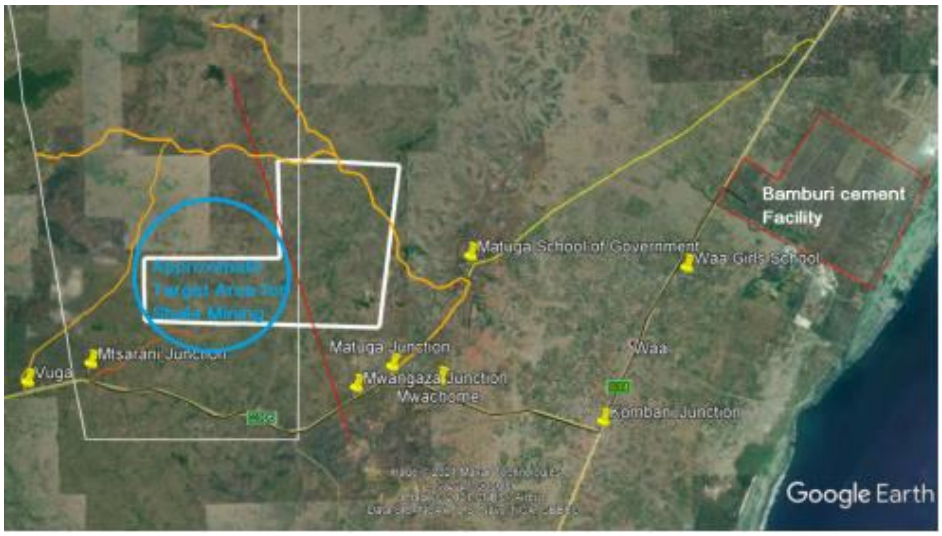
ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT PROJECT REPORT FOR THE PROPOSED OPEN CAST MINING QUARRY AND TRANSPORTATION OF SHALE SOIL MINERALS AT MATUGA- KUNDUTSI SUB-LOCATIONS OF KWALE COUNTY, KENYA



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MAY, 2021

CERTIFICATION

This Environmental and Social Impact Assessment (ESIA) Study report was carried out by a team of consultants from Earth Resources Exploration Ltd (see table 1 below) to assess the scope of the proposed Open Cast Mining and Transportation of Shale Soil mineral at Matuga and Kundutsi Sub-Locations, Kwale County, Kenya. This ESIA study report provides an accurate and truthful representation of findings established during the study and has been prepared in accordance with the Environmental (Impact Assessment and Audit) Regulations 2003, revised 2019 and International Environmental Safety Guidelines. It fulfills the requirements of section 147 (part 2) of the Environmental Management and Coordination Act (EMCA) 1999, Rev. 2019.

Table 1: List of Environmental Experts:

NAME	EXPERTS QUALIFICATIONS	YEARS	AFFILIATION
Martin Owiny Operations and Field Liaison Expert	Msc. Business and Strategic Management Certifications	25 Years	Earth Resources Exploration Ltd
Judith Mwaih Public Health and Social Expert	Public Health , PhD Msc. Public Health & Epidemiology	13 years	Earth Resources Exploration Ltd
Mr. Michael Barasa (NEMA Lead Expert Reg.1525)	MSc. Environmental science Bsc. Ecology and Natural resource management	15 Years	Earth Resources Exploration Ltd, (Environment Department)
Others: Snr Geologists Assist. Geologists And Field Assistants	Msc and Bsc.Geology JORC Compliant	24 years	Earth Resources Exploration Ltd, (Geological Department)
Mr. Fredrick Juma (NEMA Reg. No. 7512)	MSc. GIS & Remote Sensing, BSc Environmental Science Certificates in Impact Assessment	13 Years	Earth Resources Exploration Ltd, (Environment Department)

SUBMISSION OF DOCUMENTATION

I **Barasa Michael Kisiangani,** hereby submit this Environmental Impact Assessment Study Report for the proposed Open Cast Mining and Transportation of Shale Soil mineral at Matuga and Kundutsi Sub-Locations, Kwale County, Kenya. To my knowledge all information contained in this report is accurate and a truthful representation of all findings as relating to the proposed project.

Signed at Nairobi on 15th Day of May, **2021.**

Signature:  .....

Designation: **NEMA EIA/Audit Lead Expert REG. No.1525**

MSc. Environmental Science (Kenyatta University)

BSc. Ecology and Natural Resources Management (Russia)

SUBMISSION OF DOCUMENTATION

I MR/S. **……** on behalf of Bamburi Cement Ltd, hereby submit this Environmental and Social Impact Assessment Study Report for proposed Open Cast Mining and Transportation of Shale Soil mineral at Matuga and Kundutsi Sub-Location, Kwale County, Kenya. To my knowledge all information contained in this report is accurate and a truthful representation of all findings as relating to the proposed project.

Signed at Nairobi on this **15th** Day of May, **2021**.

Signature: ……..

PROJECT PROPONENT:

ACRONYMS

ADR	Alternative Dispute Resolution
AIDS	Acquired Immunodeficiency Syndrome
ALPs	Alternative livelihoods plans
CDAs	Community Development Agreements
CGK	County Government of Kwale
CIDP	County Integrated Development Plan
CITES	Convention on International Trade in Endangered Species
CMK	Cortec Mining Kenya
CSR	Corporate Social Responsibility
dB	Decibel
Do	District officer
DOSH	Department of Safety and Health
EA	Environmental Audits
EA	Environmental Audit
ECD	Early Childhood Development
EEZ	Exclusive Economic Zones
EHS	Environment Safety and Health
EMCA	Environmental Management and Coordination Act
EREL	Earth Resources Exploration Limited
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Safeguards Standards
ETSPs	Employment, Training and Succession Plans
GLA	Government Lands Act
GOK	Government of Kenya
GPS	Geographical Positioning Systems
GPS	Geo Position System
GRM	Grievance Resolution Mechanism
Ha	Hectare
HHs	House Holds
HIV	Human Immunodeficiency Virus
ILO	International labour Organization
KCAA	Kenya Civil Aviation Authority
KETRACO	Kenya Electricity Transmission Co. Ltd
Km	Kilometer
KPLC	Kenya Power and Lighting Company
Kshs	Kenya Shillings
LCA	Life Cycle Assessment
LEP	Local Employment Plan
Lpcd	Litres Per capita/Day

LPG	Liquefied Petroleum Gas
LTA	Land Titles Act
MCPs	Mine Closure Plans
MSDSs	*Material Safety Data Sheets*
NEAP	National Environmental Action Plan
NEMA	National Environment Management Authority
NGOs	Non-Governmental Organizations
NMK	National Museums of Kenya
NPEP	National Poverty Eradication Plan
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Act
PAH	Project Affected Households
PAP	Project Affected Persons
PIC	Prior Informed Consent
PPE	Personal Protective Equipment
RAP	Resettlement Action Plan
RDA	The Registration of Documents Act Cap 285 Laws of Kenya
RLA	The Registered Land Act
RTA	Registration of Titles Act
S&T	Science and Technology
SDGs	Sustainable Development Goals
SHE	Safety Health and Environment
SHIA	Social Heritage Impact Assessment
STDs	Sexually Transmitted Diseases
STIs	Sexually Transmitted Infections
TUM	Technical University of Mombasa
WHO	World Health Organization
WIBA	Work Injury Benefits Act
WRMA	Water Resources Management Authority
WSSD	World Summit for the Sustainable Development
WWF	World Wide Fund for nature

ACKNOWLEDGEMENT

Earth Resources Exploration Limited (EREL) appreciates all the individuals and organizations that were consulted and for their support towards the successful completion of this project study report. The task of gathering data and field work visits for the project study report was much eased by field lead experts, Enumerators, and more importantly, the Kwale County Government and its departmental ministries, Coast Regional Mining Department and the County Commissioners Office.

The final report is the result of a collaborative process which drew on the effort, knowledge, and patience of the various experts, and Earth Resources Project Field assistants, Chiefs and location Community. Others that have not been named here, their efforts are earnestly recognized.

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EXECUTIVE SUMMARY

Bamburi Cement Ltd has been undertaking exploration and prospecting of shale (clayey materials compacted into rocks over time) in Kwale County since 2018. In the initial desktop and field reconnaissance studies conducted by a team of Geologist and Mapping experts from both Earth Resources Exploration Ltd and Bamburi Cement Ltd, the study focused on the Mesozoic age layer (shale and sandstone) as well as Permian –lower Triassic age layer (shale and siltstone) which stretches from North coast to South Coast. The confirmatory studies, in the exploratory phase indicated presence of shale useable for clinker production. The Bamburi Cement industrial strategy is to scale up business in the South coast and establish a 5000 Ton Capacity per Day Clinker Plant at Magandia, where shale (Mtsarabe) from Mtsarani and Mwachome villages, Kundutsi Sub Location, Matuga Sub County area has been identified as a key source of raw material.

Shale material, which is to be mined at Kundutsi Sub Location, will then be transported 10-17Km via Matuga to Magandia existing road through Waa to Ngombeni Sub Location for clinker production. The proposed shale mining location is approximately 700Acres of currently owned by local community. The proposed shale quarry is expected to provide about 20% of the total resource material for the clinker production process. Bamburi Cement has been undertaking exploration activities between years 2018-2020.

The company is in the advance stages of applying for Mining License to the Ministry of Mining as per set out guidelines, hence the purpose of applying for the proposed Environmental and Social Impact Assessment to National Environmental Management Authority. In accordance with the requirement of Environmental Management and Coordination Act (EMCA 2015), the planned mining project is considered as high-risk project and thus requires Environmental and Social Impact Assessment. Earth Resources Exploration Ltd (EREL) is an independent Environmental and Geological Assessment Company registered in Kenya, has been contracted by Bamburi Cement Ltd to undertake the Environmental and Social Impact Assessment Study for the shale mining, to identify mitigate impacts and proposes mitigation measures. This study will seek to identify, reduce or avoid negative impacts and enhance positive impacts to the local communities and environment.

Environmental and Social impact assessments

Mineral resources are the most precious assets of the nation which need to be protected and subjected to sustainable use with the aim of satisfying short term need for mineral materials and the long-term goals of social and economic development. A means of such protection within the Mining Value Chain of any nation is by integration of safeguard processes such as the enforcement of Environmental and Social Impact Assessments (ESIAs) before commencing prospecting and exploration, as well as before the actual mining takes place.

In Kenya, the requirement for an EIA license is obligated by section 58 of the Environmental Management and Coordination Act (EMCA) 1999 amendment 2019, which stipulates that a proponent must seek an EIA license “notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya…”. The requirement for an EIA license applies to all projects listed in the Second Schedule to the Act. Among the listed activities is an activity out of character with its surrounding, any structure of a scale not in keeping with its surrounding or major changes in land use.

The purpose of the Environmental Impact Assessment is to identify potential positive and negative environmental impacts associated with the proposed project and provide

recommendations on how to take advantage of the positive impacts on one hand and mitigate the negative environmental impacts on the other.

The project proponent (Bamburi Cement Limited) appointed the Earth Resources EIA experts to conduct an environmental impact assessment for the proposed project and prepare a project report for submission to National Environment Management Authority (NEMA). This is in line with section 58 of the Environmental Management and Coordination Act 1999 amendment 2019 and its subsidiary legislation, Environmental (Impact Assessment and Audit) regulations, 2003 contained in the Kenya gazette supplement No. 56, legislative supplement No. 31 Legal notice No. 101 of 13th June, 2003.

Project description

The project entails proposed mining and transportation of Shale Soil Material from Matuga and Kundutsi Sub locations, Matuga Sub County, Kwale County. The proposed project in Matuga Sub County, spans between parts of two villages, Mtsarani and Mwachome (approximately 700 Acres of land) in kundutsi sub locations in Phase 1 and may extend to Ganze and Mwauchi area in phase II at a later time. Its approximately 10km from Kwale town and 6.4Km from Kombani junction. The Environmental study covered 8 villages surrounding the proposed mining area, namely Mtsarani, Mwachome, Mwanangate, Patanane in Kundutsi Sub location as well as Ganze, Mwauchi and Tsunguni, Kigato Villages in Matuga sub-location. Bamburi acquired a special Mineral Prospecting License in the project location as per attached letter from the Ministry of mining. Now the company is at an advance stage of applying for a Mining License to the Ministry of Mining as per set out guidelines, hence the purpose of this Environmental and Social Impact Assessment.
The actual Quarry is projected to cover approximately 230 Acres of land, currently inhabited by 60 land owners who are practicing maize, cassava, mango and coconut farming in the area.

This report covers aspects of the proposed Open-cast mining of Shale Soil minerals (locally referred to as “Mtsarabe”) and which will be stock-piled project area for evacuation purposes to Ngombeni. No crushing will take place on site, but will be transported to the proposed clinker plant at Ngombeni. Although there will be no use of explosives based on proponent project design and initial crushing test for shale, ripping and dozing methods shall be used. The assessment team has still identified possible impacts and proposed mitigation measures based on findings of special studies, stakeholder feedbacks and public consultation done in March-April 2021.

ESIA Methodology

The process identified both negative and positive impacts from the project, and subsequently developed an Environmental and Social Management Plan (ESMP) that would mitigate the possible impacts on the environment. The study approach included Environmental Screening, Spatial Mapping, Environmental Scoping, Desk studies, Field Assessment and baseline survey, Public Consultations using integrated approach described in the report and documentation of the streams of findings. Streams of findings include data from the household consultations, other consultative meetings and discussions, GIS data, laboratory and in-situ Air, Water and Noise Sample data, observation sheets, check lists, random informant survey, lead stakeholder institutions visits, desktop, regulatory reviews, literature reviews, etc.

Geology: What is Shale and its relative uses?

Shale is a fine-grained sedimentary rock that forms from the compaction of silt and clay-size mineral particles that we commonly call "mud." It is used as an additive to lime during production of a categorized quality of cement product (value addition). The mineral cycle is detailed in this report.

The Jurassic Sediments of the coast range in age from the Bajocian to Kimmeridgian, and consist of shale and sand stones with lesser intercalations of limestones (National Atlas of Kenya 2006).
The Shale Soil materials is shallower as one moves to Mtsarani and deeper as one approach the Ocean. Shale is reported to occur in between North Coast Vipingo area to South Coast (Mwachome, Ganze, Mbuguni, stretching to Kinango and Samburu area. The Quality of shale will vary considerably across the geographic zone.

Shale occurrences in Matuga and Kundutsi Sub Locations

1. Mtsarani- Shale occurs on the surface, less than one feet
2. Ganze -Shale occurs on the surface, less than one feet
3. Mwachome- Shale occurs about 2 feet from the surface
4. Mwauchi- Shale Occurs 2-3 feet from the surface
5. Patanane- Shale occurs about 4 feet
6. Tsunguni -Non or least presence of shale (could be deeper in over burden)

Project Cost

The proposed mining and transportation project development phase, is valued at an estimated cost of ***One Hundred and Fifty Million (150,000,000) Kenya Shillings***.

Household Level Baseline study and Public Consultation

The EREL's environmental assessment team in coordination with local administrators (Office of County Commissioners, Assistant County Commissioners, Local Chiefs and Sub chiefs, Village elders) , Office of County Government through the County Secretary, County departments, Ward and Village Administrators ; undertook public consultation meetings and face to face interviews while observing COVID-19 regulations from the ministry of health.

Two public meetings were held at Vuga,Tsimba-Golin Ward Administrators Social hall on 22nd March 2021 while another meeting was held on 27th March 2021 at Matuga Social Hall as per attached minutes and participants list. The household baseline survey was carried out in between 18 March 2021 and 5th April 2021 within Matuga and Kundutsi Sub-Locations covering about 275 households respondents interviewed (132 households at Kundutsi and 143 in Matuga) using household questionnaire from the following 10 villages , namely; Pataneni, Mwachome, Mtsarani, Mwanangate, Vuga villages in Kundutsi Sub Location and Ganze, Mwatate, Mwauchi, Kigato, Matuga Villages in Matuga Sub Location)

Summary of Findings for Baseline Survey and Public Consultation for the Proposed Project

1. **Household size:** The mean population of the individual households (Kundutsi and Matuga) was 5.7 persons per household (47% female and 53% male) and 52% in Matuga and 48% in Kundutsi.
2. **Travel distances and accessibility:** Mean distances to major social facilities was assessed and found to vary as follows: - trading centres (3.1Km), -health dispensaries (3.1Km) and primary

schools (2.65Km) respectively. Roads, particularly for those living in the interior areas require upgrading to all-weather roads to improve accessibility during rainy season.

3. **Water Accessibility:** Main water source in the area was found to be Well/spring (37%), Communal piped water (20%), Stream/river (18%), Borehole 17%, rain water (8%).
   - The few water pipe outlets whose source is from Kwale Water Supply in the study area are centrally shared between villages by the road side. Average distance to water points in the County is two (2.45) Kilometres.
   - In Matuga and Kundutsi sub location, 30.9% of the households took less than 30 minutes to fetch water from shallow wells in the valleys along river Mwachome. About 29.1% took about 31 to 60 minutes and 15.6% took about 1 hour to 2 hours. Water access to village community fluctuates with seasons, dry and wet period.
4. **Per Capita Consumption of drinking water:**
   - The per capita consumption of water within the surveyed households was at a mean of about 21.05 litres per person per day.
   - This value seems to fluctuate with season considering that the research applied the same approach in December 2020 when it been hot and dry for a long period, rivers had shrunk and water was scarce.
   - The results indicated a low mean water consumption of about 10.2 litres per capita, which was below the mean WHO recommended quantity of about 17.5 litres per person per day.
5. **Water Treatment:** Only the piped water supply is pre-treated by the Water Service Provider Company before delivery to clients, the rest is boiled at household level
6. **Sanitation:** In Kwale County the main type of toilet facility is the pit latrine. In 2018 the latrine coverage in the County was 55%, which was below the national target of 90%. During the survey in the indicated 10 villages within two sublocations, it was determined that the major toilet usage options among the households were bush and pit latrines at about 41% and 57% respectively.
7. **Solid Waste Handling:** Majority of the respondents, 78.5% burn their waste, 22.9% discard into the environment, 4.7% use open dump sites and 3.3% decompose their waste. Some residents practice more than one method of waste handling.
8. **Housing Construction materials:** Most households are constructed by mud and corrugated iron at 69.8% and 67.3% respectively. Only 3.3% were constructed with by bricks and 30.9% by stones. 19.3% had some timber materials, and 33.5% were with thatched rafts.
9. **Source of household construction materials:** The following were registered: 40.7% were acquired from local markets, 27.7% from hedge, 16.9% from the compound, 14.7 from the forest, 4.5 and 5.8% from grasses and other markets respectively, 4.3% from local stones and 0.9% from waste products. Other sources of construction materials 0.2%.
10. **Health Care:** The County has a total of five (5) government hospitals, ten (10) health centres and ninety (90) dispensaries located in Msambweni, Matuga, Lunga-Lunga and Kinango Sub-Counties. The doctor and nurse population ratio stands at 1:76,741 and 1: 3,133 respectively. In addition, the county has a total of thirty-six (36) private health facilities and nine (9) health facilities owned by faith-based organizations. Nearby dispensary is located at Mwachome.
11. **Alternative Medical treatment:** There are varieties of forest medicinal products sold by local community traders from the local forests. The medicines have been traditionally used to treat various ailments including stomach upsets, fatigue, headaches, wound infections, eyes, snake bites, open wounds, etc.
12. **Sources of Income:** Most of the households rely on kitchen gardens. Those that have larger farms take excess harvests to the local markets. 74.1% depend on farming, 7.8% on farming, 1.3% on Livestock, 0.1% on artisan mining and 16.7% from other sources

13. **Household Income levels:** Mean monthly income (Kshs): less 3.999 (325%), 4,000 to 12,999 (40.3%), 13,000 to 17,999 (24.7%), above 18,000 (20.6%). In some instances, monthly income is dependable on seasonal variation of markets and products.
14. **Household item ownership:** The main household hold asssets owned by the local community included, Mobile phones at 86%, radios at 62%, poultry at 59% and hand tools at 55%. Households with motorcycles were 22.5%, those with bicycles 21% and those with cows at 14%. The least owned items were ox plough at 6.5%, cars at 1.8%, donkeys at 1.1% and ox cart at 0.4%. Others mentioned as household valuables were dogs, television sets and refrigerators, but these were declared by a few respondents.
15. **Air Quality and Water Quality tests:** recently done at Mwembeni spring, Mwachome River, Bububu river, Shallow wells at Patanane,Barcelona and Matuga. The laboratory analysis on water found out that, current water sources are not safe for domestic use and has high level of iron and fluoride as well as other macro-elements. Therefore, an alternative source of water eg.Boreholes or treated water is important for the community in future (See annex for details on data).

