Rehabilitation of roads and tracks	Rehabilitation of roads and tracks should start at the time of decommissioning and final rehabilitation. Other highly compacted areas such as loading areas and stockpile pads should have special treatment, such as deep ripping or removal of compacted material, prior to re-spreading of topsoil.	Progressive
Monitoring of decommissioning activities	Have routine maintenance of structures such as drains, silt traps and fence. Performance against "completion criteria" should be monitored during and after rehabilitation. SEE ALSO -PROGRESSIVE REHABILITATION AND CLOSURE (PRC) PLANS	Progressive

7.4 ENVIRONMENT MANAGEMENT PLANS FOR COMPLIANCE TO HEALTH AND SAFETY DURING THE PROJECT INSTALATION, OPERATION AND DECOMMISIONING PROJECT PHASES.

HEALTH AND SAFETY ISSUES	STATUTORY REQUIREMENT	PRECAUTIONARY MEASURE TO BE TAKEN BY THE PROPONENT
Cleanliness	Dirt should not accumulate in the work place and should be cleaned at least once a week.	Accumulation of dust will not be tolerated. Cleaning and evacuation will be done on a daily basis and whenever necessary. The Proponent will be advised to form a cleaning strategy.
Working space	350 cubic feet per person Not less than nine feet high No overcrowding	The Proponent will be asked to observe this statute. Visitors will be strictly limited to those concerned. They must be provided with relative PPEs such as helmets.
Ventilation	Adequate ventilation	The building structure will mostly be open and well-ventilated during construction. One of the targeted aspects of the design was ventilation. This will be adequate both during and after construction.
Lighting	Adequate natural and artificial lighting	During construction, natural lighting will be adequate. No activity will take place at night. During darker days or Late hours, the Proponent will be required to provide flood lights as a safety measure.
Drainage	Provide functional drainage to prevent wetness	Drainage is a key aspect. Evacuation of trash and unnecessary building materials will be adequate so as to avoid collection of water.

Sanitary rooms	Provide adequate and separate toilets for both sexes Be kept clean Washing facility should be provided	As earlier advised, the Proponent will be required to provide well-kept toilets for both sexes. Cleanliness should be frequent throughout the construction period. They should be coupled with washing facilities and temporary changing rooms for the workers. Regular monitoring of internal sewer system to avoid overflow which would otherwise cause odour smell
Dust arrestors	Provide dust arrestors	As required by law, the building will be shielded using dust arrestors, which also trap falling dirt resulting from construction activities.
Personal Protective Equipment (PPE)	Provide suitable and protective clothing	The workers and visitors should be well groomed with appropriate PPEs. This should be catered for by the Proponent. Dust masks are compulsory protective.
Fire precaution	**i)** Readily accessible means for extinguishing fire **ii)** Adequate means of escape **iii)** No obstruction for the means of escape **iv)** All doors affording means of escape should open	Due to stock piling and inflammables such as paint, diesel, clothing materials such as dust arrestors, electrical circuits...etc., the Proponents are required to provide with appropriate firefighting equipment. Escape routes should be well designs at all phases of construction. All ways should be kept clear. At the construction site, doors will be installed at a later phase (towards completion. The main doors will be sliding doors.

	outwards except sliding doors	
First Aid	Provide adequate first aid box/boxes depending with the number of employees There should be trained first aider	As required by the law, to avoid unnecessary inconveniences, the Proponent will be required to provide a well-equipped first aid box. The set should include pain killers.
Occupational Diseases	Control causes	No worker should be allowed on site when unwell, especially if the condition is communicable. The Proponent is advised to conduct an internal health audit to assure healthy working conditions.
Floors, steps, stairs and other passage ways	Sound construction All opening properly fenced Hand rails on the open side at height	Scaffolds are very prominent on construction sites. They should be made of materials designated for this purpose. More preferably steel. Their joineries should include hand rails. Stairways should be well guarded during construction.