Community Environmental and social feedback from Public Barazas and Household Surveys

According to the survey findings, the local community anticipates the following positive interventions associated with the proposed shale mining in the area. This include: Creation of Employment Opportunities for both youths, women and their spouses, Improvement of exisiting infrastructure such as roads, health and water through Bamburis Cooperate social responsibilities or CDA establishments, revenue for local county government and national government, improved trade and business environment in the project area, access to affordable cement in the area, a fair resettlement and compensation for those who farm and live in the project area, and industrial establishment, income from sale of land to the company, rental business for the employees settling in the area.

During the meetings held in Matuga and kundutsi sub location. The meeting was attended by 15 no community representatives including local administration and focused on the following:

- **On land ownership conflicts:** It was agreed that all stakeholders will be engaged and any arbitration action and the land ownership issue will be tracked back to acquisition level before any decision is made. No single person that is defined as a “legal land owner” will have any lose at the end of it all. There will be no forcing of locals to vacate or grant mining consent but through community meetings all stakeholders will be engaged informed and be listened to.
- **Community benefits:** The controls for community benefits particularly in the extractives industry will be formalized as per the law under the CDA Regulations which require holders of mining license (granted under the new Mining Act), mining leases and special mining leases to enter into CDAs with one or more communities located around their exploration and mining operations areas.
  Besides the CDA requirements, Bamburi Cement is a key contributor to the community under the CSR good practice, which is not a compulsory obligation by the company. Some of the benefits that will come along the above include: Local Employment, Improvement of key facilities and infrastructures, Forest development programs, Environmental rehabilitation and Livelihood programs, etc.
- **On resettlement conditions** - destination areas: The Resettlement Action Plan considers all factors that may come into play. The current land will be evaluated including all items on it. A proper resettlement action plan shall be developed and endorsed by all actors as a guiding framework for compensation and addressing any grievance mechanisms.
- **Project permits and public disclosure:** The community was informed that all necessary permits including the NEMA license and mining permit will have to be acquired before commencement of the project. Restoration of the exploited land will be ongoing alongside the mining and completion will take a little longer after exhaustion of the resource at Magandia. Before commencement of the project, there will be a public disclosure.

- **Local Content and community benefits**: The community locals and leaders requested Bamburi to ensure all suppliers of materials and equipment's are not sourced from far and priority of locals is adhered to ensure and boost business growth expected with the proposed development.
- **Rehabilitation and Restoration of Quarry**: Bamburi cement best practices along with Largae ecosystems, that have a background on ecological restoration where Bamburi Cement has left foot prints will ensure all land is restored in the area to avoid open quarry endangering the local community. Therefore, the exploited land will be restored after exhaustion of resources.
- The community was explained to that every single project bears positive as well as negative impacts on implementation and during operation. For this particular project, dust and noise will constitute the most common pollution sources. Their impacts may be respiratory diseases, eyes irritation and nuisance from noise. It is up to the company to develop mechanisms for reducing the impacts as much as possible.
- Explosives will not be used considering that shale is not hard rock.
- The vulnerable community properties will all be accounted for in order to relocate those that may be affected by the process, through the Resettlement Action Plan (RAP).
- The RAP process will categorize the various forms of preferred compensation designs in order to determine how to deal with each group. The individual property owner will be dealt with at individual level if this will be the most preferable means by that particular property owner. Evaluation will consider current market value.

Environmental and Social issues noted through discussions during the meeting

- There are some difficult access areas as well as immovable structures such as power lines and these may fall on their land. Such will have to be avoided in the project design.
- Vulnerable points such as community dams and high gradient areas will be avoided.
- Noise, Soil erosion and dust activation may will require mitigation in the course of the project.
- Road safety and hazards analysis will be carried out for remedial interventions. Some are already noted.
- The company should frequently sensitize the community on development and plans to keep them less anxious.
- The technical team should be aware that there is a water catchment area at Madziwani (between Mwangate and Mtsarani) as well as a mosque at Mwachome.
- The technical team emphasized that Kayas and water points will be avoided.

The community also never failed to express doubt and to allay fears, known as potential negative impacts of the proposed shale mining project.

Some of the potential negative impacts of the proposed project as expressed by local community and public include:

- (29.8%) indicated that the project would result in land displacement for squatters living/ farming
- 17.3% fear potential disease incidences and cultural erosion due to foreigner migrating into the area looking for employment opportunities
- 15.4% of respondents indicated likelihood of air Potential pollution in the area due to noise, dust aerosols and vibrations due to explosives.
- 9.6% of respondents expressed that there is likelihood of low compensation to the affected, due to poor bargaining power and lack of exposure and
- 8.7% of respondents perceived that the project is likely to degrade farming land and village life
- 8.7% of respondents perceived that the mining project would result in distress to locals.
- 3.8% of the residents perceived the likelihood of having potential conflict of locals with administration in the area due to project expansion
- 2.9% thought that the project would affect the fragile aquatic life in the area

- 2% respectively feared for high living standards, insecurity, drug abuse and lack of employment.

The proposed project is foreseen to contribute to the national and county development in the following ways:

Positive Project aspects

- Job creation at Cement plant and during shale extraction.
- Reduced cost of cement for the local community due to reduced transport costs.
- Other CSR and CDA benefits such as new schools, health facilities, road repair, water supply.
- Improved business in the community hence improved standards of living.
- Sustainable and Optimal use of land based resources.
- Increased revenue base as a County and National secondary advantage.

Negative aspects

- Air pollution (dust aerosols) resulting from the Shale Extraction activities and transportation
- Noise and Vibrations from heavy equipment operating in the facility, as well as from heavy vehicles transporting the raw material.
- Increased morbidity resulting from potential project pollution sources.
- Social disturbance and need for resettlement of individuals, which can be transformed into a benefit to all stakeholders if handled well.
- Potential water pollution if management of the environment is not adequately implemented.
- Loss of agricultural land (and grazing land) at the expense of the mining project.
- Potential reduction of water table if mining methods alter waterways
- Flooding upstream if natural waterways are blocked by excavated soils
- Traffic accidents and jam along the shale transportation corridors and routes
- Incidences of communicable diseases and eroding of social cultural fabric in the Digo and Giriama local community

Other environmental risks will include:

1. Risk of breaking quarry cliffs and banks where deep excavations exist, may require fencing
2. The existing high-power transmission line which traverses the project area. Buffer zone of 360meter way leave is required.
3. River discharge points at the Mombasa's Port Reitz. The discharge point may experience heavy siltation depending on mining and quarry management, integrated with season. There should be periodic monitoring of water ways through the operation phase.

Table 2: Proposed Mitigation measures during Commissioning, Operation and Decommissiong Phase

Shale Mining Project Commissioning Phase	
Potential Impact	**Proposed Mitigation**
Social Disturbances	• Resettlement Action Plan and compensation framework • Quarry design master plans • Phase based mining • Grievance mechanism • Develop a participatory Asset inventory

Shale Mining Project Commissioning Phase	
Potential Impact	**Proposed Mitigation**
Land Use Conflict	• Grievance redress committee at Company level • Establish a resettlement committee at both County level and Village levels • Ensure a free and fair compensation for indigenous community, land owners and project affected persons • Establish buffer zones to mining area • Ensure minimal disturbance to local social amenities • Continuous sensitization and liaison with the community eliminate aspects of doubts and to enhance clarity. Coordination with the local authority should be prioritized.
Terrestrial Habitat Alteration	• Ecological & biodiversity studies of target areas with an objective of establishing statistics. • Re-vegetation of disturbed areas with native plant species; • Undertake selective clearance by removing tall woody species leaving saplings, for quick regeneration of vegetation along the way-leave
Aquatic habitat alteration	• Minimizing clearing and disruption to riparian vegetation.
Soil erosion	• Top Soils excavated during ripping of shale material should be used for back-filling and should not be left exposed to wind or water for long periods. Avoid exploring during rainy season. • The contractor should avoid steep terrain during the transportation of material by using alternative routes or use light vehicles where appropriate • Riverine vegetation should be minimally disturbed during the Exploration phase to reduce soil erosion and safeguard riverbank protection • Re-plant degraded areas with local species common in the area to complement natural vegetation regeneration to improve ground cover. • Monitor for potential fugitive mechanical or hydrology aided migration of soils as a result of operation of the project or maintenance of roads.
Air Pollution (dust, fuel emissions)	• Control speed of exploration vehicles • Prohibit idling of vehicles Water should be sprayed during the Exploration phase on excavated areas • Regular maintenance of plant and equipment. • Provision of dust masks for use when working in dusty conditions
Water Pollution	• Management of stock piles of shale, excavated soils and phase based mining • Quarry rehabilitation by tree planting
Management of Solid waste	• A NEMA certified Contractor must dispose solid wastes away from the site to an approved disposal site.
Management of Hazardous substances	• Use of designated areas for repair and maintenance of machinery e.g. garages to avoid fuels and lubricant spills at the -site. • Segregating waste and assigning appropriately licensed waste handlers • Employing a spillage mitigation plan • Sensitization and strategic storage
Risk of fire	• Carry out routine thinning, slashing, and other maintenance activities, within and adjacent to Rights-of-way in order to minimize the risk of fire. • Install appropriate classes of fire extinguishers at strategic positions of the facility • Each assigned heavy vehicle to have at least 5kgs of fire extinguisher • A trained fire marshal to be employed on site at all times • Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access.
Spread of Diseases	• Education, guidance and counseling on HIV/AIDS and other STDs – exploration staff • Avail condoms to Exploration staff • Use of COVID-19 guidelines, use Masks
Land acquisition and	Ensure that the displaced persons are: • Informed about their options and rights pertaining to resettlement;

Shale Mining Project Commissioning Phase	
Potential Impact	**Proposed Mitigation**
Resettlement	• Consulted on, offered choices among, and provided with alternatives; • Provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project. • Offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; • Provided with development assistance in addition to compensation measures; • Set up a Grievance resolution Mechanism
Visual impact	• Extensive public consultation during the planning of project • Tree planting and erection of buffers • Operations limited to low dust seasons • Limited speed of vehicles • Deploy use of PPEs
Operation Phase	
Potential Impact	**Proposed Mitigation**
Terrestrial habitat alteration	• Maintenance of ecological records • The selective removal of tall-growing tree species and the encouragement of low growing grasses and shrubs in project site. • Removal of alien invasive plant species, • Cultivating native plant species; • Avoiding clearing in riparian areas; • Vegetation management should not eradicate all vegetation • Protection of important wildlife
Noise, Dust and Vibrations	• Use of correct PPEs such as ear muffs, dust coats, gloves, masks for the operators • Periodic Workers Medical examination • Avoid working in hanging areas with high potential for soil collapsing • Public awareness • Erection of security tapes
Soil Erosion	• Back-filling of excavated soils • Use of liners to cover the shale materials soils to avoid wind blowing away • Ensure proper drainage around the working environment
Siltation on the road	• Avoid spillages on the road during transportation of shale • Cover with liner to avoid wind effect while in motion • Establish mini weirs on trenches draining the mining sites and de-silt appropriately
Commissioning Phase	
Potential Impact	**Proposed Mitigation**
Vehicular	• Control of vehicle speed • Road Signage • Road repairs and upgrading
Compressor	• Provision of hearing • protection devices
Physical Hazards	
Physical Hazards	• adopting ergonomic work flow designs that tend to fit the physical tasks to the workers and not vice-versa while maintaining a balance with expected productivity • Ensure all staff go through Work Safety Medical tests by approved DHOS
Air Pollution	
Shale Dust	• Provide appropriate hand, respiratory and body protective devices • Avoid working while winds are very low or blow low towards residential households
Vehicular	• Proper service of project vehicles

Shale Mining Project Commissioning Phase	
Potential Impact	**Proposed Mitigation**
Water Pollution	• Quarry rehabilitation Solid Waste Management • Soil erosion control and desiltation of waterways

Environmental and social management and monitoring plans

The Environmental and social management and monitoring plans address specific concerns and mitigation measures encountered during the Mine setup, Extraction and camp Operation, and decommissioning phases of the proposed project. To ensure that the negative environmental impacts can be mitigated effectively a stringent management and monitoring plan has been prepared. The ESIA proposes to utilize the Safety Health and Environment (SHE) department taking the responsibility of ensuring environmental and social issues are achieved in regard to the proposed project. SHE department shall take the responsibility of conducting annual audits to ensure the project complies with the set regulations and the proposed Environmental and social management and monitoring plans.

Conclusion

It is quite evident from this study that the proposed Mining and Transportation of Shale project will bring positive effects in the study area including creation of employment, development of new social amenities, and increase in national and County revenue among others. The current mining regulations will ensure instutionalization of a participatory Community Development engagement to oversee development of host community development. This will be covered by a percentage of the returns from proponents mining activities. However, although the project will come with various positive impacts, negative impacts will also be experienced hence the need to assess them and put in place appropriate mitigation measures. In reference to the proposed methods of mining which is Open cast mining that involves ripping and dozing of shale. Its also important to note that, shale being a soft soil materials composed of clay, there will be NO USE OF EXPLOSIVES OR BLASTING, Open-cast mining methods such as ripping and stock piling will be used to minimize environmental hazards related to blasting.. The proposed methods have minimal environmental impacts. The negative impacts of this project will mainly be Air pollution including Noise, Dust/Aerosol emissions, and related air pollution impacts in terms of health among the residents, increased population in the project area, which is a sparsely populated rural set up. There will be social economic impacts related to migration of persons to the project area during operations. Other social impacts may include increased pressure on social amenities and infrastructure; social crime among others.

The consultant wishes to document the following based on the above conclusion: -

i. The negative impacts that will arise during the project cycle will be mitigated.
ii. The impacts that will be adverse will be temporary during the exploration phase and can be managed to acceptable levels with the implementation of the recommendation of the mitigation measures for the project.
iii. The main issue will revolve around relocation and resettlement of those who will be affected by the project. This includes, legal and illegal land owners and this should be mitigated through a resettlement plan.

Recommendations

It is our recommendation that the project be license by National Environment Management Authority and allowed to go on provided the following recommendation have been made: -

i. Mitigation measures outlined in this report should be adhered to and the Environmental Management Plan (EMP) implemented to the letter. The implementation of this EMP the entire life cycle of the proposed project (i.e. construction, operation and de-commissioning) is considered to be key in achieving the appropriate environmental management standards as detailed for this project.
ii. Should undertake environmental audits (EA) of the project after every 12 months after completion of the project to confirm the efficiency and adequacy of ESMP.
iii. Should carry out a survey and demarcate the boundaries shown on the proposed areas to identify those who will be affected.
iv. The proponent should carry out a Resettlement Action Plan (RAP) as per the international Policy and National RAP Policy Framework on Natural Resources.
v. A clear compensation framework to be developed prior to any extraction of materials during sampling for prospecting of Shale Soil materials.
vi. Land Rehabilitation plan to be adhered to during and after prospecting.

1. INTRODUCTION

1.1 Background and Rationale for an Environmental Impact Assessment

Bamburi Cement-LafargeHolcim as one of the leading cement companies in the region, and has been undertaking exploration and prospecting of shale (desiccated clayey materials compacted into rocks over time) in Kwale County since 2018 with special focus on Mesozoic age layer (shale and sandstone) as well as Permian –lower Triassic age layer (shale and siltstone) which stretches from North coast to South Coast. The recent confirmatory studies, in the exploratory phase indicated presence of shale useable for clinker production.

The Bamburi Cement industrial strategy is to expand its Bamburi business in the South coast and establish a 5000 Ton Capacity per Day Clinker Processing Plant at Magandia, in Ngombeni Sub Location along Likoni-Lunga Lunga Highway. It is in the plant that shale (locally known as Mtsarabe in Swahili) is planned to be sourced from Kundutsi and Matuga area as a key source of raw material.

Shale material, which is to be mined at Kundutsi Sub Location, will then be transported 10-17Km via Matuga to Magandia existing road through Waa to Ngombeni Sub Location for clinker production. The proposed shale mining location is approximately 700Acres of currently owned by local community and have started discussion on either leasing or pruchase. The proposed shale quarry is expected to provide about 20% of the total resource material for the clinker production process.

Bamburi in its effort to acquire more industrial minerals, it has commissioned an Environmental and Social Impact Assessment in order to understand the people, their environment and the mining cycle mechanism as they prepare to undertake the shale mining activities in the region.

Bamburi is in the advanced stages of setting up another Clinker plant at own parcel of land located at Magandia area, adjacent to Calcium Quarry and Kwale Eye Clinic along Likoni-Ukunda road, Kwale County. In Clinker production, limestone, gypsum, and shale materials form a part of ingredients.

The proposed project in Matuga Sub County will entail mining of Shale Soil Material from within the environment where adequate reserves have been identified in Matuga and Kundutsi Sub locations, Matuga Sub County, Kwale County. The target villages are Mtsarani, and Mwachome located in Kundutsi sub location, Tsimba Golini Ward, Matuga Sub County.. Shale is a key input in cement production, and hence the purpose of research on Occurrences of shale materials (“Mzarabe”) in the prospect area. The proposed Bamburi Cement project in Kwale is set to start in about 1.5 years from 2021. Environmental and Social Impact Assessment and Baseline Surveys form part of preliminaries required by the ministry of mining before granting Bamburi the mining licenses for shale material in Matuga.

The purpose of this Environmental Impact assessment is to identify the potential impacts of the projects to the community, involve the community in giving their views about the project and mitigation of the negative impacts of the project as positive ones are amplified. The move is aimed at achieving compliance and efficiency in the mining sector value chain, accountability and practical social responsibility. The International and National EIA regulation states that mining and other related sector activities falls under environmentally high-risk projects

according to Environmental Management and Coordination Act (EMCA 1999) Rev. 2019. Legal Notice No. 31, "The Environmental management and Coordination Act (No. 8 of 1999), Amendment of the second Schedule", states that mining projects such as the one under this study are classified as High-Risk Projects under Part 3, which references "Mining and Other Related Activities (such as the proposed Shale Mining Project), thus demands adequate due diligence. Earth Resources Exploration Limited (EREL) has put together a team of professional experts to carry out EIA of the area and document information which will guide relevant operations.

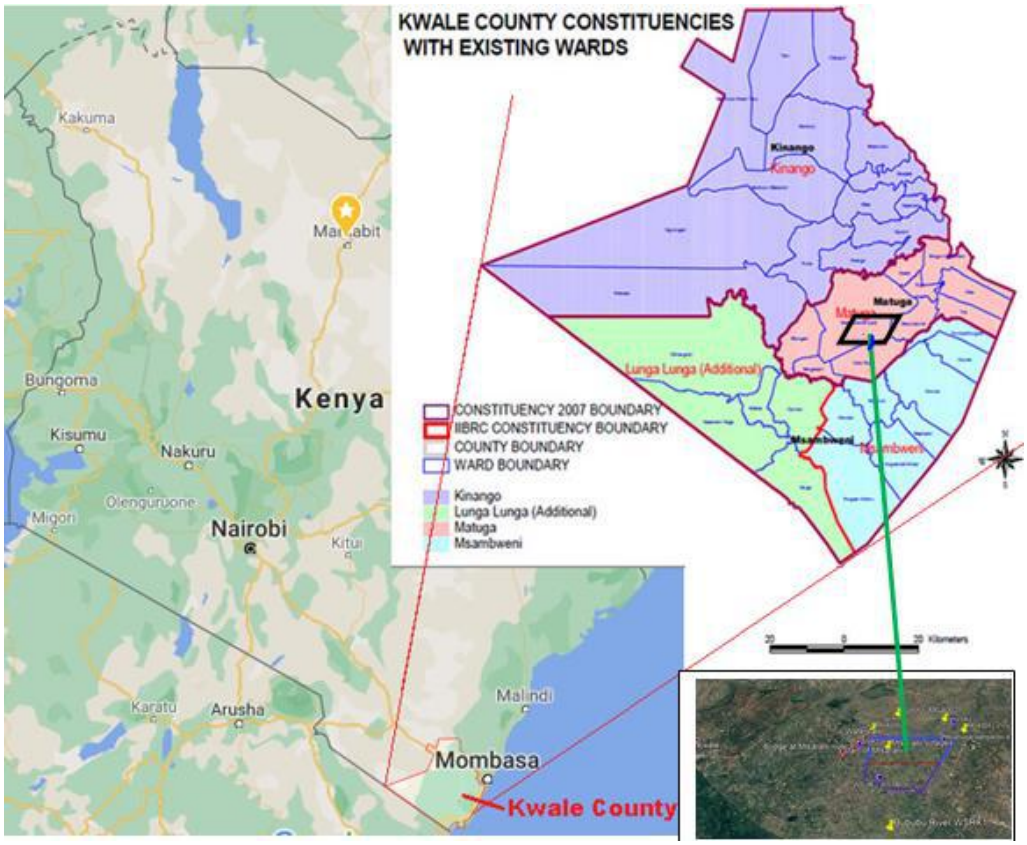


Figure 1: Project study area Outlook in Kwale County

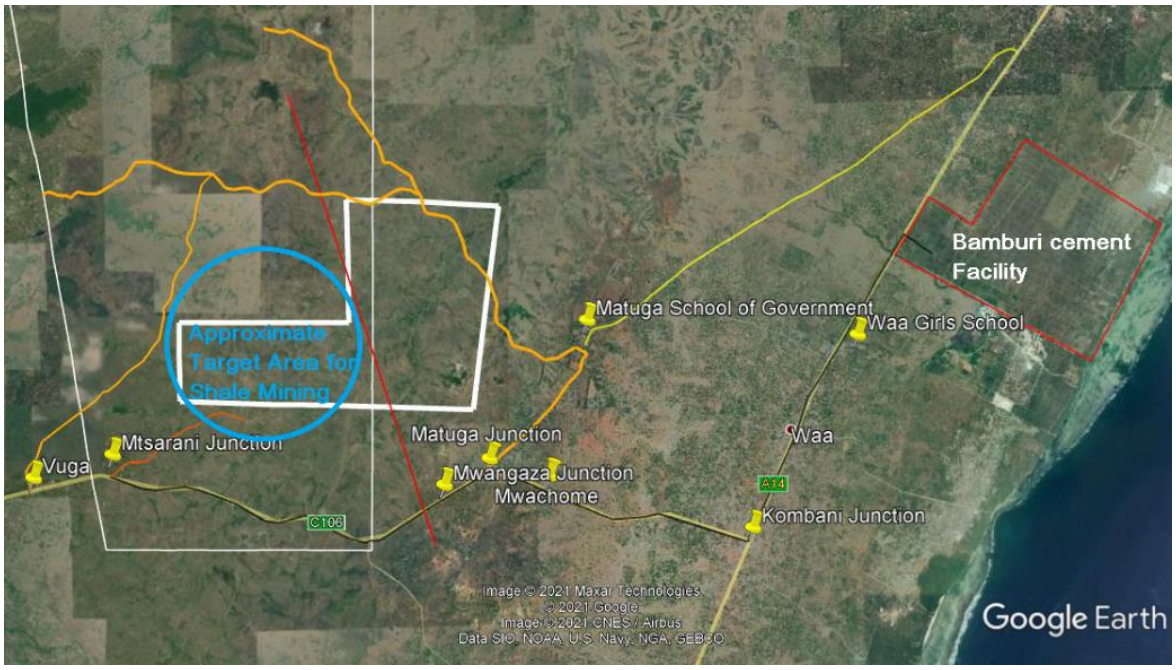


Figure 2: Project study area in Matuga area.

The project Area of 700Acres in Matuga Sub County is located at Kwale County of Kenya's, South Coast. The proposed project in Matuga Sub County, spans between Mwangaza Vision Academy Primary School along Matuga-Kwale road, Tsimba, Mtsarani ECD, Sheep/ goat area, Mwachome Area, Mwanunje area in Matuga. From Mwangaza Primary Schools, its approximately 10km from Kwale and 6.4Km from Kombani. The target villages are Mtsarani, Mwachome, Patanane in Kundutsi Sub location as well as Ganze, Mwauchi and Tsunguni Villages in Matuga sub-location. More specific project area will be discussed under chapter 3.

1.2 ESIA Study

The Kenya Government policy on all new projects of such scales require that Environmental and Social Impact Assessment (ESIA) studies be carried out at the project planning phase in order to ensure that significant impacts on the environment are noted and taken into consideration during the project implementation, operation and decommissioning stages.

Earth Resources and Exploration Limited (EREL), also referred to as the Consultant, has been contracted by the proponent to carry out an Environmental and Social Impact Assessment (ESIA) for the proposed mining and transportation of shale material around Matuga area. The scope of transportation component is further defined in this document. The goal of this assignment is to ensure that any potentially adverse environmental and social impacts can be eliminated or minimized to most feasible extent, and the positive impacts are introduced or enhanced.

The ESIA assignment has been implemented in accordance with the requirements of the Environment Management and Coordination Act (1999) Amendment 2019 of Kenya, and the

Environmental Impact Assessment and Audit Regulations of Kenya (2003). The Consultant shall seek to obtain approval of this Project Report from the National Environment Management Authority (NEMA). The Terms of Reference for carrying out the ESIA studies provided detailed information on the scope of the studies and the expected outputs.

1.3 Study Objectives

In particular the EIA team ensured that the objectives of environmental and social impact assessment study are achieved by undertaking the following:

- Develop or comment on the terms of reference for the EIA study as provided for by part 3 of the Environmental (Impact Assessment and Audit) Regulations, 2003.
- Identify and assess potential impacts of the project on the environment.
- Predict likely potential significant adverse changes on the environment as a result of the development.
- Verify compliance with the environmental regulations and industry standards (National and applicable international regulations where necessary).
- Evaluate the impacts of the various alternatives in the project and propose mitigation measures for the significant negative impacts in the environment.
- Generate baseline data for monitoring and evaluation of impacts, including mitigation measures during the project cycle.
- Conducting the necessary ESIA requirements including public participation, Stakeholder consultations etc.
- Highlight environmental issues with a view to guiding policy makers, planners, stakeholders and government agencies to make environmentally and economically sustainable decisions.
- Prepare an Environmental Impact Assessment Study report, also assist the client to follow up and seek license approval of the proposed project by the National Environmental Management Authority to meet design, construction and occupational environmental requirements.
- Liaising with NEMA to obtain a Conditional Approval and thereafter an EIA License for the proposed development in accordance with Environmental Management and Co- ordination Act (EMCA) 2019 or its successor or related statutes.

1.4 Scope of the Study

The issues considered in this study included but not limited to the following:

a) Assessing potential impacts of the project on the natural environment covering-

Biological survey

- Assessing the potential impacts of the development on the recreational and intrinsic value.
- Determining the available and alternative best practices for maintaining the resilience and functions of the ecosystem in achieving balance between development and ecological processes.

Physico-chemical survey

- Determining the current levels of noise within the project site.
- Assess baseline and potential impact on air quality.
- Assess baseline and potential impact on water quality.

b) Assessing potential impacts of the development on the Social-economic conditions within the locality, based on the Shale Mining baseline survey which will entailed: -

Social conditions survey

- Carrying out interview survey on the social conditions of local residents including their sources of livelihood, security conditions, health and their education status.
- Assess the potential impacts on cultural amenities such as the Kaya forests or graves of importance if present.
- Potential community members that may be affected adversely by the development through land acquisition or pollution from transportation of the shale.
- Employment Impact including direct and or indirect employment opportunities.
- Public health implications of the new development.
- Security-threats, risk and enhancement.
- Demand and development of infrastructure and social amenities.
- Identify community needs and alignment of priorities for CSR.

Settlement Density Assessment

- Field survey on the distribution of settlements within and around the project area.

c) Assess the potential impacts of the development on landscape such as;

- Impacts on opening up or closing up of views, visual impacts.
- Compatibility of the project with the surrounding area.
- Amenity open, duo or closed such as recreation possibilities and access road congestion.

d) Assess the potential impacts of the development on land use such as: -

- Determine the effect of proposed project on current land uses and the use potentials in the project area.
- Determine the impact on change on civic shape, scenery, aesthetic modifications
- Determine the possibility of multiple land uses.
- Examine the compatibility and complementary of the development with the surroundings land uses.

e) Assess the potential impacts of the development on water resources

- Assess the impacts of the development on surface and ground water qualities and availability.
- Assess the impacts of development on drainage patterns/systems in the project area.

f) Develop an Environmental and Social Management Plan (ESMP) that would mitigate the possible impacts on the environment.

1.5 Study Approach

The approach to this exercise was structured such as to cover the requirements under the EMCA 1999, (Revision 2019), the EIA Regulations as stipulated under the Gazette Notice No. 56 of 13th June 2003. It involved largely an understanding of the project background, the preliminary designs and the implementation plan as well as commissioning. In addition, baseline information was obtained through physical investigation of the project site areas, desktop studies, public consultations with members of the community in the project areas, photography and discussions with the project Proponent.

1.6 Data collection tools and equipment

Several data collection tools were used to document available data during the study these included use of checklists, photography, geographical positioning systems (GPS), questionnaires, note books and computers among others. All data collected were analyzed for production of a Baseline Survey report and subsequently this ESIA report. Samples of the questionnaires used during the study are provided under Annex of this report. The main steps undertaken to meet the objective of the study were as follows:

1.7 The EIA Process

The EIA process is presented under the Environmental Management and Coordination Act (No 8 of 1999) Environment Impact Assessment Guidelines and Administrative Procedures, published in November 2002, while the project categorization is presented under Legal Notice No. 31, The Environmental management and Coordination Act (No. 8 of 1999), Amendment of the second Schedule.

1.7.1 Environmental Screening:

In screening the Consultant set out to confirm whether or not this project falls within a category that requires EIA prior to commencement. In addition, other considerations during the screening process included a preliminary assessment of the environmental sensitivity of the areas along the proposed project; this comprised of a desk study involving the analysis of project maps and proposed line route, as well as literature review of previous studies on the proposed project. It was determined that infrastructure development activities (such as the development of the proposed mining and transportation of shale mineral) are listed under Schedule 2 of EMCA, 1999 (amendment 2019) among projects requiring an EIA study. Under amendment of the second schedule, mining projects of scales such as the one under this study have been classified under “High Risk projects” (Ref: EMCA Second Schedule Amendment). The project proponent therefore commissioned this study in line with the provisions of EMCA, 1999 (Rev 2019).

1.7.2 Environmental Scoping

The project scoping stage which followed the screening stage was applied to narrow down the project potential issues to those that requiring detail analysis. The process involved conducting discussions with the proponent on the project issues and, collection of primary and secondary

data. The primary data was collected through the qualitative and quantitative methods of data collection. Qualitative data was collected through field visits/site walks, public and stakeholders consultation while quantitative data was collected through the use of sampled questionnaires. The secondary data was collected through literature review which included study of the following documents:

- Policies, Acts and Regulations;
- County Development Plans;
- Project area topographical and cadastral maps;
- Previous project study documents; and
- Literature materials on project including those on Plant Species, Culture, Power Project Installation and Management among other project parameters.

1.7.3 Desk study

Desktop studies were conducted through review of secondary data to establish the following:

- Legal Policies, Legislative and Institutional Framework governing the proposed project;
- Licenses and permits requirements and conditions;
- Project area baseline information including documented sensitive environmental receptors;
- Types of waste to be generated, proposed management and disposal methods; and
- Potential positive and negative impacts.

The secondary data was obtained by reviewing several literature materials including:

- Policies, Acts and Regulations
- GIS maps
- Current County Development Plan for Kwale County
- The Sectoral Environmental Impact Assessment Study, August 2009
- Project area cadastral and topographical maps
- Biodiversity cover in the area

1.7.4 Field Assessment and baseline survey

Detailed field surveys for this study were undertaken within the proposed project area and it's surrounding during a previous Shale Prospecting and Exploration study from the 13th -17th December 2019, and during the current proposed Shale mining and Transportation ESIA process carried out between 22nd March 2021 and 5th April 2021.

This involved conducting systematic field traversing to quantify and qualify perceived impacts on:

- Land ownership, usage and conflicts with other Socio-economic issues;
- Vegetation cover of the area;
- Underground and surface waters;
- Waste management; and
- The general environment and its sensitive receptors found within the project area.

The ESIA study experts traversed the whole project area and identified the status of the environment and socio-economic indicators which included the following:

- Baseline data on the bio-physical environment
- Socio-economic and cultural environment;
- Possible Project Affected Persons (PAP) and Project Affected Households (PAH) via satellite imagery analysis
- The level of project impact on affected persons and the environment;
- The opinion of the stakeholders including the local communities and on the proposed project; and
- The project alternatives routes

1.7.5 Public Consultations

Due to restrictions of the Corona Virus (Covid-19) pandemic, holding a full Public Consultative meeting was not possible. Instead, some community representatives (village elders) were met during two meetings held at Matuga Sub County, Matuga and Kundutsi Sub Locations on the 27th March 2021. To complete the public consultation process, the following were also conducted:

- **Key Informant Interviews and Semi-Structured Interviews:** - These interviews were conducted with the County officers, Chiefs, Assistant Chiefs, ward administrators and Village Elders.
- **Stakeholder Meetings:** County level Stakeholders' meeting had been held in February 2020 during the Prospecting and Exploration ESIA application process to sensitize the County Directors and accommodate their professional opinion.
- **Open-ended and Pre-coded questionnaires:** -These questionnaires were administered to target groups in order to obtain their views on the proposed project and its perceived impacts.

The community representatives were sourced from the main target groups including the PAPs within the proposed mining and transportation area and the households surrounding the proposed project area. The general public was also interviewed and this involved reaching communities members with property within the project area through random sampling. The names of all those interviewed during the consultation are found under public consultation chapter of this report.

The community representative meetings were organized by the Chiefs; and transect walks were also done to confirm the information from the discussions and observations were made on physical and environmental conditions. In addition to constant briefing of the client, this environmental impact assessment project report was prepared. The contents were presented for submission to NEMA as required by law.

1.8 Baseline Survey Questionnaire Format

The team developed comprehensive baseline survey questionnaire in consultation with the project facilitators. The questionnaire is annexed. The survey format consisted of the following components:

Table 3: Characteristics of Household Field Survey Tools

Research Tool	Section	Details
-HH Questionnaire	1. Identification of HHs	Coding, location, Interviewee, Contact,
	2. HH Dynamics	Age, Religion, Sex, Relationship to head, Education, Employment, Income, HH head gender
	3. HH Income	Pay, Income from activities, Affordability
	4. Land tenure	Duration of stay, if owns other land, type of tenure, size of land, approximate value, duration of stay
	5. HH build design	Walls, roof, floor, toilet, design, windows, doors, Type of toilet
	6. Source of construction Material	Local, imports, type
	7. Access to Main Facilities	Trading Centre, health facilities, Schools, Water points,
	8. Water and Sanitation	Cost of water, Water Sources types, Cost of water, Duration to get the water, Purification Method, Waste Management
	9. Source of Energy	Traditional, modern, type, cost, frequency
	10. HH Disease Incidence	Eye, Respiratory, Skin, Intestinal, Headaches, colds, allergies, others
	11. HH Expenditure	Consumables, fees, rent, Agriculture, fuel, savings, housing materials, etc
	12. Livestock Kept	Cattle, Sheep, Goats, Value
	13. Cultural Assessment	Sites of significance near living area
	14. Gender	Chores Allocation, HH ownership, Roles
-Institutional Communication	A project introductory letter was developed and used to access the relevant departmental reps. An open discussion method was applied.	The random discussion guided by general matters was applied to gather key issues affecting the area, as well as available data where possible.
-Environmental & Social Questionnaire	HH Perception on the proposed project	If good/bad/viable/suggestions, other comments/etc.
	HH Economic dynamics	Key economic indicators
-Environmental Observation Sheet	Hydro-setting, landscape, vegetation, Associated impacts,	Baseline and dynamic transformations under anthropogenic or natural impacts
-Towns, Centers and Market observation sheet	Settlement, power distribution, drainage, solid waste, air quality, drinking water quality, noise	

Questionnaires are available under appendix 2

2. GENERAL SHALE MINING CYCLE AND THE PROJECT DESCRIPTION

2.1 Shale and its relative use

Shale is a fine-grained sedimentary rock that forms from the compaction of silt and clay-size mineral particles that we commonly call "mud." This composition places shale in a category of sedimentary rocks known as "Mud-stones." Shale is distinguished from other mud-stones because it is fissile and laminated. "Laminated" means that the rock is made up of many thin layers. "Fissile" means that the rock readily splits into thin pieces along the lamination.

Cement is a common material that is often made with shale. To make cement, Crushed limestone and shale are heated to a temperature that is high enough to evaporate off all water and break down the limestone into calcium oxide and carbon dioxide. The carbon dioxide is lost as an emission, but the calcium oxide combined with the heated shale makes a powder that will harden if mixed with water and allowed to dry. Cement is used to make concrete and many other products for the construction industry.

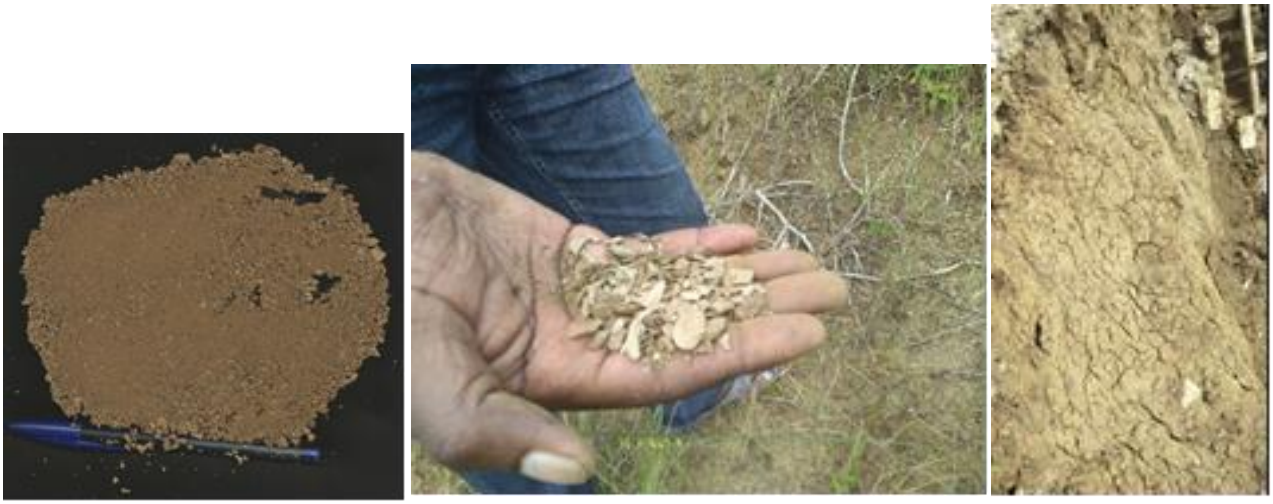


Figure 3: Image of Shale Material from field (Kwale)

2.2 The Mineral Cycle

For this survey, it is worth understanding the mining project cycle and what goes into it. There are 12 number basic levels of the mining cycle. These develop according to the phases indicated in Figure below and table. Duration of the cycle is dependent basically on the resource quantity, quality, and ease of reach as well as licensing procedures and social stability where the resource occurs. Due to economic logistics, the mineral title is acquired after confirmation of availability to pave way for Resource Modeling.

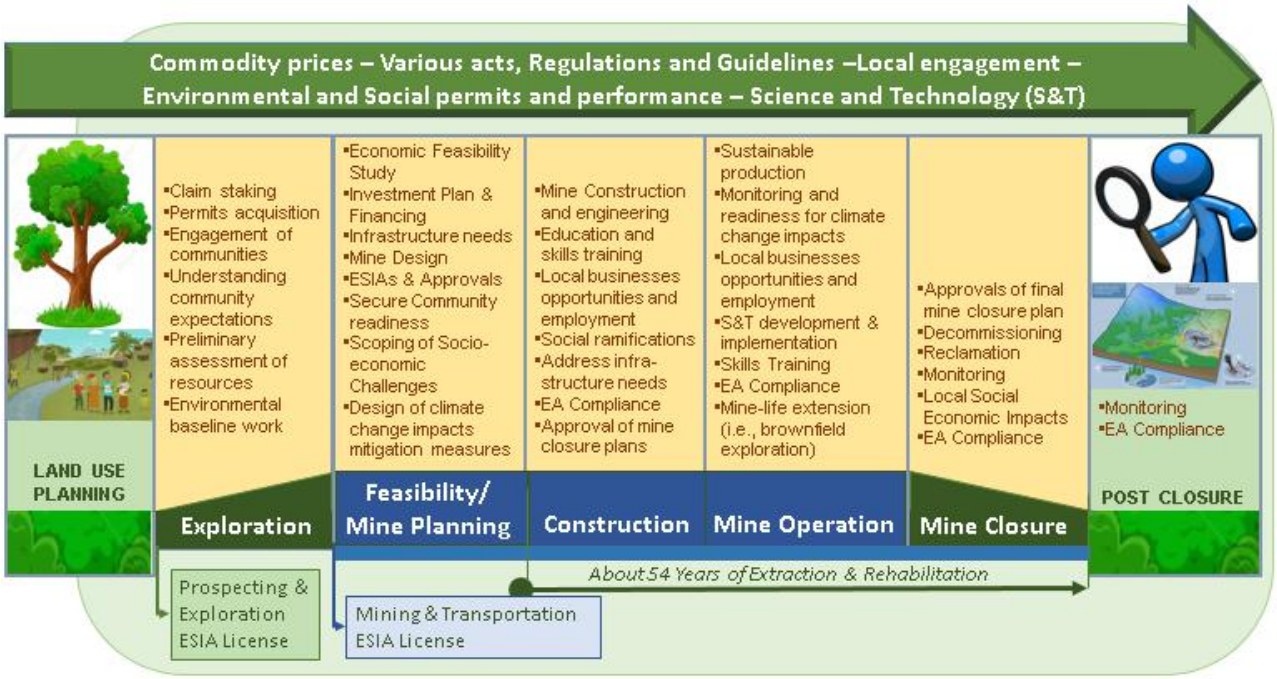


Figure 4: The Mineral Cycle as per the Project Indigo 4 Model (EREL 2021).