7.5 ENVIRONMENTAL MONITORING PLAN FOR SIGNIFICANT ENVIRONMENTAL PARAMETERS

Table: Environmental Monitoring Plan (Site installation Phase)

S/No	Monitoring Issue	Parameter	Monitoring Method	Indicator	Frequency of Measurement	Responsibility
1	Traffic inconveniences	No. of Recorded complainants	Inspection of complainants records	Frequent/high Complainants	Weekly	Proponent
2	Soil Erosion	Water Turbidity/Color	Visual Inspection/Turbid meter	Presence of soil particles in Water, Presence of Gullies	Continuous	Proponent
3	Energy/ Water Consumption	KWH/ M^3(billings)	Checking of meter reading/ Bills	High values/ bills	Monthly	Proponent
4	Ambient Air quality	Dust	Visual Inspection	Airborne particles / accumulations	Continuous	Proponent
5	Noise	Noise Level	noise dosimeter / sound level meter(SLM)	Complaints	Continuous	Proponent

6	Health and Safety	Occupational Health and Safety monitoring	Statistical records and safety reports	Reported accident and incidents, safety breaches and damaged to equipment Use of personal protective equipment for worker	Continuous	Proponent
7	Waste Management	Amount of Solid waste produced	Tracking the volume of solid waste generated and establishing the storage, transport and disposal methods	Waste streams and volumes generated on site	Continuous	Proponent

Environmental Monitoring Plan Operation Phase

S/No	Monitoring Issue	Parameter	Monitoring Method	Indicator	Frequency of Measurement	Responsibility
1	Fire protection	Inspection of fire equipment	Review of Inspection records	Presences of working hydrants/extinguishers	Semi annually	Proponent
2	Waste Management	Solid waste	Tracking the volume of solid waste generated and establishing the treatment,	Bins of waste	Continuous	Operator and Proponent

			storage, transport and disposal methods			
3	Health and Safety	Occupational Health and Safety monitoring	Reporting of accident and incidents, safety breaches and damage to facility	Statistical records and safety reports Safety policies	Continuous	Operator & proponent
4	Energy and water Usage	KWH/ M^3(billings)	Consumption records of water, electricity and other resources Bills	Financial savings in subsequent bills	Monthly	Proponents

7.6 DUST MONITORING AND CONTROL PLAN FOR SIMBA CEMENT C O M P A N Y LIMITED LIMESTONE MINING IN NGAAIE IN KITUI COUNTY

INTRODUCTION

Purpose of the plan

The purpose of this plan is to ensure that no person is exposed to average concentrations greater than the universally recommended exposure limits for dust as guided by WHO and National Laws Standards-Air Quality Regulations. It is also meant to ensure that airborne dust is maintained at a safe level thus safeguarding the health and safety of the local community and workers.

Each responsible person at the must ensure that any atmospheric contaminants in workplaces and environment are maintained at levels below the exposure standard for the atmospheric contaminant and as low as practicable.

Scope of the plan

This procedure communicates the need to assess, control, and monitor dust generating activities throughout the project operations

Sources and Impact of Dust Emissions

The main source of stack dust is from raw materials (typically mineral ore) that are used for the production of the graphite and are of the inert type. Any airborne pollutants from the process or transport of raw or finished product can potentially settle on the ground.

Hydrocarbons in dust may also result from the combustion depending on the type of fuel.

The stack dust can be generated from the followings:

- Loading and unloading of sample mineral ore rock to the stockpiles
- During transportation of mineral sample ore
- Crashing grinding of sample ore

While most of the dust sources related to the project will emanate from quarrying and crashing and processes, the most common air pollutants are particulate matter /fine dust with a diameter of no more than 10 microns (PM10).

The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems, because they can get deep into the lungs, and some may even get into the bloodstream. Exposure to such particles can affect both the lungs and the heart. There is thus need to ensure there is no compromise on the emission standard provided for by WHO and air quality regulations.