Table 4: The Mineral Value cycle

	Project Phase	Sub Titles	Activities
1	**Project Identification**	Mineral Title	• Ownership of minerals • Mining rights (License) • Legal and physical policy • Regulation
		Desktop Study	• Examination of available data about a prospective mineral (Ore) deposit • Development of a preliminary mineral case
2	**Prospecting/Exploration**	Surveys	• Ground (surveys, trenching) • Aerial • Seismic
3	**Exploration**	Samplers	• Rotary Air Blast • Core Drilling
4	**Project Evaluation**	Appraisal	• Resource Modelling • Mine planning • Valuation • Scoping • Pre-feasibility • Bankable Feasibility

	Project Phase	Sub Titles	Activities
5	**Mine Development**	Infrastructure	• Beneficiation (Ore process system, Logistics)
6	**Mineral Exploitation or Extraction**	Production	• Open cast or Under ground
7	**Mine Closure**	Decommissioning	• Dismantling, Disposal, Cleaning
		Rehabilitation	• Restoration • Improvement
			➔ Prospecting & Exploration level
			➔ Exploitation Level

2.2.1 Prospecting

Prospecting is the process of finding minerals (commercially viable concentrations of minerals) to mine. Project evaluation will inform on decisions to be made by the company, and is purely an economic decision making process. This level requires an ESIA study which will assist in identification of associated hidden environmental and social factors. This report is confined within this level of the Mining cycle.

2.2.2 Surveys

The most common survey methods in the process are Ground surveys (Observation, Trenching), Aerial and Seismic surveys. In this study, satellite imagery, ground observation and sourcing information from random informants apply during the prospecting and Exploration level.

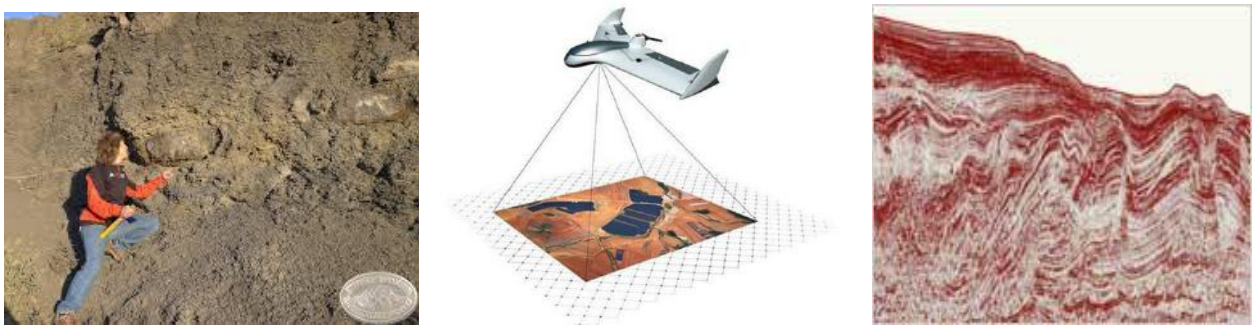


Figure 5: Geologist Survey, Aerial Survey and Seismic Data from seismic exploration.

2.2.3 Exploration

The two most common methods to be applied in shale prospecting are ripping, pitting and trenching. In this survey, trenching and pitting will be applied. The samples are taken to offsite labs for analysis. With adequate amounts of samples and adequate (positive/economical) project evaluation test results, the process can be transformed to the next level (exploitation/extraction) where a new ESIA will be required for accurate determination. The Extraction process is site specific. The samples collected at the field are taken for lab analysis processes.

Figure 6: Image of Shale Material from field (Kwale).

2.2.4 Mine Development

The process of constructing a mining facility and the infrastructure to support the facility is known as mine development. Mine development may involve many activities such as:

- The preparation of the mine site by clearing trees and blasting rock (if need arises).
- The construction of mining facilities such as head frames, administration buildings or mechanical shops.
- The creation of infrastructure such as power lines and substations, roads or water lines.

Requirements: Before beginning development, certain requirements must be met. These requirements include: Submitting a Notice of Project Status to the State department for Mining, Consulting with all required parties through Environmental and Social Impact assessment processes, Filing a closure plan with accompanying financial assurance and achieving certification and, Acquiring all required permits/approvals from ministries, agencies and government organizations.

2.2.5 Mine Closure

This is the process for ending the operation of a mine. It is commonly embodied in a closure plan developed as part of the operations plan for a particular mine. Robertson and Shaw (2006) articulate four key objectives to be considered when closing a mine from operation:

- Protect public health and safety.
- Alleviate or eliminate environmental damage.
- Achieve a productive use of the land or a return to its original condition or an acceptable alternative.
- To the extent achievable, provide for sustainability of social and economic benefits resulting from mine development and operations.

Orderly mine closure depends on planning for providing the details on design and costs to achieve these key objectives (ICMM 2008).

The design of Mineral Exploitation may consider Mine Closure for Active and Exhausted Mines. It may seem counter-intuitive to consider closure during the development and opening of a new mine. This means closing up exhausted sections while opening up new sections of the mine, with integrated rehabilitation action. There are several advantages to simultaneous rehabilitation which include:

- Controlled extent of land degradation
- Saving money and time
- Improved aesthetics as the mining progresses,
- Reduced environmental pollution, etc.

2.2.6 Physical Property of Shale material

For the purpose of this study, it is important to describe the physical property of Shale materials. It crumbles to dust very easily. When excavated in depths, the banks remain vulnerable to collapse, it does not easily support agriculture, but grass can grow on it, Shale may activate dust during severe dry periods, and is easily transported by storm water during heavy rains.

Table 5: The Shale Physical Properties

	Properties	Shale ash	Cement Dust
1	Average particle density, kg/m^3	2,800	3,000
2	Bulk density of the particles, kg/m^3	900	511
3	Compacted bulk density of the particles, kg/m^3	990	610
4	Specific surface area of the particles, m^2/kg	570	600

2.2.7 Shale Mine Site Reserve and Transportation

The mining method will be by ripping across the reserve location. The demarcated shale reserve area will be cordoned off from the rest of the area and only those involved in the process will be authorized on site. Ripping is a version of continuous mining. The Shale material is extracted at the rate of production required by the crusher. When using Dozing & ripping and transportation Load method, the hydraulic excavator rips a certain quantity of rock and then loads this in order to clear the ground for the next ripping section.

The equipment on site will include but not limited to excavators, backhoes, bulldozers, ripping equipment, loaders, tippers, 4wd vehicles, mobile offices and amenities, etc. Other enhancements will include fuel storage tanks, storage areas, garage section, generators, compressors, drill rigs, water storage facilities, crushers, conveyors, hand tools and dining areas.

The excavated material is not on hard ground, thus will be crushed and accumulated on site waiting for collection by 18 tons tippers and transportation to the processing plant. Blasting may be rare considering that shale is not rock-hard material. For the case of blasting, approval from the ministry of mining will be sought, the mine engineer from the ministry will have to supervise the work, and the local community will be sensitized appropriately using siren and alarms. All mining equipment would be diesel powered. The mining area will be secured and tree planting

will be done on the edges of the quarry. The lifetime of the shale mining activity will be determined by the calculated estimate of limestone material (mined elsewhere) which has been used as a benchmark for the processing life cycle. According to Bamburi cement, the limestone deposit is of 50.4 years. The required quantities of shale material are about 34 million tones which will constitute 20% of the required quantities for the cement production. The mine will operate 8am-5pm only. Project power source will be from site generators.

2.2.8 Predicting and Mitigating Environmental Impacts in Shale mining

The mining of Shale Mineral from the proposed area will be a complex undertaking that will require a well coordinated approach with rigorous application of engineering, environmental, social and other applicable safeguards. A high amount of inputs and outputs of various scopes is anticipated, as well as considerable levels of social issues to be addressed. We have considered multiple approaches of scoping for such diverse aspects and we are still compiling new aspects with every step of development. A life cycle assessment (LCA) is one of the methods which will be adopted for assessing the environmental impacts and sustainability of clinker production.

The figure below illustrates a model Shale Mining Cycle as expected to operate under Indigo 4 Mining Project which will be located at Matuga Sub-County, Matuga and Kundutsi Sub-Location. According to the figure, the green circle is a continuous process till when the required quantity of 34 million tone of shale is extracted from the project location over a period of about 50.4 years. The circle is continuous because new areas will be opened progressively as the mining operation proceeds with time.

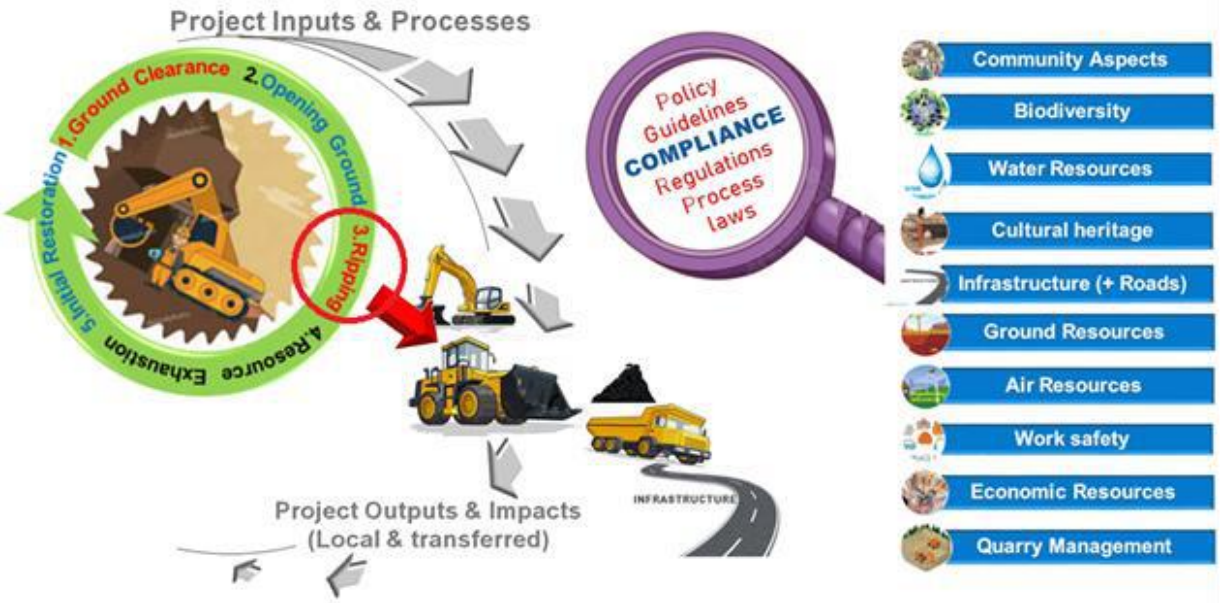


Figure 7: Shale Mining cycle, Basis for Scoping of Impacts (Source: EREL Field Work 2021).

The first step as per the green circle will be ground clearance where obstacles such as vegetation, rocks and unwanted soils will be removed to expose the shale mineral. The ground

will be opened as the shale is extracted by ripping technique. Where the resource is exhausted, initial rehabilitation will commence.
Following step three (3), will be conveying or hauling the material for crushing and stalk pilling. In the process, machinery such as conveyor belts, excavators, tippers, bulldozers, compressors and other forms of earth movers will be used. All will be diesel powered. The site may contain camps and associated amenities.

The gray arrows indicate project inputs and processes, where project inputs will constitute resources into the project (I.e: fuel, labour, water, spare parts, forms of paper materials, food, etc). Associated Processes will constitute, those associated with applied community based labour, professional labour, operation procedures such as onsite vehicle maintenance, waste management, etc. The importance of understanding the processes involved is that certain processes may require certain choices of controls, where one may be environmentally friendlier than the other, hence offering opportunity to fulfil justification for selection of **"Alternatives of Options"** which is a subheading within the ESIA reporting.

Process outputs reflect on the project operation cycle outputs which may influence the environment positively or negatively. These are identifiable by studying the entire project operation cycle, project location, equipment used, sources of materials, potential emissions, solid waste and effluent if any. All should be with relevance to the aspects indicated according to the blue titles in figure 7), as well as other similar associated fields. The objective should be to identify best alternatives for the project, identify potential negative impacts and developing mitigation measures for these, ascertaining that the project is in line with operating Policies, guidelines, regulations, laws and observes standard processes. A key aspect in consideration is the integration of Code of Ethics as in provision of the Kenya Law.

2.2.9 Sustainable Management in the Mining Sector

The Second Medium Term Plan 2013-2017 of Vision 2030 considers development of mineral resources a priority and states that exploitation of these resources will benefit the people of Kenya. One of the major goals for the Government of Kenya is to ensure that exploitation of mineral resources in the country does not lead to environmental degradation and pollution including having negative social impacts on people and their livelihoods. Nonetheless, there is a wide range of environmental considerations in the exploration, exploitation and processing of mineral resources because mining activities can have a wide range of environmental and social risks as shown in the table below.

Table 6: Environmental and social risks in the mining sector

Environmental risks	• Habitat alternations, with adverse impacts for local communities,flora & fauna; • Waste management, including general wastes and hazardouswastes; • Gaseous emissions; • Hazardous effluents; • Water contamination; • Reduction in local water supply from overuse;

	• Energy use; and • Non-compliance with local environmental laws and regulations.
Social risks	• Child labour; • Forced labour; • Worker exposure to hazardous materials; • Use of explosives; • Physical hazards, notably from underground mining (fires,explosions, confined spaces); • Non-payment of minimum wages; • Lack of proper labour contracts; • Lack of workplace associations/unions; • Lack of proper training and protective equipment for workers; • Community concerns over land alternations from mining; • Resettlement of local communities from new or expanded miningoperations; • Inflow of non-local workers to new or expanded mining sites, withpotential adverse impacts for local communities such as an increase • in prostitution and HIV/AIDS prevalence, especially if new non-localmale workers are not with their families;
Human Rights	• Impacts on indigenous populations; • Impacts on cultural heritage; • If the mining site is remotely located, there are risks for improperliving conditions for workers and their families; • Risks associated with the use of a company security force; and • Non-compliance with local health and safety laws and regulations

2.2.10 Mineral Exploitation/Extraction

Mineral exploitation means the act of extracting a mineral resource from a mine with the aim of producing mineral materials, minerals in their existing form the ground, in order to meet different needs and uses. Mineral exploitation field means a specific part of or total mineral field which is the subject of, and the surface and depth of which is defined in, the decision made to assign the mineral exploitation field or the licence issued for the exploitation of its mineral resources. Mineral extraction is the act of either removal from ground, or crushing and separating ore into valuable substances or waste by any of a variety of techniques. In this case, separation of shale materials from unwanted impurities.

2.2.11 Project Cost

The proposed mining and transportation project development phase, is valued at an estimated cost of One Hundred and Fifty Million (150,000,000) Kenya Shillings.

3. BASELINE INFORMATION OF THE STUDY AREA

3.1 Introduction

Kwale County is one of the six Counties in the coastal region. It borders Taita Taveta County to the North West, Kilifi County to the North East, Taita Taveta and Kilifi to the North, Mombasa County and Indian Ocean to the East and United Republic of Tanzania to the South. The County is located in the South-eastern corner of Kenya, lying between Latitudes 30 3‘and 40 45‘south and Longitudes 380 31‘and 390 31‘East.

The county covers an area of 8270.2 Km², of which 62 Km2 is under water. The area excludes the 200-miles coastal strip known as the Exclusive Economic Zones (EEZ). The position of the county puts it in a strategic location for accelerated economic growth in the Kenyan Coast. The proposed project is currently concentrated within Matuga and Kundutsi Sub-locations of Kwale County.

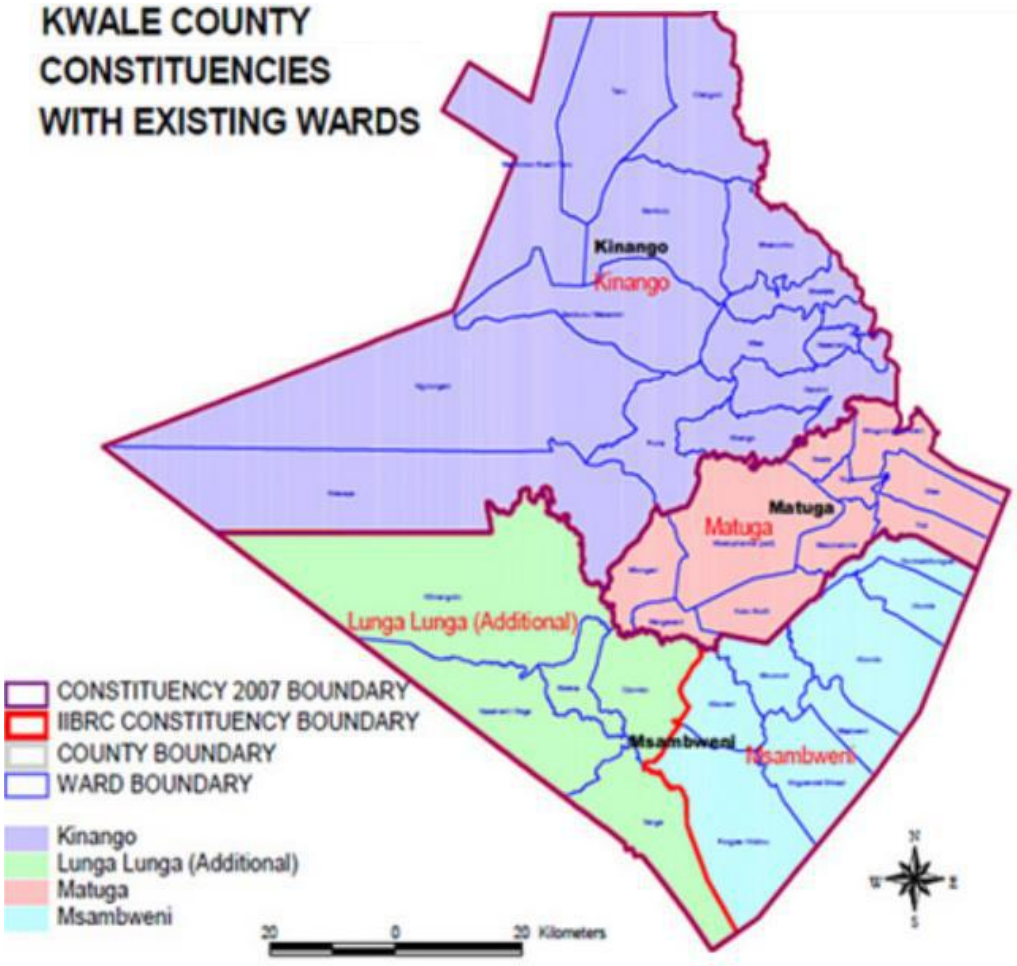


Figure 8: Map showing project area coverage in Kwale County.

3.2 Administrative and political units

The county is divided into four sub-counties namely; Kinango, Matuga, Msambweni and Lunga-Lunga. The sub counties are further divided into wards. Table 8 below summarizes the distribution of wards as per sub-county, and their respective human population:

Table 7: Administrative and political units

Sub-County	Constituency	Division	Area (Km^2)	No of locations	No of Sub locations
Matuga	Matuga	Matuga	342.1	6	12
		Kubo	472.8	6	16
		Shimba Hills Nat. res.	216.3	-	-
		Total	1031.2	12	28
Kinango	Kinango	Samburu	1,803.1	5	10
		Kasemeni	592.0	5	12
		Kinango	1,060.7	3	6
		Ndavaya	555.9	1	4
		Total	4011.7	14	32
Msambweni	Msambweni	Msambweni	346.3	4	10
		Diani	232.4	2	5
	Lungalunga	Lungalunga	2648.5	5	9
		Total	3,227.2	11	24
Total			**8,270.2**	**37**	**84**

Source CIDP 2013-2017

3.3 Demographic Characteristics

The County population based on the 2018-2022 County Integrated Development Plan (CIDP) population projection for 2020 was 1,279,682. The population density based on the 2020 projection was 111. The population is projected to rise to total 1,914,796 by 2022.

The labour force (15-64 years) was 352,353 persons (165,636 males and 186,718 females respectively) in 2009 representing 49% of the total population and is projected to increase to 451,391 people in 2022.

At the study area, the most populated center is Matuga which has a typical clustered pattern and a small quantity of villages and few instances of individual households spread within under developed areas where the shale mineral occur. Each household at the study area has an approximate population of about 5.5 persons according to the current Mining Baseline survey statistics collected at the field.

3.4 Health care

The County has a total of five (5) government hospitals, ten (10) health centres and ninety (90) dispensaries located in Msambweni, Matuga, Lunga-Lunga and Kinango Sub-Counties. The

doctor and nurse population ratio stands at 1:76,741 and 1: 3,133 respectively. In addition, the county has a total of thirty six (36) private health facilities and nine (9) health facilities owned by faith based organizations. The average distance to the nearest health facility within the County is seven (7) kilometers as compared to the required maximum of three (3) kilometres. Matuga has a total of 21 level 2 health facilities, 3 No level 3 facilities and 2 No level 4 facilities. The following are the health facilities within or near the project area:

- Kwale County Hospital
- Matuga Health Centre
- Muungano Dispensary
- Mwachome Dispensary (Not yet operational)
- Vuga health Centre

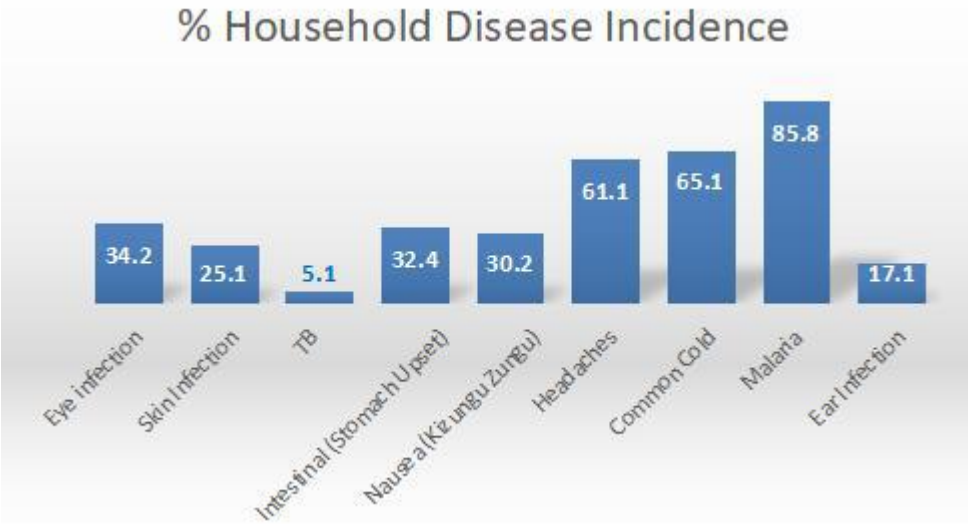
The CIDP 2017-2022 (Kwale) indicates that the highest disease burden in the county are malaria, anaemia, HIV, diarrhoea, respiratory conditions and non-communicable diseases. These conditions highly contribute to the high morbidity and mortality in the county. This calls for concerted efforts to address this health challenge in the community. A visit at Tiwi Rural Home Training Centre, the following disease incidences were recorded:

Table 8: Top 12 Disease Incidences recorded at Tiwi health centre

General Disease incidence occurrence recorded at Tiwi Health Centre:		**Top Twelve health conditions affecting children under 5 years:**	
1. URTI	2692	**1.** URTI	1328
2. Confirmed Malaria	1651	**2.** Skin Diseases	772
3. Skin Diseases	1027	**3.** Confirmed Malaria	382
4. Arthritis	1409	**4.** Ear Infection	94
5. UTI	950	**5.** Asthma	93
6. Suspected Malaria	770	**6.** Suspected Malaria	92
7. Injuries	466	**7.** Chicken pox	86
8. Hypertension	369	**8.** Injuries	83 (Burns 37)
9. Asthma	312	**9.** U.T.I	56
10. Diarrhoea	291	**10.** Eye Infection	49
11. Deaths from injuries	280	**11.** Jigger	46
12. Pneumonia	197	**12.** Others	1222
Other General Disease Incidences recorded at Tiwi Health Centre			
13. Other LRTI	-176	**20.** STI	- 102
14. Ear Infection	- 163	**21.** Eye Infection	- 88
15. Abortion	- 150	**22.** Dysentery	- 55
16. Dental	- 142	**23.** Anaemia	- 53
17. Chicken Pox	- 131	**24.** Malaria in PNG	- 43
18. Diabetes	- 119	**25.** Intestinal Worms	- 33
19. Mental	- 119		

(Source: Field 2021)

From the above table, disease incidences and conditions which may relate (caused or exacerbated) to negative consequences of the proposed project as either inherent, accidental risks or human error may include: Upper respiratory Tract Infections (URTI), Confirmed Malaria, Injuries, Asthma, deaths from Injuries, Pneumonia, Ear infection (due to dust) and eye infection. Malaria may be a factor attributed by breeding of mosquitoes in poorly managed quarries.



Household disease incidences among the sampled households (Source field 2021)

Covid 19 was one of the choices but was not recognised as a priority household disease in the area. The diseases were pre listed in order for the household community to prioritize severity from that list withing their individual households. The analysis then disd a comparative sturdy to see how these diseases ranked among the general households in the area. The list was compiled with a consideration od diseases thought to be common in the country. From the households, Malaria ranked highest at 85% occurence, Common cold and headaches at 65.1% and 61.1% respectively. Eye infections scored 34.2%, intestinal ailments at 32.4% and nausea at 30.2% and skin infection ranked 25.1%. Ear Infections were recorded at 17.1% and TB at 5.1%. Other ailments and health conditions mentioned by household respondents included Disability (6), Asthma (5), Blood pressure (4), Diabetes and Jiggers, each appearing two (2) times.

Considering the above indicators, those diseases which relate to adverse project impacts directly or indirectly as a result of open quarries, inhalation of pollutants and noise impacts among others can be identified and mitigation measures justified against the indications. The operator can use the information to determine which County based programs may be associated with to alleviate health performances in the county and in particular the project area..

Alternative Medical treatment: There are many varieties of forest medicinal products sold by local community trades from the local forests. The medicines have been traditionally used to treat various ailments including stomach upsets, fatigue, headaches, wound infections, eyes, snake bites, open wounds, etc. Their identification was in ethnic names. These products are sources from the rocky lowland environments where coral rocks occur. The ethno medicinal plants found in the market and treated ailments are provided below:

Table 9: Traditional Medicinal plants and their associated value.

	Plant	Description	Parts used	Ailment treated
1	Mtsalafu	Shrub	Roots and leaves	Stomach, body pains
2	Mgunja	Tree	Roots	Used to purify water
3	Mdaa	Tree	Twigs, roots & leaves	Pain reliever for pregnant women
4	Mrusa Pungu	Shrub	Roots	Running stomach, pregnancy relieve, head aches
5	Mdungu	Shrub	Roots	Stomach upsets and legs
6	Morubaini	Tree	Leaves bark & roots	Malaria, stomach, body pains, headaches, eyes, skin, bleeding gums, (40 diseases)
7	Golonje	Shrub	Twigs and leaves	Ring worms and stomach worms
8	Munga	Shrub	Root and leaves	Placenta ejection, leaves treat anxiety affecting children
9	Mumbu	Shrub	Leaves	Stomach aches & digestive system
10	Mjasusa	Shrub	Leaves	Controls blood flow from cuts, pain reliever
11	Mtserere	Shrub	Leaves	Stops blood flow
12	Mvuma	Tree	Leaves and roots	Stomach aches

All species above grow within the prospective area.
Source: Field (Informant - Mwanasiti Kirauni (0728271923), Ethno Medicinal Practitioner)

3.5 Education

Pre-School Education: The County has a total of 1,072 Early Childhood Development (ECD) centres spread evenly in the county with 820 being public and 252 being private. The total enrolment stands at 83.7 percent and a net enrolment 81.2 percent. The teacher/pupil ratio is at 1:37 and the average ECD attendance age is 4.5 years.

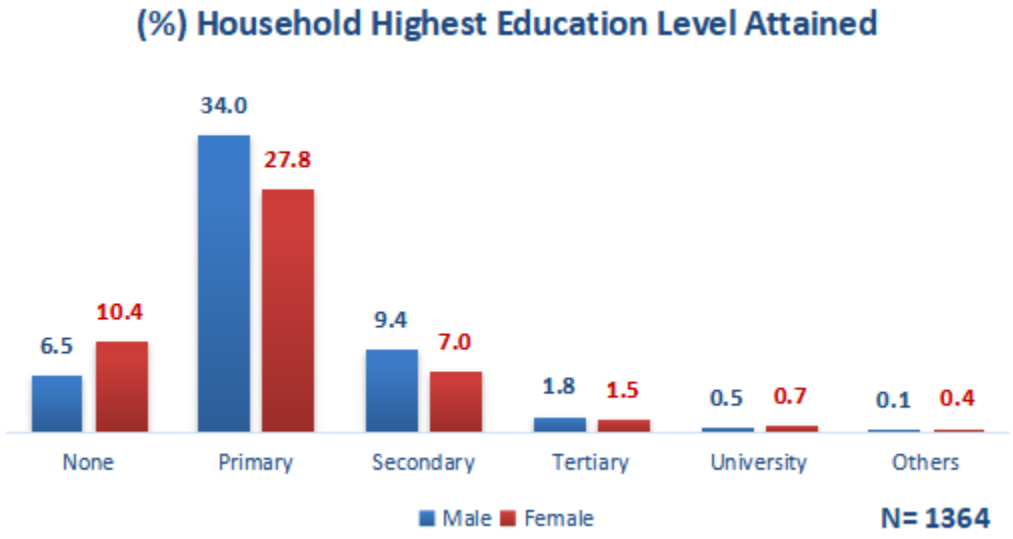
Primary Education: Kwale County has total of 471 primary schools comprising of 392 and 79 public and private primary schools respectively with a total enrolment of 178,166 pupils which constitute a gross enrolment rate of 107.5 percent and a net enrolment rate of 76.1 percent. The primary school teacher population is 4,892 which translate to a teacher/pupil ratio of 1:36. The performance in national examination is very poor due to poor and inadequate school infrastructure such as classrooms, toilets and desks. Another factor attributed to poor performance in the County is malnutrition.

Secondary Education: The county has a total of 79 secondary schools with a total enrolment of 25,739 students which constitutes a gross enrolment rate of 35.5 percent and a net enrolment is 25.3 percent. The secondary school teacher population is 1,173 this translates to a teacher student ratio of 1:21 though the teacher distribution is uneven with hinterland schools experiencing high teacher shortage.

Tertiary Education: The tertiary institutions in the County include a Kenya School of Government (KSG), Kenya Medical Training College and 34 registered public and 4 private vocational training centres. The County has no university but has a satellite campus of Technical University of Mombasa (TUM).

Literacy: The County has a total of 150 adult literacy centres with a total enrolment of 7,133 where 4,391 were females and 2,742 were males. With the introduction of the free primary education for all and adult classes in the County, the literacy levels have reached an average of 57 percent.

Project HH survey Area: The figure below illustrates the education levels attained by the community at the study area:



Education level for those above 5 years in the study area (Source Field 2021)

In the study area, the indications show that there is a great -ve variation of enrolment between primary schools and secondary schools, as well as between secondary schools and tertiary schools. This is an indicator of high drop out rates and a high illetaracy level (considering those with no education). it may be difficult for the developer to adequately identify properly qualified qualifications to fill higher cadre jobs which require tertiary or university qualifications from the location, and thus may need to initiate programs to alleviate the potential qualifications to get absorbed into the industry. Indicators from the CIDP as well as existing county programs, and the wish lists developed during this survey can be used to advise the developer on how to prioritize their action to effectively improve education quality in the area.

3.6 Mining

The county has several on-going mining activities such as exploitation of limestone at Waa and Titanium at Nguluku and Mrima by Coast Calcium Limited and Base Titanium Limited respectively. Previous Prospects for niobium at Mrima Hills and have found huge deposits of a rare mineral sparking a race for exploitation. The companies have extended operations to more regions of the county that are rich in the mineral. Similarly, Milli Glass Limited, Kenya Breweries Glass Limited and Eastern Chemicals are exploiting Silica Sand in the county. In addition, small scale mining of gemstones is going on in the county. Coral rocks also provide resources for road construction in the county. There has been attempts by Pancontinental Oil and Gas to bring up oil deposits at the 2014 completed Sunbird-1 well off the southern Kenyan coast. Indications are that there are vast deposits at offshore Kwale (World oil, 2014).

Bamburi Cement will be among the first cement processing companies in Kwale to discover Shale (Mtsarabe for desiccated clay materials) and this new industrial mineral will revolutionize and attract other the cement and tiles industry in Kwale County.

Despite the elaborate legal framework on benefit sharing as per the Mining Act 2016, the county is already hosting Base Titanium mining company which has brought tremendous benefits to the community and County through revenue collection. The County is yet to benefit from the mining activities related to cement production. The only forms of industrial mining encountered at the proposed project area were old quarry pits at Gongoni and near Matuga Area, which have been abandoned with no rehabilitation.

3.7 Ranches

There are 13 ranches in the county with an average size of 15,055 Hectares. Out of these five are company ranches and eight group ranches most of which are in Kinango Sub-county (www.kwale County 2021).

3.8 Industry

Kwale County has 4 manufacturing industries that include Coast Calcium Limited, Base Titanium, Bixa Limited and Kwale International Sugar Company. By their description, these industries are engaged in mining and agricultural activities. Other industries include 2 bakeries and two water distilling companies. There is a substantial potential for establishing industries and factories for coconut and cashew nut processing in this area. The main challenges affecting small scale industrialization which will be beneficial to the locals according to the CIDP 2018-2022 include:

- Inadequate machinery and equipment for micro-processing/ value addition.
- Inadequate investment in industrial research including limited uptake of appropriate industrial technology.

3.9 Energy Resources

The CIDP indicates 20.1% of residents in Kwale County use electricity as their main source of lighting. A further 17.6% use lanterns, and 41.8% use tin lamps. Electricity use is slightly common in male headed households at 12% as compared with female headed households at 8%. More

than half (71.7%) of households rely on firewood for cooking while 12.2% use charcoal, 7.7% use kerosene and 6.6% use liquefied petroleum gas (LPG).
The relevance of energy matters is in view that the local community potentially uses the targeted area as a resource area for their wood energy resource. According to the CIDP 2018-2022, lack of access to clean sources of energy is a major impediment to development through health related complications such as increased respiratory infections and air pollution.

Figure 9: 132KV Power Transmission line & local firewood harvesting (Source: Field 2020).

There is a high voltage transmission line connecting the south coast through Galu to Lunga lunga and traverses the area. It is in accordance to the Energy Regulation that such corridors should be provided with way-leaves of about 60 meter width. The project should also consider that the use of community area may reduce the surface area where energy resources are sources and may have to work with the community to develop green ideas on how to improve sustainable energy sources within the community.

3.10 Tourism

The main tourist attraction sites in Kwale are Shimba Hills National Reserve, Mwaluganje Sanctuary, the protected Kaya Forests for cultural heritage, marine reserves and parks, historic sites (Shimoni Holes and Diani Mosques), forest, coral and white sandy beaches, bird habitat areas, hotels and turtle breeding grounds. There still exist potential in this sector such as untapped cultural resources and plenty of potential tourist sites that could offer accommodation facilities and sport tourism.

There is no tourist attraction site within the proposed project area. However, there is a wildlife migratory route to the north of the site, which will not be affected by the proposed extraction of shale material. The closest Kaya forest is Kaya Bombo which will offer indicator for monitoring.

3.11 Main Forest Types and Size of Forests

Kwale County does not have commercial plantations. There is one rain forest that is Shimba Hills Forest. The size of the gazetted forest is 350.45Km^2 and 1900Km^2 for non-gazetted forest. There are a number of indigenous forests commonly known as Kayas which are sacred sites and are maintained by the Miji Kenda Councils of elders. Kaya forest patches are small in size, ranging in area from 10 ha to 400 hectares and are what remains, preserved by cultural norms, of much

more extensive forest. To date, over 50 kayas have been identified in the contiguous districts of Kwale, Msambweni, Kinango, Kaloleni, Mombasa, Kilifi and Malindi. Most Kaya forests tend to be located at strategic sites on hill-tops but a few are found in river valleys, and others on flat land. The type of vegetation of the Kayas varies from place depending on the type of forest or woodland that originally dominated the area (NMK, 2008).

Table 10: The Protected Kaya Forests of Kwale County

	Name	Legal Status
1	Kaya Kwale (in FR)	FR/NM
2	Kaya Mtae (in FR)	FR/NM
3	Kaya Lunguma	NM
4	Kaya Bombo NM	NM
5	Kaya Kiteje NM	NM
6	Kaya Teleza	NM
7	Kaya Waa NM	NM
8	Kaya Tiwi NM	NM

NM=National Monument FR=Forest Reserve FR/NM= Dual site

Source: *NMK, 2008*

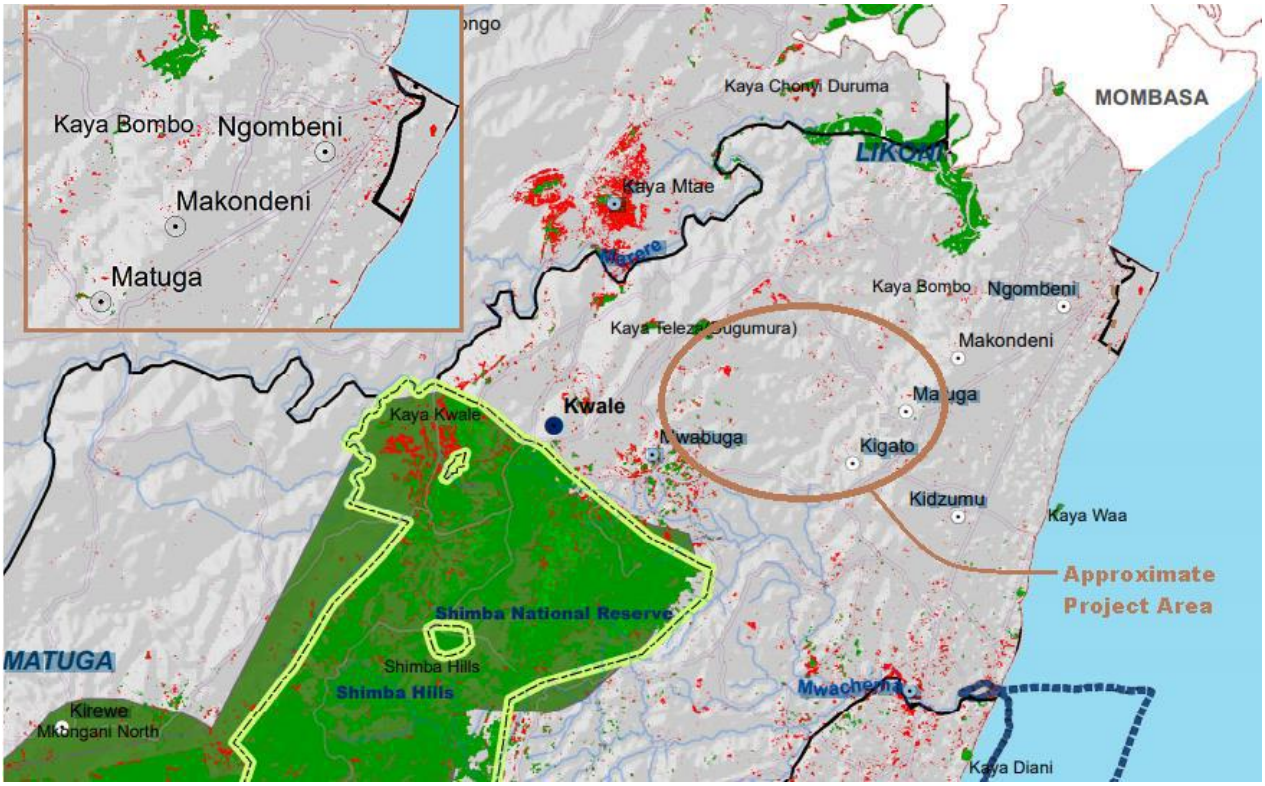


Figure 10: Kaya Bombo and Kaya Teleza: The closest kayas to the project area.