Referring to the Air Quality Regulations, 2014, the emission standards are provided in table below:

The following are the potential dust hazards covered by the plan

Excavation works:

- Site clearing; drilling; stripping; topsoil removal; excavator and truck operation; pits; ripping floor; clean up floor, mining; hauling; rehabilitation and reclamation
- Other Sources;

  Blowing out components, transportation of excavated sample material, access and egress of vehicles to the site.

ACTION AND OBLIGATIONS OF THE PLAN IMPLEMENTER-PROPONENTS

Maximum Permissible Exposure Limits

The procedure shall aim to limit environmental and occupational exposure to average concentrations less than;

(i) 5mg/m3 Respirable dust	(i) 2.5mg/m3 Respirable dust
(ii) 10mg/m3 Inhalable dust	(ii) 5mg/m3 Inhalable dust
(iii) 0.2mg/m3 free silica	(iii) 0.1mg/m3 free silica
In an 8 hour period.	In a 12 hour period

DUST AND HEALTH MONITORING PROGRAM

As a means to ensure that persons at the mine site are not exposed to hazardous levels of dust in the workplace, the following dust monitoring and management program shall be complied with.

1) A competent person shall conduct a baseline respirable dust survey with the frequency of future monitoring being based on the results of this survey. Any further monitoring shall be conducted in accordance with Table as shown below.

   Sample for respirable dust survey and monitoring

XXX	Measured values	Max Permissible levels
Date/Time		
Remarks		

   A typical baseline survey should encompass those hazards identified.

   Table: Air Quality Standards (Particulate)

Pollutant	Maximum limits (µg/m3)	Average Timing
Total Suspended Particles (TSP)	150 50	24-hr Annual Average
PM10	100	24 hr

Contaminant monitoring shall be undertaken on an as required basis with a record of results maintained to inform annual environmental auditing. The Resident Mine Manager and EHS officer shall be notified of any result from dust samples exceeding the exposure standard and together with the individual sampled and management will discuss recommendations to reduce occupational and environmental health risk. The results of this testing shall be made available to the mines worker concerned through a memo and to the workforce through the site safety notice boards.

2) Monitoring shall be conducted via static sampling and personal monitoring.
3) Dust monitoring shall also be carried out when a significant change occurs to a process or new machinery is introduced. Likewise, when a person working in the area has a concern about excessive dust levels.
4) All in house work areas shall be effectively ventilated by natural, mechanical and or exhaust extraction to allow people to work in an atmosphere that does not contain atmospheric contaminants exceeding the exposure standards.
5) Mechanical ventilation may be required in the following instances/activities:
   • When using volatile substances in an enclosed environment
   • When performing cutting and welding in an enclosed environment
   • When entering a confined space
   • When performing any duty where natural ventilation fails to provide protection against contaminants
   • In office and enclosed cab environments.
6) Such ventilation equipment shall be inspected regularly as per DOSH advice and damaged or broken equipment repaired or replaced as soon as possible.

CONTROL AND MANAGEMENT OF DUST

1) All areas or tasks that exceed the prescribed exposure limits shall be investigated for control strategies via the following hierarchy of control:
   • Elimination or substitution of the hazard or task
   • Engineering modification - isolation / enclosure of task or equipment or placement of partitions where practicable

• Engineering modification - ventilation

• Administrative controls: - limit duration of employee's exposure - wet methods of operation

• Through the use of appropriate respiratory protection devices

2) An ongoing monitoring program shall be put in place to ensure the controls are effective and are being complied with.

3) Persons shall be instructed in dust control principles, and where they are required to work in designated high dust areas, be provided with, and required to wear, appropriate personal respiratory protection

ROLES AND RESPONSIBILITIES FOR THE IMPLEMENTATION OF THE PLAN

Mine site Manager

As the person responsible for implementation and ongoing compliance:

- He /She has the obligation to ensure that the Plan is implemented and that management allocates adequate resources for its implementation
- Recommend or act on recommendations to rectify any deficiencies found in the procedure as per the correct process
- Ensure that a formal review is made of these procedures in conjunction with work crew representatives
- Communicate to lead agencies and ensure compliance to relevant laws and standards.