Most farmers have adopted agro-forestry and green economy as a result of on-going promotion of agro-forestry and tree planting sensitization programmes in the county. This is expected to reduce dependency on indigenous forest for wood fuel. Kayas rehabilitation is ongoing to maintain Kaya Catchment for ground water rejuvenation as well as protection of Marere Water Catchment in Shimba Hills Forest. There is horticulture farming at Kubo and Msambweni Division for both domestic consumption and commercial use. Of importance to the community and conservation purposed are certain species of trees which do not grow necessarily within forests or protected areas. These include the Baobab tree and mango trees (Kwale County Website, 2017).

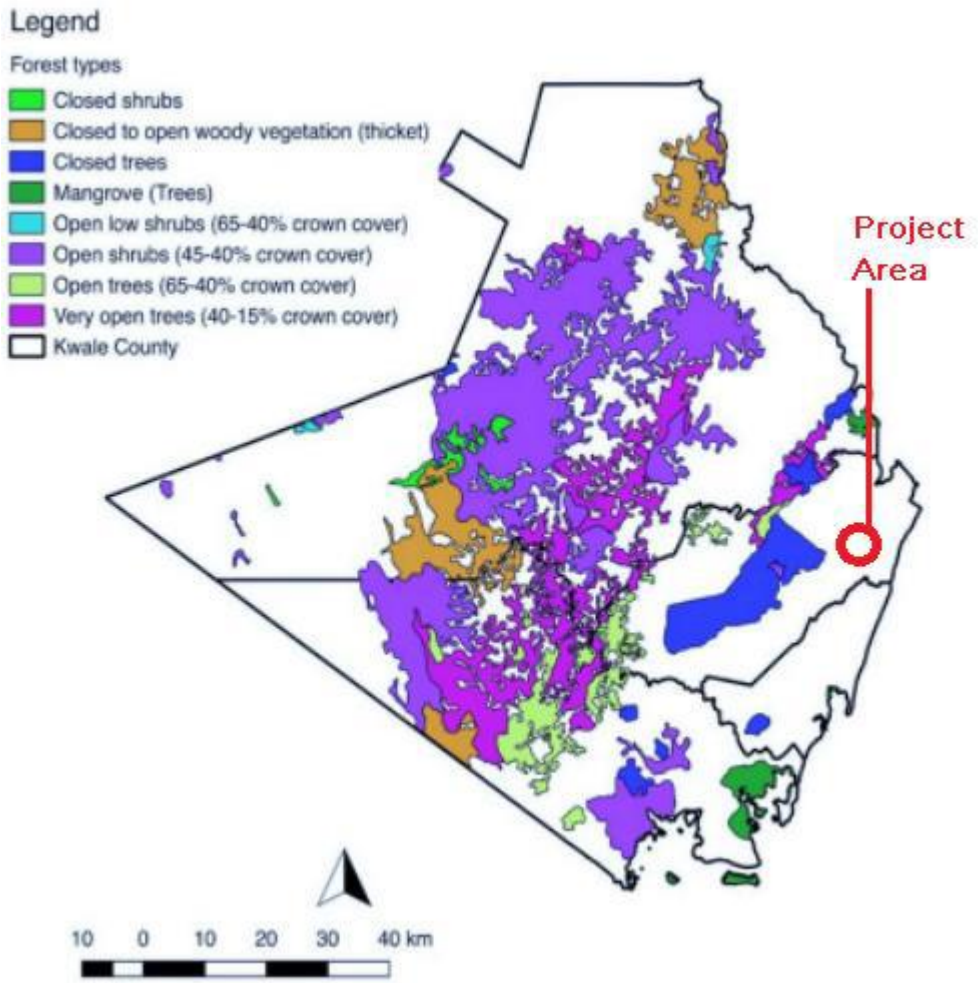


Figure 11: Forest types and sizes in the County

3.12 Self-Help Gender Groups

Self-help Gender groups have been registered with the social department and they are engaged through the departments of registration. The groups are facilitated through Sacco funds, merry-go-round initiatives or through NGOs and other groups of interest. Gender groups diversity range between youth groups, elderly groups, the physically challenged, women groups, special persons groups etc.

3.13 HIV-AIDS

With an estimated HIV prevalence of 5.7% (National HIV Estimates 2014) Kwale County is ranked as a medium-epidemic county. With 21,159 People Living with HIV (PLHIV) in the county, it is of concern that two thirds of this population are women and over 2,600 of them are children (National Aids Control Council, 2021).

3.14 General remarks on basic information and gender

Women are clearly side-lined at all levels in the community. The project should develop designs which would object at reducing heavy burdens on women. I.e. incorporation of sustainable water provision, development of structures which would bar the excessive use of fuel wood while lobbying for cleaner energy sources, involvement of women in decision making and local employment opportunities where possible, bench-marking minimal women participation before holding meetings, cooperating with women's groups for their involvement etc. HIV/AIDs preventive measures should be actively implemented throughout the project phases.

The statutory stakeholders involved in Gender and Social Issues are the County Government (Department of social services) and the Youth and Sports department.

4. PREVAILING PHYSICAL AND HUMAN CONDITIONS

4.1 Climate

Under this section, factors related to geography of the area are highlighted. These are related to climate, geology and soils, hydrology, ecology and vegetation.

4.2 Climate setting

Kwale is one of the warmest regions in Kenya with an average daily high temperature of 31 degrees centigrade. High humidity and high temperatures are making the weather pleasant at times, but also and partly tropical hot and humid. It is warm to hot all year round and invites to bathe at average water temperatures of 27 degrees. Due to the lesser rain the best time for traveling is from December to March. Most precipitation decrease from April to May (www.world data.info).

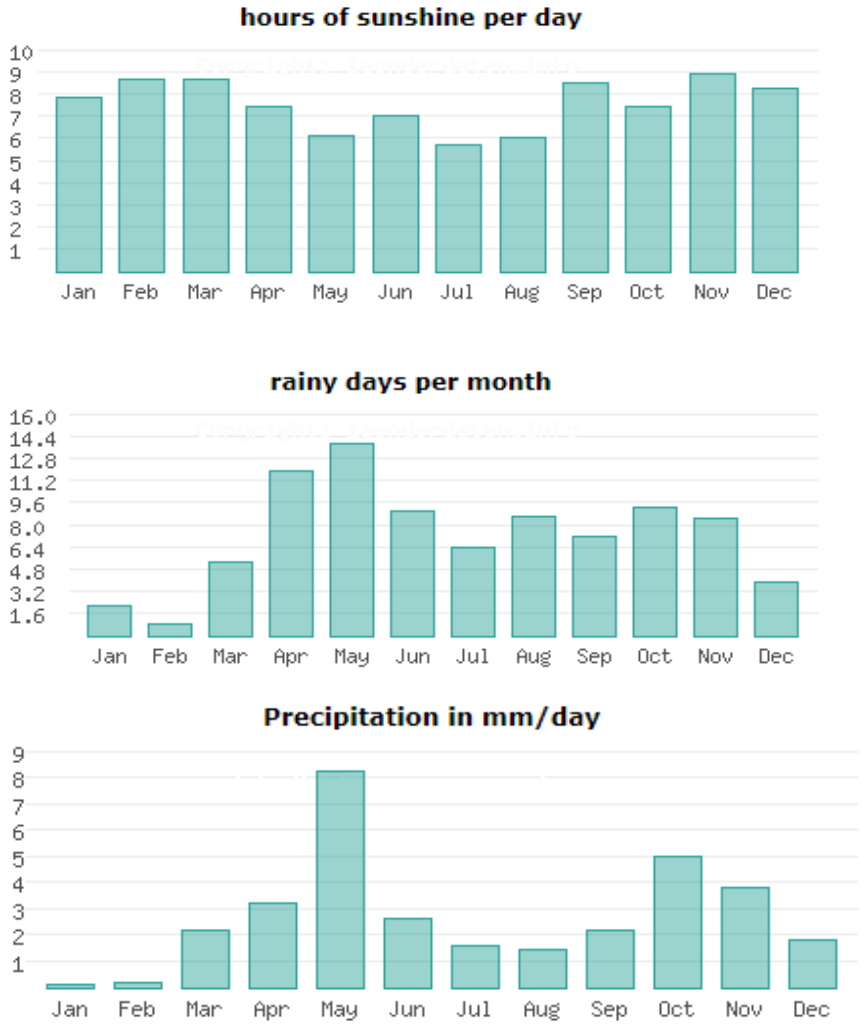


Figure 12: Weather Pattern (https://weather-and-climate.com)

Implications of weather: considering the proposed project is that mining is about opening up the ground surface and moving of earth materials, creating huge pits and undulating grounds in the process. High rainfall may trigger high surface runoffs, weaken excavations and may also activate siltation and transportation of surface soil into the receiving water body. This may cause unusual turbidity, loss of soil and unnecessary pooling. Wet weather on the loose surface roads also render the roads impassable and dangerous to drive on. On the other hand, prolonged drought and high sunshine may trigger dust activation depending on wind strength. This calls for pre-planned remedial measures to suppress adverse occurrences.

4.3 Physical and Topographic Features

Kwale County has four major topographic features namely the Coastal Plain, the Foot Plateau, the Coastal Uplands and the Nyika Plateau. The coastline in Kwale County is about 250 kilometers. This strip of land consists of corals, sands and alluvial deposits. The Foot Plateau, behind the Coastal Plain lies at an altitude of between 60 and 135 meters above sea level. The plateau has a flat plain surface with high potential permeable sand hills and loamy soils. This zone is composed of Jurassic rocks and sandy hills consisting of Magarini sands ideal for sugar cane growing (http://www.dolficode.com).

4.4 Soils and Geology of the project area

There is a narrow scope of soils and geological variation within the specific project area. The figures below illustrate the general soils and geology of the project area: -

a. Soils

The following mixes of soils variations consists of the general composition of soils and exist in pockets within the general area (National Atlas of Kenya 2006):

-***Dark red loamy sands (Latosolic soils):*** *Reddish-brown* (5YR 5/4) low humic (0.5-1.5% carbon) "A" horizon, overlies a dark red (2.5YR 3/6) crumby to weak sub angular blocky loamy sand. Derived from sediments and occur on high grounds in the coastal belt, between 30-150m. Rainfall 750-1,000mm.

-***Brown clay (grumosolic soils)*****:** *Dark greyish-grown* (10YR 4/2) to black (10YR 2/1) "A" Horizon, overlies a dark brown (10YR 4/3) blocky clay which becomes pale olive (5YR 6/3) with depth. Mainly derived from sediments and occur on both high ground and low-lying areas in the coastal belt from sea level to 250m. Rainfall 600-900mm.

b. Geology

The Jurassic Sediments of the coast range in age from the Bajocian to Kimmeridgian, and consist of shales and sand stones with lesser intercalations of sandy clay (National Atlas of Kenya 2006).

4.5 Characteristics of the immediate environment

General description: The area is characterized with high gradient undulating hills with loose clay where the ground is undisturbed. The Altitude of Vuga and Mtsaranu which is on the extreme west is between 200 and 130masl. Matuga on the extreme west of the wider project area is at about 125masl. The area currently identified for the shale abstraction which is west of the high-power transmission cable is between 100 and 50 mast with a number of hills rich with shale

materials. Settlements are sparsely populated with subsistence-gardens. The connecting roads are seasonal considering the clay characteristics at many areas as well as the vulnerable drifts where seasonal rivers cut the through roads and flood during moderate rains. Forests have been cut down for domestic use, thus coverage is poor.

4.6 Shale occurrences by Villages in Matuga and Kundutsi Sub Locations

The Shale Soil materials is shallower as one moves to Mtsarani and deeper as one approach the Ocean.

1. Mtsarani- Shale occurs on the surface, less than one feet
2. Ganze -Shale occurs on the surface, less than one feet
3. Mwachome- Shale occurs about 2 feet from the surface
4. Mwauchi- Shale Occurs 2-3 feet from the surface
5. Patanane- Shale occurs about 4 feet
6. Tsunguni -Non or least presence of shale (could be deeper in over burden)

4.7 Hydrological characteristics in the county

Generally, the county is well drained by seven major rivers among them Ramisi, Marere, Pemba, Mkurumuji, Umba, Mwachema and the Mwachi River. It is also served by numerous minor streams. Of the seven (7) rivers, three (3) are permanent. All Kwale rivers flow into the Indian Ocean. Rivers Marere and Mwaluganje have been harnessed to provide piped water.

Table 11: Main Rivers in Kwale County

River	Source	Areas Traversed	Volume M3/D	Quality	Destination
Marere	Marere Spring, Shimba Rain Forest	Shimba Hills National park	9087	Good	Indian Ocean at Bamboo Creek
Pemba	Marere Spring, Kinangop Area	Kinango-Tsunza	7605	Good Saline at Destination	Indian Ocean at bamboo creek
Mkurumudzi	Shimba Hills	Shimba hills, msambweni	9917	Good Saline at Destination	Indian Ocean at Gazi-Msambweni
Umba	Usambura mountains	Lungalunga	6104	Good Saline at Destination	Indian ocean at Vanga
Ramisi	Chenze Ranges	Mwereni-Shimoni	8190	Good Saline at Destination	Indian Ocean at Bod/Shimoni
Mwachema	Majimboni msulwa	Majimboni Gombato-Diani	341.73	Good Saline at Destination	Indian ocean at Diani
Mwache	South Samburu	South Samburu	-	Good Saline at Destination	Indian Ocean at Mazeras

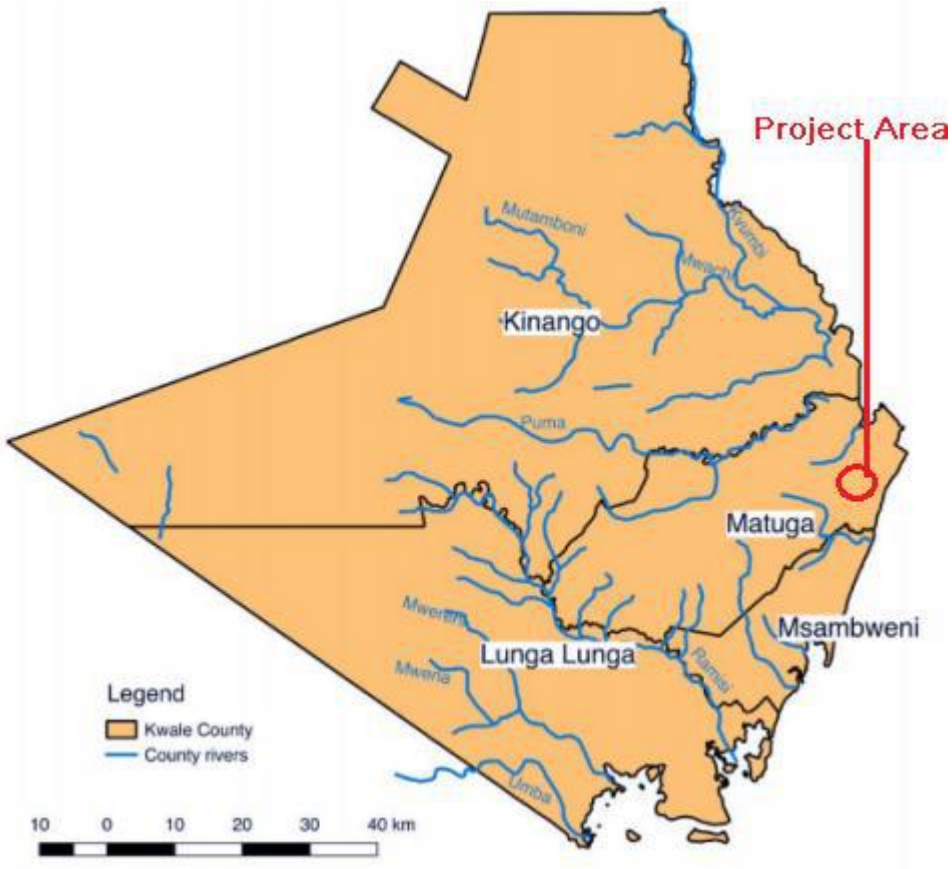


Figure 13: Distribution of rivers in the County (Source: CIDP 2018).

Kwale has great groundwater potential because of its abundant rainfall and porosity of the underlying rock. The water quality is largely determined by the geology of the micro-location. Most of underground water in this series is saline and found in greater depths. The coastal belt has a great potential for potable underground water with six main underground water catchments and/or reservoir. During heavy rain seasons, the hilly Matuga environment holds water pools which slowly sips out through the underground channels. The semi-permanent rivers serve as ground water recharge as well as fall back water sources for some community members and wildlife (including elephants) during extreme dry seasons (CGK, 2013). Other common rivers mentioned by the local community in Matuga include: Chiziarure River in Mwachome village, Tsunguni River and Mtsarani Rivers in Mtsarani village, Bomeza/Bububu River which is a permanent river flowing into Indian Ocean at Diani, Mwauche River near Barcelona, Ganze River, and Vyunguni River.

4.8 Ecology of the area

Kwale County is divided into agro-ecological zones in terms of agricultural potential. Medium potential and marginal lands constitutes 15 per cent and 18 per cent of the total land area respectively. The rest of the land, about 67 per cent is range, arid and semi-arid land suitable

only for livestock and limited cultivation of drought resistant crops. Annual rainfall is less than 800mm on the average and is extremely unreliable.

The climatic zone best fitting the targeted area for Mining according to the National Atlas of Kenya classification is zone 3 (Dry sub-humid to Semi-Arid - moisture index 10 to 30). The land is not of forest potential, carrying a variable vegetation cover (moist woodland, bush land or Savannah).
The trees are characteristically broad leaved (such as Combretum), and other large shrubs which are mostly ever green. Use of this zone prominently includes mining, tourism and settlement. Priority of use is increasingly dependent on prevailing economic trends and fiscal planning systems (National Atlas of Kenya 2006).

4.9 Biodiversity

The distribution of vegetation and wildlife in Kwale County as a region is controlled by climate, the geological formation (soil) and human interaction (tree cutting, clearing and grazing). The total area covered by forests in the region is about 7 per cent, 54,544 hectares (35,043 hectares gazetted and 19,500 hectares not gazetted).

Terrestrial Wildlife: The remnant of the tropical forest in the region has been gazetted for conservation as the Shimba Hills National Reserve and the Mwaluganje Elephant Sanctuary. Among animal species found in the reserves are elephant, eland, sable antelope, giraffe, yellow baboon, Angolan colobus, sakes monkey, Grimm's bush buck, hyena, leopard, buffalo, and water back. The ranches of Kinango and Samburu Division are home to the zebra, impala, etc. Figure 2.12 illustrated approximate distribution of vegetation.

Vegetation: The dominant natural vegetation in the general area consists of wooded grassland in general. Areas immediate to human settlements have been modified to suit community preferences. Areas under wooded grassland are the most dominant. These consist of grassland with scattered or grouped trees, the trees always conspicuous, but having a canopy cover of less than 20%. At the lower coastal trees are mangrove forests which are influenced by the ocean and internal drainage systems. Some of the trees are enhanced for their socio-economic values (i.e. mangos) while others are under populating due to community use and demand for settlement.

At domestic level, the species most exploited for a number of uses include the mango tree and the coconut palm trees. These bear multiple uses and are of high value economically. It is worth noting that the community has reduced efforts to indulge in small scale or kitchen garden farming, bee keeping and innovative use of forest resources for sustainable domestic purposes.

Marine: The country values marine life along the Kenyan coast. Kisite-Mpunguti Marine National Park and Reserve is managed and protected by Kenya Wildlife Service (KWS). The marine park is located on the south coast of Kenya, 40km from Ukunda town in the Msambweni Sub County of Coast Province. The ecosystem covers a marine area with four small islands surrounded by coral

reefs. Kisite island is covered in low grass, herbs and rocks, while Upper and Lower Mpunguti Islands have dense coastal equatorial forest. Sea grasses cover a large area of the sub-littoral zone of the reef.

4.10 Major Contributions of Degradation

The main contributor to environmental degradation in the County is solid waste such as plastic bags; bottles; cans; garden and kitchen waste; vegetable waste and oil waste, logging (charcoal burning), bush fire (burning vegetation by farmers), overgrazing, dumping of solid waste by the hotels next to the ocean. Mining and sand harvesting also contribute to environmental degradation by leaving behind sites that are not rehabilitated as well as leaving mines and materials that have radioactive emissions (CIDP 2018). The proposed project should not at all deliver any footprints to exacerbate the above noted contributors of degradation.

4.11 Environmental Hot-spots

These are areas with high amount of biodiversity that experiences habitat loss by human activity. The Shimba Hills ecosystem in the County is a key biodiversity hotspot with Madabara, Mwele, and Longo Mwagandi forests within the Shimba Hills National Reserve hosting the highest number of unique and rare species. The proposed project should check for any potential ecological influence on the closest kaya forests (Kaya Bombo and Kaya Teleza) during Mine development and Operation Phases.

4.12 Road, Railway Network, ports and Airport Network

The County physical infrastructure has remained underdeveloped. Kwale County has a total of 2,028 Km of classified roads of which 212.5 Km are Bitumen surface (paved surface), 425.2 Km is gravelled and 1,695.5 Km of earth surface roads/rural access roads. An international trunk road traverses the county from Mombasa to Lunga-Lunga on the Kenya – Tanzania border. On the northern side the Mombasa – Nairobi Highway virtually forms the boundary of Kwale and Kilifi County. There are 4 Km of railway line and four (4) airstrips at Ukunda/Diani, Shimba Hills National Reserve, Msambweni and Kinango although only Ukunda/Diani is operational. Air transport has contributed to the growth of tourism sector, which significantly contributes to the economic growth of the county. There is a small port at Shimoni which is mostly used for water transport by boats controlled by Kenya Wildlife Service. The County Government through partnership with the Kenya Ports Authority and the National Government intends to develop the Shimoni port facility.Water transport potential in the county remains largely unexploited.

4.13 Housing

The statistics on dwelling structures in Kwale County indicate poor housing conditions with no water or sanitation facilities. Majority of the household structures are thatched using coconut tree leaves (makuti) as roofing materials at 49.8%, while corrugated iron sheet account for 37.1%. The main materials used for the construction of walls include mud and wood, stones, and Mud and cement walls which account for 56.9%, 15.2% and 9.8% of households respectively. Most houses do not have piped water or water closets (CIDP 2018-2022). Housing quality was also considered on a general perspective as observed in the study area (Matuga and Kundutsi).

The few water pipe outlets in the study area are centrally shared between villages and villagers. Most houses are built of mud material. Further north at the scheme (an area which we did not cover) are more permanent houses built of stones and are within a settlement scheme.

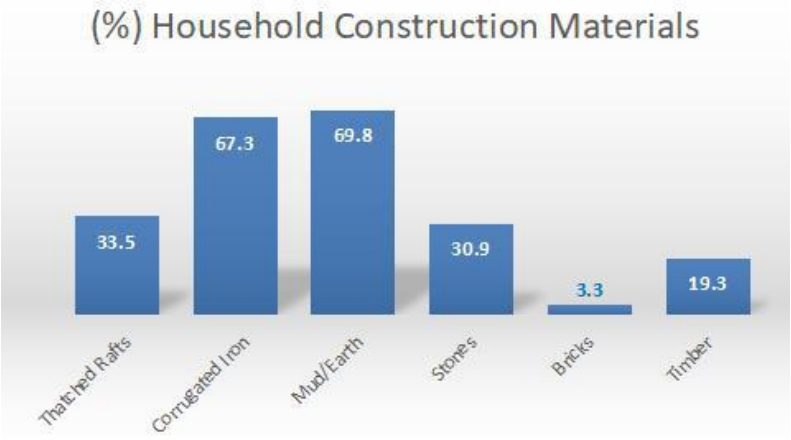


Figure 14: Distribution of Household construction materials (Source: Field 2021).

At the field, most households are constructed by mud and corrugated iron at 69.8% and 67.3% respectively. Only 3.3% were constructed with by bricks and 30.9% by stones. 19.3% had some timber materials, and 33.5% were with thatched rafts. The high prevalence of mud/earth housing design as well as thatched rafts is an indicator of high poverty rates.

In comparison to County Indicators, the location is considered to be generally of higher quality building materials, though a lot may still need to be done to improve the mean housing standards in the county.

4.14 Employment and Other Sources of Income

Access to jobs is essential for overcoming inequality and reducing poverty. Therefore, levels and patterns of employment and wages are significant in determining degrees of poverty and inequality. According the 2009 census, Kwale had a labour force of about 352,353 comprising of 165,636 and 186,718 male and female respectively.

Table 12: Employment by education levels

Education Level	Work for pay	Family Business	Family agriculture	Intern/ Volunteer	Retired/ Home maker	Fulltime Student	Incapacitated	No. of Work	No of individuals
Total	17.3	12.3	27.2	0.9	18.8	13.9	0.5	9.1	315,948
None	10.3	11.5	40.2	1.1	27.2	0.4	1.1	8.2	98,724
Primary	15.5	12.6	24.5	0.8	16.9	20.1	0.2	9.4	159,276
Secondary+	34.4	12.5	12.5	1.2	9.7	20.0	0.2	9.6	57,948

Source: CIDP 2018-2022

According to the CIDP 2018-2022, wage employment is still very low within the county, contributing just 8.6% of the average household income. It states that wage labour is mainly concentrated in the hospitality sector, catering to tourist sites such as the natural and marine reserves (Shimba Hills National Reserve and Mwaluganje Sanctuary); historic sites (Shimoni Holes, Diani Mosques); forest, coral and sand beaches (Diani, Tiwi, Gazi, Msambweni) and wildlife habitats (bird and turtle breeding grounds). Other formal wage earners include teachers, public servants, general labourers, and those employed in the production and manufacturing sector (mining, agro-industry, distillers). At the study area, about 80% of residents are in the informal sector while 20% are in the formal sector on employment.

Among the study community, those below 18 years were about 41% of the general population. 18 years is the minimum age where one can be declared formally employed. This population, including the spoilt entries which could not be included in the analysis was about 48% of the total household population. Among the ones that were above 18 years, there were those few who were still occupied in learning institutions. However, 29% employment ratio against those unemployed still presents a low employment level considering the dependent population.

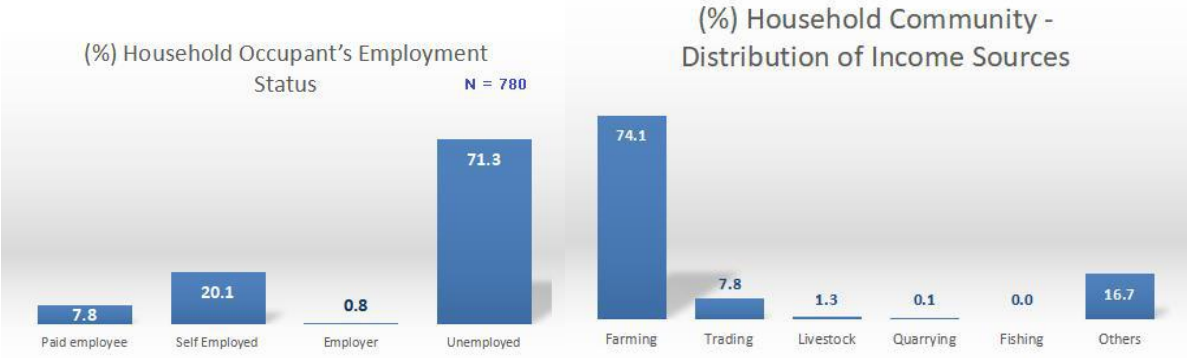


Figure 15: Type of Employment- income distribution at the study area (Source: Field 2021).

It was notable that most houses rely on kitchen gardens to make ends meet. About 71.3% were unemployed. 20.1% were self employed while 7.8% were paid employees. Employers were about 0.8%. The scope of data for this analysis were modified from field indications, however, county data indicate that low employment contributes to just 8.6% of household income. The CIDP indicators suggest that there is more opportunity for employment in under exploited industries such as the formal mining sector.

Poverty is a major determinant of life quality, and thus should be addressed as much as possible to alleviate living standards. The proposed project can leverage of Corporate Social Responsibility programs to enhance projects that would contribute towards addressing this key issue. The figure below indicates the various sources of income in the study area. The County Government can coordinate with the mining sector to formulate strategies which would object at skewing community capacity and interests into the contemporary labour markets to increase the community labour market supply to upcoming industries.

Most of the residents (74%) rely on subsitence farming as a source of livelihood in the project area and trading at only 7.8%. This indication tells that the community value land as a resource as it contributes to daily domestic basic inputs. The proposed project should well evaluate the extent at which the residents daily input from farming may be impacted directly or indirectly and develop mitigation measures if any is identified. One mitigation measure could be to induce local trading and business opportunities directly or indirectly where possible.

4.15 Waste management

Accumulated waste deposits are an indication of societal lifestyles, waste management practices and production technology. Improper management of waste leads to proliferation of disease; environmental degradation and ultimate impact on livelihoods. The county Integrated development plan (CIDP 2018) states that the county has inefficient waste management system where a great deal of wastes generated is dumped in illegal dumpsites leading to physical accumulation of garbage waste leaching its effluents into fresh water systems. Poor transportation of waste has led to littering, making waste an eye-sore, particularly plastics in the environment. At the moment there are few waste handling points (or collection points) organized by the county government in the project area environment, especially around Vuga and Mwanangate markets.

From the household survey, it came out that the community use various means to handle their waste as illustrated in the figure below:

Figure 16: Waste handling at the study area (Source: Field 2021).

Most of the residents (about 78.5%) get rid of their waste by burning while 22.9% discard their waste into the open. 4.7% have open dumpsites which they bury when full and dig new ones. 3.3% said they decompose their waste. Some residents practice more than one method of waste handling. The open dumpsites are open to the environmental winds, domestic and small wild animals as well as scavenging children looking for items to play with particularly near trade

centres. However, the locality does not generate a lot of waste due to low populations but cumulatively, ignoring proper means of discarding waste may cause eye sours to adjacent environment.

With Bamburi Cement objecting at exploiting Shale Soils at Matuga, various streams waste generation will be inevitable from the process. The objective should be to ascertain no foot prints of waste is realized in the project area after action.

4.16 Water Resources

The main water resources in Kwale County comprise of seven rivers, some 693 shallow wells, 56 springs both protected and unprotected, water pans, 6 dams (6) and 110 rock catchments and boreholes (https://kwalecountygov.com). However, most of the rivers are seasonal and cannot be relied upon to supply the much-needed water in the county for both agriculture and household uses.

Kwale Water and Sewerage Company is mandated by the Coast Water Services Board to supply/ distribute, control and manage all the water supply schemes within the county. Private water service providers in liaison with the Kwale Water Services Board have been supplying water to the community to ensure water is available for all. Other water supply schemes include community owned and managed boreholes, dams and water pans. Local community participation in the projects has been poor in both operation and maintenance.

Figure 17: Main Water Sources at the Study area (Source: Field, 2021).

The main household water sources at field calculated from the field sample size (N = 275) was: Well/Spring at 37%, Stream/River at 18%, Rain water collection 8%, Piped water 20% and borehole at 17%. We noted that some houses relied on more than one source and the pipe water as well as the rest on sources were mainly shared as communal facilities. Thus these were commercial. The average distance to water facilities were considered during the household survey. The findings indicate that at Matuga, residents travelled about 2.6kms to the nearest water source while at Kundutsi residents travelled 1.3 kilometers to their main water source. Matuga residents, mainly women, travel far to access water particularly during dry seasons.

4.17 Water Quality

The main source of water in the study area is rain water, most of it obtained after falling on ground from rivers, ground water, water pans and roof water. Samples were collected from a number of common water resource facilities and processed for quality analysis. Their respective results were used to understand quality status.

Table 13: Water Quality methods and standards

Parameter	Test Method	Units	Limit-Treated Water	Limit-Natural Water
Total Suspended Solids	ISO 11923	mg/L	ND	ND
pH@ 25^0	ISO 10523	pH units	6.5-8.5	5.5-9.5
Color	ISO 7887	TCU	15.000	50.000
Turbidity	ISO 7027	NTU	5.000	25.000
Permanganet Index	ASA-APHA-$KMnO_4$	mg/L	NS	NS
Conductivity (EC)	ISO 7888	µS/cm	1500.000	2500.000
Iron	ISO 6332	mg/L	0.300	0.300
Manganese	ISO 6333	mg/L	0.100	0.100
Calcium	ISO 7980	mg/L	150.000	150.000
Magnesium	ISO 7980	mg/L	100.000	100.000
Sodium	ISO 9964	mg/L	200.000	200.000
Potassium	ISO 9964	mg/L	50.000	50.000
Total Hardness	ISO 6059	mg/L	300.000	600.000
Total Alkalinity	SAS-APHA-2320	mg/L	NS	NS
Chloride	ISO 9297	mg/L	250.000	250.000
Flouride	ISO 10359	mg/L	1.500	1.500
Nitrogen as Nitrates	ISO 14911	mg/L	45.000	45.000
Nitrogen as Nitrites	ISO 6777	mg/L	0.900	0.900
Ammoniacal Nitrogen	ISO 11732	mg/L	0.500	0.500
Aluminium	ISO 12020	mg/L	0.200	0.200
Sulphates	ISO 22743	mg/L	400.000	400.000
Orthophosphates	ISO 15681	mg/L	2.200	2.200

Parameter	Test Method	Units	Limit-Treated Water	Limit-Natural Water
Free Carbon Dioxide	SAS-APHA-4500-O	mg/L	NS	NS
Total Dissolved Solids	ASTM D 5907-13	mg/L	1000.000	1500.000
Dissolved Oxygen	SAS-APHA-4500-O	mg/L	NS	NS
Bocarbonates	SASAPHA-2320	mg/L	NS	NS
Carbonates	SAS-APHA-2320	mg/L	NS	NS

Remark Limits are based on KS EAS 12:2018. CFU – Colony Forming Units (for Microbiology), mg/L-milligrams per litre, µg/L – micrograms per litre, TCU – True Colour Units, NTU – Nephalometric Turbidity Units, ND – Not Detected, NS – No standard issued by any Authority, Permissible limits means that the water complies with limits for Natural Potable water but is off limits for treated water.

Here below, we only indicate the sites which were sampled and respective parameters which did not comply, as well as implications of their non-compliance. The detailed reports are appended under appendix 15.

Table 14: Matuga Water Quality Sample & Extreme Parameters

Field Visit Date: 16-11-2020	**Sample Site No. 1 (WSR1)**	**Non-Compliant Parameters**
Kundutsi Sub Location	Kundutsi	• **Iron Content** reads **1.3600mg/L** which is above the requisite level of **0.300 mg/**L of the Natural and Treated Water Limit.
Ward	Tsimba-Golini	
Water Source Type	Bububu river with running water	
Place Name	Behind Patanane village	
Area Description	Bububu river	
GPS Coordinates (Longitude, latitude and Elevation)	(Latitude -4.209617, Longitude 39.530556, Elevation 46m a.s.l)	
Water Uses	Domestic Drinking, washing, watering livestock, irrigated farming	
Photograph taken on site →		

Field Visit Date: 16th Nov.2020	**Sample Site No. 2 (WSW2)**	**Non-Compliant Parameters**
County	Kwale	• **Iron Content** reads **0.7750 mg/L**, above requisite level of **0.300 mg/L** of the Natural and Treated Water Limit.
Sub County	Matuga	
Kundutsi Sub Location	Matuga	
Ward	Matuga	• **Turbidity levels** read **26.3500 NTU**, which is above Treated water limit of 5.000 and Natural Water Limit of **25.000.**
Water Source Type	Shallow well (Protected with a pump and tap connection)	
Place Name	Kwa mzee Mafimbo, kigato village	
Area Description	Near Matuga town	
GPS Coordinates (Longitude, latitude and	(Latitude -4.182921, Longitude 39.560775, Elevation 121m a.s.l)	

Elevation)		
Water Uses	Irrigation of crops, domestic drinking, washing, livestock	
Photograph taken on site →		

Field Visit Date: 16th Nov.2020	**Sample Site No. 3 (WSW3)**	**Non-Compliant Parameters**
Kundutsi Sub Location	Kundutsi	• **Conductivity at 4,045 µS/cm,** exceeds the **1,500.000 & 2,500.000** µS/cm for Treated and natural Water Limits Respectively. • **Magnesium at 207.1528 mg/L,** exceeds the **100.000mg/L** limits for both Treated and natural Water Limits Respectively. • **Sodium at 969.5000 mg/L** exceeds the **200.000mg/L** limits for both Treated and natural Water Limits Respectively • **Total Hardness at 1,176 mg/L,** exceeds the **300.000 & 600.000 mg/L** for Treated and natural Water Limits Respectively. • **Chloride at 1,737 mg/L,** exceeds the **250.000** limits for both Treated and natural Water Limits Respectively. • **Flouride at 3,7500 mg/L,** exceeds the **1,500.000 limits** for both Treated and natural Water Limits Respectively. • **Total Dissolved Solids mg/L,** exceeds the 1,000.000 & 1,500.000 for Treated and natural Water Limits Respectively.
Ward	Tsimba-Golini	
Water Source Type	Shallow well (Protected with no pump and taps)	
Place Name	Patanane village	
Area Description	Near a bridge and Mwangaza Vision Primary School heading to Kwale town off Tsimba area	
GPS Coordinates (Longitude, latitude and Elevation)	(Latitude -4.189378, Longitude 39.527791, Elevation 80m a.s.l)	
Water Uses	Domestic Drinking, washing, watering livestock,	
Photograph taken on site →		

Field Visit Date: 16th Nov.2020	**Sample Site No. 4 (WSR4)**	**Non-Compliant Parameters**
Kundutsi Sub Location	Matuga	• **Total Suspended Solids at 4.4800 mg/L,** Exceeds set limits marked ND (Shouldn't be detected) for Treated and natural Water Limits Respectively. • **Colour at 65.000 TCU,** exceeds the 15.000 & 50.000 for Treated and natural Water Limits Respectively. • **Turbidity at 85.3000 NTU,** exceeds the 5.000 & 25.000 for Treated and natural Water Limits Respectively. • **Iron** reads **2.6600 mg/L**, above requisite level of **0.300 mg/L** of the Natural and Treated Water Limit.
Ward	Matuga	
Water Source Type	Stagnant Water pool, rain surface run-off	
Place Name	Mwanunje dam at Ziwani village	
Area Description	Near Matuga -Gandini road opposite Matuga Government school	
GPS Coordinates (Longitude, latitude and Elevation)	(Latitude -4.168295, Longitude 39.560980, Elevation 60m a.s.l)	
Water Uses	Direct Watering of livestock, washing, swimming,	

Photograph taken on site →	

Field Visit Date: 16th Nov.2020	**Sample Site No. 5 (WSR5)**	**Non-Compliant Parameters**
Kundutsi Sub Location	Kundutsi	• **Turbidity at 17.5000 NTU,** exceeds the **5.000 for** Treated Water Limits. • **Iron** reads **1.6800 mg/L**, above requisite level of **0.300 mg/L** of the Natural and Treated Water Limit. • **Sodium at 262.3000 mg/L** exceeds the **200.000 limits** for both Treated and natural Water Limits Respectively •
Ward	Tsimba-Golini	
Water Source Type	Running water-river Mwachoma	
Place Name	Kisunya village	
Area Description	Near a bridge at Mwachoma river near Sheep and goat	
GPS Coordinates (Longitude, latitude and Elevation)	(Latitude -4.156466, Longitude 39.556243)	
Water Uses	Domestic Drinking, washing, watering livestock, water for irrigation	
Photographs taken on site →		

Field Visit Date: 16th Nov.2020	**Sample Site No. 6 (WSP6)**	**Non-Compliant Parameters**
Kundutsi Sub Location	Matuga	• **Turbidity at 34.5000 NTU,** exceeds the **5.000 & 25.000** for Treated and natural Water Limits Respectively. • **Iron** reads **0.7150 mg/L**, above requisite level of **0.300 mg/L** of the Natural and Treated Water Limit.
Ward	Matuga	
Water Source Type	Spring water	
Place Name	Mwembeni spring	
Area Description	Near Matuga -Kwale road	
GPS Coordinates (Longitude, latitude and Elevation)	(Latitude -4.194035, Longitude 39.551168, Elevation 91m a.s.l)	
Water Uses	Domestic Drinking, washing	