Mine workers, and Visitors

All workers, and visitors shall take the necessary steps for ensuring compliance with the plan to ensure their dust exposure does not exceed statutory limits thus undermining their health.

The County Environment Committee

To monitor adherence to the plan requirements

Address community complaints related to environmental exposure

Local Community liaison committee

To act as feedback to the CEC on the implementation of the plan

Handle complaints and grievances before they escalate

Definitions of Key Terms in the context of the DUST MONITORING AND CONTROL PLAN

"Shall" *The word "shall" is to be understood as mandatory and the word* ***"should"*** *as non-mandatory, advisory or recommended.*

Airborne Dust*; Airborne dust is considered to be the 'nuisance' dust, generated by wind or vehicles that may cause a hazard through a reduction in visibility.*

Respirable Dust*; Respirable dust is that dust of size between 1 and 7 microns, which can be breathed into a person's lungs*

Inspirable / Inhalable Inspirable / Inhalable dust; *is that dust of size between 7and 185 microns which can be breathed into a person's lungs.*

Baseline Survey*; Baseline survey is a preliminary survey of all dust affected areas and tasks throughout the mine site. This provides a reference point to base frequency of further testing and highlights areas requiring control measures*

7.7 PROGRESSIVE REHABILITATION AND CLOSURE (PRC) PLANS FOR SIMBA CEMENT COMPANY LIMITED LIMESTONE MINING IN NGAAIE , KITUI COUNTY .

7.7.1 Introduction

Upon project licensing for the proposed Limestone Minerals project, the proponent is under obligation to implement **this Progressive Rehabilitation and Closure plan**. The proponent will thus notify the authority within the first years following the operations start date of the commencement of this plan through the initial environmental audit. Thereafter monitoring of plan shall be part of annual compliance audits. However, control audits might be commissioned on regular basis or as directed by NEMA.

The main purposes of this progressive rehabilitation and closure (PRC) plan are to:

- Require the holder of an EIA to plan for how and where rehabilitation activities will be carried out on land in a way that maximizes the progressive rehabilitation of the land to a stable condition
- Provide for the condition to which the holder must rehabilitate the land before the decommissioning EIA is commissioned.

The proponent will also conduct a risk assessment (R.A) as guided by OSHA act of 2007, As the PRC plan is based on the rehabilitation and closure of land for surrender to the original owner, the lessee in this context, residual risk is not included in this process. The residual risk framework identified in the risk assessment will be applied to the decommissioning EIA as part of the application process.

The proponent is obligated to ensure that that all areas disturbed within the relevant mining tenure must be rehabilitated to pre-mining site conditions and are required to meet best practice in environment management.

A PRC plan thus developed will consist of two parts:

- Rehabilitation planning
- PRCP schedule. With typical milestones –annexed in last page of this plan.

The rehabilitation planning part of the PRC plan must include the, as described below.

The content requirements for the rehabilitation planning part include, but are not limited to:

- General information about the sites and operation
- Information about community consultation
- Details of the rehabilitation methodologies and techniques that will be used to develop rehabilitation milestones and management milestones and supporting documentation.

The PRCP schedule will have to be prepared and reviewed by the respective CECs as provided by EMCA 1999 CAP 387 approved by the administering authority and will include maps of final rehabilitation and Guideline–Progressive rehabilitation and closure plans (PRC plans) and shall be annexed in the decommissioning EIA thereby prepared.

The respective closure outcomes for the site and tables of time-based milestones for achieving each PMLU has been provided in the schedule

The PRCP schedule for the Limestone Mining Project in Ngaaie , Kitui County will consist of the following:

- rehabilitation and management milestones
- milestone criteria
- when land becomes available for rehabilitation and available for improvement
- rehabilitation areas and improvement areas
- Milestone completion dates.

Rehabilitation planning

The purpose of the rehabilitation planning part of the PRC plan is to support and justify the development of the proposed PRCP schedule.

The rehabilitation planning part of the PRC plan must state the extent to schedule for the plan is consistent with:

a) The outcome of consultation with the community in developing the plan, and

b) Any strategies or plans for the land of a local government,

Design for closure

One of the main purposes of this PRC plan is for proponent to plan for how and where environmentally

relevant activities will be carried out on land in a way that maximizes the progressive rehabilitation of the land to a stable condition. The rehabilitation planning part of the PRC plan must explain how progressive rehabilitation and closure has been considered in the design of the mining sites.

Proactively designing for closure will maximize the progressive rehabilitation of the land to a stable condition and will minimize the long-term management requirements and costs at closure.

To demonstrate that rehabilitation will be maximized the rehabilitation planning part of the PRC plan for will include a description of how the following aspects have been designed for closure:

- Location of mining sites, having regard to the following considerations:
  -Protection of environmental values of the site and receiving environment, including matters of National Environmental Significance, matters of State Environmental Significance and matters of Local Environmental Significance
    - Surrounding land uses and proximity to sensitive receptors
    - Proximity to the open-pit exit or exits
- The gradient of the footprint area, both for the direction of drainage from the landform and for the dumping costs
    - Local and regional topography
- Surface and ground water features (quality, quantity and seasonal variation) geotechnical conditions (i.e. soil/rock characteristics) and suitability for the structure type (i.e. presence of structural features that may transmit seepage)
  Competing water and land uses, visual impact size, shape and design of mine features/infrastructure (e.g. waste rock dump design)
    - Excavation methods (such as utilizing underground methods versus extraction via an open cut pit).

Post-Mining Land Use-PMLU

This is defined as the purpose for which the land will be used after all relevant activities for the PRC plan carried out on the land have ended. Relevant activity for a PRC plan is defined as the relevant activities to be carried out on land the subject of the plan. It is not the intention of this definition to include third-party activities or assets that continue to exist once mining activities have ceased, such as third-party pipeline easements, power easements or overlapping tenures for other EAs.

Several examples of PPLUs are provided below; however, it is not the intent of this guideline to develop a hierarchy or prescribe PPLUs for a resource activity.

Examples of potential PPLUs land use include (but are not limited to):

- Native ecosystem
- Habitat and ecosystem services
- Livestock grazing fields
- Agriculture
- Forestry
- Cropping

However, a decommissioning report will detail the ideal Post Mining Land use (PMLU) to be adopted and as per the guidance of NEMA/CECs and the decommissioning ERMPs in the latter section.

CHAPTER EIGHT: CONCLUSION AND RECOMMENDATION

7.1 Conclusion

This Comprehensive EIA project report has assessed the potential impacts of the proposed Limestone minerals mining in Ngaaie, Kitui County. The report also evaluated issues and concerns raised by Interested & Affected stakeholders and the local community. The assessment of impacts identified various negative impacts and proposed appropriate mitigation measures. The report also presents a dust control plan and a progressive rehabilitation plan which if well-presented will eliminate or reduce the severe impacts associated with the kind of project.

The proponent is committed to putting in place the remedial measures proposed in the report to mitigate the negative environmental, safety, health and social impacts associated with the project activities lifecycle. It is recommended that in addition to this commitment, the proponent shall focus on implementing the measures outlined in the Environmental Management and Monitoring Plan as well as adhering to all relevant national environmental, health and safety standards, policies and regulations that govern establishment and operation of mining projects in Kenya.

7.1 Recommendations

The proposed project scope involves small scale extraction of Limestone mineral ls mainly involving open cast extraction operations at the proposed site in Ngaaie.. From the prediction and analysis of impacts, it can be argued that limited negative environmental impacts are anticipated, mostly during operation and decommissioning phases of the project though the impacts can have mitigated successfully by implementing the mitigation measures proposed in the report. It is also expected that Kitui County Environment committee will offer regular environmental monitoring during the entire project phases so as to safeguard the interests of the local community. Considering the forgoing statement, the project is thus recommended for implementation.

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