Photographs taken on site →		

The study found that the non-conforming parameters in one or the other site were present. These include Iron, Turbidity, Conductivity, magnesium, Sodium, Total hardness, Chloride, Fluoride, TDS, TSS and color. We studied these parameters and found that they widely impact on human health in the following ways when chronically consumed:

Table 15: Health Implications and remediation for parameters found above limits

Element	Health Impacts	Remedial Measures
Iron	• Small particles of iron can host bacteria, some of which are dangerous to humans. • Exposed skin to water with high iron content, may suffer acne and other skin conditions may increase. Could potentially clog up pores, resulting in breakouts. Could also damage the skin cells themselves. • Diabetes, a loss of sex drive, potential impotence, heart or liver failure	• Water Treatment and Skin treatment for severe cases • Using water Iron Removal filter
Turbidity	• Develops gastrointestinal diseases, especially problematic for immune-compromised people (Contains contaminants like viruses or bacteria). • The suspended solids interfere with water disinfection with chlorine (particles act as shields for the virus and bacteria)	• Using coagulants • Use of domestic water filters
Conductivity	• Conductivity is not a pollutant itself, but serves as an indicator of the presence of pollutants. • The conductivity of water is affected by the presence of dissolved substances in the water, including salts and heavy metals. Some of these substances are harmful to aquatic life and to humans, especially at high concentrations.	• Micro filtering water • Chemical treatment of water for safety
Magnesium	• Excess long term intake of Magnesium can result to kidney failure	• Install water softeners
Sodium	• Acute effects: nausea, vomiting, convulsions, muscular twitching and rigidity, and cerebral and pulmonary oedema. • Excessive salt intake aggravates chronic congestive heart failure, and ill effects due to high levels of sodium in drinking-water have been documented. • The effects on infants are different from those in adults because of	• Expensive to treat. Consider alternative sources if content is high. • Reverse Osmosis (R.O.) • Distillation

	the immaturity of infant kidneys. • Infants with severe gastrointestinal infections can suffer from fluid loss, leading to dehydration and raised sodium levels in the plasma (hypernatraemia); permanent neurological damage is common under such conditions.	• Deionization (DI)
Total Hardness	• Varying degree of effect on human health, depending on chemical/chemical composition and concentration of elements in the water	• Install water softeners which replaces the magnesium ions with sodium ions
Chloride	• Asthma symptoms, Food allergies, Congenital abnormalities, Bladder and rectal cancer, Unpleasant taste and smell	• Use of appropriate water refiners or filters (Commercial/domestic)
Fluoride	• Dental fluorosis, Skeletal fluorosis, Thyroid problems, Neurological problems • Acne and other skin problems, cardiovascular problems, reproductive issues, thyroid dysfunction, conditions affecting the joints and bones, neurological problems,	• Use of appropriate adsorbent dosage,
Total Dissolved Solids	• organic and inorganic materials, which include minerals and ions that are dissolved in water • Indicator thus presents presence of any of the above in dissolved contents • Same as turbidity	• Filtering at commercial or domestic level
Total Suspended Solids	• Same as Turbidity	• Same as Turbidity and TDS
Colour	• An indicator of pollution by one of the above	• Same as Turbidity

Water quality can be treated centrally or domestically following standard procedures approved by public health department. To cope with water quality issues, the local market to be provided with portable filter equipment for domestic use.

4.18 Air quality

Although this location is characterized significantly with natural ambient air, considering low incidences of bush fires, industrial activities, roads and activities that would trigger air pollution, it was worth setting a baseline status of the air quality before potential exploitation of the area. Otherwise, the main causes of pollution in the area is attributed to prolonged dry weather when strong winds lift dust particles and particulates. Air quality tests for the area were carried out at Kwale County, Matuga Location, which is representative to the project area.

4.18.1 Methods applied

Parameters: Baseline air quality was conducted for the air quality monitoring study was conducted for gaseous parameters (Sulphur dioxides (SO_2), Nitrogen dioxides (NO_2), Carbon monoxide (CO), Hydrogen Sulphide (H_2S), and particulate matter (PM10 & PM2.5). Baseline air quality monitoring was done using the Aeroqual 500 series machine.

Location: The location selected was based on proximity to the highway where vehicle would probably be the main sources of emissions and an interior location to develop a control for an area off the highway and within a community area.

Control Parameters: The two control parameters of reference were the ***Environmental management Coordination (Air Quality) Regulations, 2014*** and the ***WHO Guidelines 2005.*** The applied standard limits are as presented below

Table 16: Extract of the EMCA Ambient Air Quality (Tolerance Limits)

	Pollutant	Time weighted average	Industrial Area	Residential, Rural & other area	Controlled Areas
1	Respirable particulate matter (<10 µg/m³) (RPM)	24 Hours	150 µg/Nm³	150 µg/Nm³	75 µg/Nm³
2	PM2.5	24 Hours	75 µg/m³		
3	Sulphur dioxide	Instant Peak	500 µg/m³		
4	Hydrogen Sulphide	24 Hours	150 µg/m³		
5	Total VOC	24 Hours	600 µg/m³		
6	Oxides of Nitrogen	24 Hours	100 µg/m³	0.1 PPM	
		Instant Peak		0.5 PPM	
7	Carbon monoxide / carbon dioxide	One hour	10 mg/m³	10 mg/m³	10 mg/m³

Table 17: WHO Air Quality Guidelines Values

	Pollutant	Time Weighted Average	WHO Guidelines
1	PM_{10}	24 hours mean	50 mg/m³
		Annual mean	20 mg/m³
2	$PM_{2.5}$	24 hours mean	10 mg/m³
		Annual mean	25 mg/m³
3	Sulphur dioxide	24 hours	20 mg/m³
		10 Minutes mean	500 mg/m³
4	Nitrogen dioxide (NO_2)	Annual Mean	40 mg/m³
		1 Hour mean	200 mg/m³
5	Ozone O_3	8 Hour mean	100 mg/m³

The air quality data obtained for the two selected monitoring station is summarized below. Additional air quality data obtained from the field is under appendix 15.

Table 18: Finding of the gaseous parameters, particulate matter and meteorological conditions

LOCATIONS	TEMP	HUMIDITY	CARBON MONOXIDE (mg/m^3)	NITROGEN DIOXIDE ($\mu g/m^3$)	SULPHUR DIOXIDE ($\mu g/m^3$)	$PM_{2.5}$ ($(\mu g/m^3$)	PM_{10} ($(\mu g/m^3$)	Hydrogen Sulphide	WEATHER	WIND SPEED AND DIRECTION
Patanane Bridge site (Patanane village) (Run 1)	26.7	66.5	0.08	0.15	0.88	22	36	0.12	Sunny and partly windy	13km/hr North East to South
Patanane Bridge site (Patanane village) Run 2	26.7	66.3	0.10	0.18	0.68	26	44	0.14	Sunny and partly windy	15km/hr North East to South West
Averages	**26.7**	**66.4**	**0.09**	**0.165**	**0.78**	**43**	**60**	**0.13**		
Mean	**26.7**	**66.4**	**0.09**	**0.165**	**0.78**	**43**	**60**	**0.13**		
Precision	**26.7±0.0**	**66.4±0.02**	**0.09±0.02**	**0.17±0.03**	**0.78±0.28**	**37±4**	**58±8**	**0.13 ±0.02**		
Mwanuje site (Ziwani village) (Run 1)	27.1	61.2	0.05	0.18	0.22	34	44	0.22	Sunny and partly windy	15km/hr North East to South
Mwanuje site (Ziwani village) (Run 2)	27.1	61.2	0.08	0.19	0.24	41	50	0.24	Sunny and partly windy	15km/hr North East to South West
Averages	**27.1**	**61.2**	**0.065**	**0.185**	**0.23**	**37.5**	**47**	**0.23**		
Mean	**27.1**	**61.2**	**0.065**	**0.185**	**0.23**	**37.5**	**47**	**0.23**		
Precision	**27.1±0.0**	**61.2±0.0**	**0.065±0.03**	**0.185±0.01**	**0.23±0.02**	**37.5±7**	**47±6**	**0.23 ±0.02**		
WHO GUIDELINES 2005				**200 ug/m^3**	**500 ug/m^3**	**10 ug/m^3**	**50 ug/m^3**			
EMC (Air Quality) Tolerance Limits			**10.0 mg/m^3**	**150 ug/m^3**	**125 ug/m^3**	**75 ug/m^3**	**150 ug/m^3**			

4.18.2 Comments

- The results however showed compliance against the EMC (Air Quality) Regulations, 2014 for Carbon monoxide levels for all the selected monitoring locations.
- The Nitrogen dioxide recorded at both monitoring location however showed compliance with the EMC (Air Quality) Regulations, 2014. The Nitrogen dioxide recorded at both monitoring location were below the World Health Organization Air Quality Guidelines, 2005.
- Particulate matter (PM2.5 &PM10) recorded at both monitoring locations however showed compliance with the EMC (Air Quality) Regulations guideline.

Table 19: Patanane Village Air Quality Sampling

Field Visit Date: 16th Nov.2020	**Sample Site No. 1**
Kundutsi Sub Location	Kundutsi
Ward	Tsimba-Golini
Place Name	Patanane village
Area Description	Near a bridge and Mwangaza Vision Primary School heading to Kwale town off Tsimba area
GPS Coordinates (Longitude, latitude and Elevation)	(Latitude -4.188208, Longitude 39.527525, Elevation 77m a.s.l)
General Wind Direction	South East-North West
Major Land Use	Crop farming and livestock keeping (eg.Poultry farming), Matuga-Kwale Road Highway infrastructure
Field Visit Date: 16th Nov.2020	**Sample Site No. 2**
Matuga Sub Location	Mwanunje
Ward	Matuga
Place Name	Mwanunje water pool at Ziwani village
Area Description	Along Matuga-Gandini road and behind Govt. School in Matuga
GPS Coordinates (Longitude, latitude and Elevation)	(Latitude -4.167823, Longitude 39.561410, Elevation 67m a.s.l)
General Wind Direction	South East-North West
Major Land Use	Crop farming & livestock keeping (eg.cattle, sheep and goats)

4.19 Noise

The proposed location is descriptively at a largely rural setting and is under developed with few earth roads traversing the area and connecting to that moderately busy Kwale Mombasa road. There are relatively few motorbikes serving the area. Noise is commonly from the few vehicles and motor bikes plying the area and is considered insignificant. Below are noise measurements taken from adjacent villages which are comparatively busier compared to the current study area:

Table 20: Noise levels Analysis

Point GPS Ref.	Location	Descriptive	Noise Levels (dB)
Matuga Location			
(Latitude -4.189378, Longitude 39.527791, Elevation 80m a.s.l)	Patanane bridge	This is a road setting. Prominent audible noise is from Motorbikes	**Maximum – 67.3**
			Average – 54.3
			Minimum – 44.2
Latitude -4.209617, Longitude 39.530556, Elevation 46m a.s.l	Bububu river, behind Patanane village	Notable noise is from crosswinds and community conversations and motor bikes.	**Maximum – 61.7**
			Average – 49.7
			Minimum – 32.3
Latitude -4.182921, Longitude 39.560775, Elevation 121m a.s.l	Kwa mzee Mafimbo, kigato village, Matuga	Notable noise is from motor bikes and community noise	**Maximum – 63.5**
			Average – 55.5
			Minimum – 37.1

The parameters above were measured in December 2021 during the Prospecting and Exploration ESIA Study. The parameters are still indicative for current considerations. From the above report, the maximum (highest) oscillations are occasional and short term, attributed to motorbikes and light vehicles. The current site under study bear no active quarries or heavy vehicles. Cross winds can also trigger peak recordings particularly at open areas, thus were not considered to be sensitive. The general levels are considered to be low due to the nature of activity at the point. The general area is rather quiet with cross winds blowing across open fields. The residents informed that night hours are relatively silent.

We also investigated the noise level parameters at the potential site where the Shale is marked for mining using the Professional Sound Level Meter (Ver. SLM-25) on the 28th of March 2021. The results for the Prospecting Hole 10 and Hole 7 at Mtsarani Village are indicated below:

Record Parameters	Content
Address	1
Serial Number	
Test Name	**Mtsarani Hole 10**
Setting Time	28/03/2021 02:59:46
Total Records	50
Record Interval	3 sec
Immediately/Manual	Manual
Noise Alarm	L:30 H:130 dB
Sample Level	FAST
Noise Level	A
Start Time	28/03/21 03:01:55
Test Records	50
Maximum (dBA)	58.4
Average (dBA)	56.33
Minimum (dBA)	48
Is Noise Alarm	

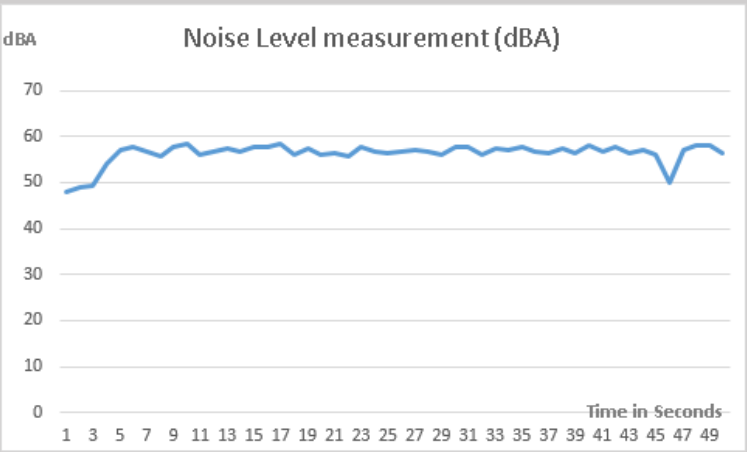


Figure 18: Noise measurement for Mtsarani Prospecting Hole 10

Record Parameters	Content
Address	1
Serial Number	
Test Name	Mtsarani Hole 7
Setting Time	15/05/2021 03:50:29
Total Records	50
Record Interval	3 sec
Immediately/Manual	Manual
Noise Alarm	L:30 H:130 dB
Sample Level	FAST
Noise Level	A
Start Time	15/05/2021 03:50:42
Test Records	50
Maximum (dBA)	60
Average (dBA)	56.51
Minimum (dBA)	54.1
Is Noise Alarm	

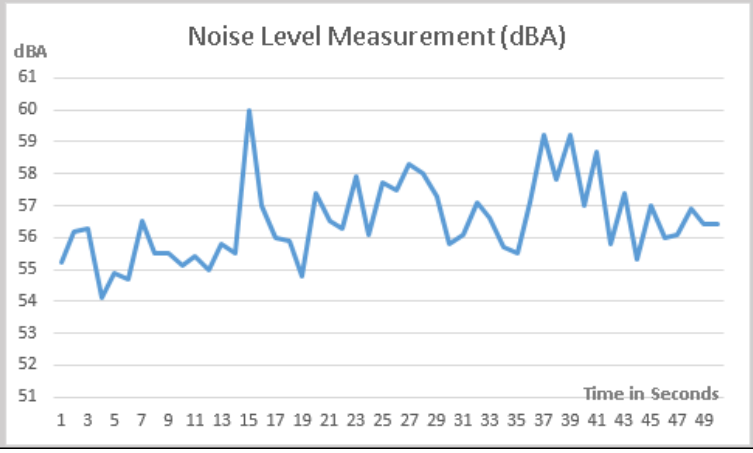


Figure 19: Noise measurement for Prospecting Mtsarani Hole 7

Table 21: Maximum Permissible Noise levels

Zone		Sound Level limits dB(A) (Leq,14h)		Noise Rating Level (NR) (Leq,14h)	
		Day	**Night**	**Day**	**Night**
A.	Silent Zone	40	35	30	25
B.	Place of Worship	40	35	30	25
C.	Residential: Indoor	45	35	35	25
	Outdoor	50	35	40	25
D.	Mixed residential (with some commercial & entertainment places)	55	35	50	25
E.	Commercial	60	35	55	25
Time Frame Day: 6:01a.m. – 8.00 p.m (Leq, 14 h Night: 8:01p.m. – 6:00 a.m. (Leq, 10 h)					

Criteria for noise level analysis: Mean noise level recordings at 30 meters from source for various categories of sources in the area, or any other source observed against frequency of occurrence per selected point. Noise measurement procedures can be requested for from NEMA or County Public Health offices. Note that the maximum permissible noise levels at residential outdoor areas according to EMCA 1999 (Rev 2019), Noise and Vibrations regulations of 2009 are 55dB for daytime hours and 35dB for night hours.

5. RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORK

5.1 Introduction

EIA is an instrument for environmental management and development control. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound. It is a condition that all developers conduct ElAs on the development projects.

EIAs are carried out in order to identify potential positive and negative impacts associated with the proposed development with a view of taking advantage of the positive impacts and developing mitigation measures for the negative ones. The guidelines on ElAs are contained in section 58 to 67 of the Act. According to section 68 of the EMCA 1999 Amendment 2019, the authority shall be responsible for carrying out environmental audits on all activities that are likely to have a significant effect on the environment.

There are a number of policies, laws and regulations that govern the protection, conservation and exploitation of the natural resources coupled with provisions for environmental management. These national policies, laws and regulations cover infrastructure, water, agriculture, forestry and health just to mention a few. The national environment action plan documents cover policy directions regarding integration of environmental concerns including EIA into development planning process.

Some of the key national laws, policies and regulations that govern the management of environmental resources in the country are discussed herein.

5.2 The Constitution of Kenya, 2010

The provisions of Chapter V (Protection of Fundamental Rights and Freedoms of The Individual) shall have effect for the purpose of affording protection to those rights and freedoms subject to such limitations of that protection as are contained in those provisions, being limitations designed to ensure that the enjoyment of those rights and freedoms by any individual does not prejudice the rights and freedoms of others or the public interest. The constitution protects citizens from deprivation of property. No property of any description shall be compulsorily taken possession of, and no interest in or right over property of any description shall be compulsorily acquired, except where it is necessary for public interest.

5.3 Relevant National Policies

The following national policies are of relevance to Environmental management in Kenya and to the proposed project:

5.3.1 The National Environmental Action Plan (NEAP)

The NEAP was a deliberate policy effort to integrate environmental considerations into the country's economic and social development initiatives/plans. The integration process was to be

achieved through a multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and conservation of natural resources are an integral part of societal decision making. 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, EIAs were introduced targeting the industrialists, business community and local authorities (now the county governments).

The mining project shall be implemented and operated based on these guidelines and where the guidelines will be seen to fall below requisite threshold, international standards will be adopted.

5.3.2 National Policy on Water Resources Management & Development (1999)

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 waste water 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.

5.3.3 Policy Paper on Environment and Development (1999)

The key objectives of the policy include;

i. To ensure that from the onset, all development policies, programs and projects take environmental considerations into account,
ii. To ensure that an independent EIA report is prepared for any industrial venture or other development before implementation,
iii. To come up with effluent treatment standards that will conform to acceptable 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.

So far, in the course of the ESIA process, the environmental consultants have attempted to reach out to the project stakeholders through public consultative processes. As the ESIA process matures, the experts will be keen to see that all necessary clean development mechanisms are incorporated for the benefit of environmental receptors of the project.

5.3.4 The National Poverty Eradication Plan (NPEP)

The objective of NPEP was to alleviate poverty in rural and urban areas by 50 percent by the year 2015 as well as the capabilities of the poor and vulnerable groups to earn income. It also aimed to narrow gender and geographical disparities and a healthy, better educated and more productive population. This plan had been prepared in line with the goals and commitments of the World Summit for the Sustainable Development (WSSD) of 1995. Since poor health status is among the indicators of poor societies, the plan pursuits to address its capacity to relieve poverty.

5.3.5 Public Health Policy

The prevailing public health policy calls upon the project proponent to ensure that buildings and work areas are adequately provided with utilities so that they are fit for human habitation. The proposed development has been designed by professional architects and engineers and as such will have all amenities/utilities that are essential for safeguarding public health for all people using the facilities during the construction, operational and decommissioning phases of the project.

The proponent must adhere to the provisions of the relevant Act of parliament, Public Health Act (CAP 242).

5.3.6 Sustainable Development Goals (SDG's)

On September 25th 2015, countries adopted the United Nations Sustainable Development Goals (SDG's) aimed at contributing towards ending poverty, protecting the planet, and ensuring prosperity for all as part of a new sustainable development agenda. The SDG's have very significant implications for investment needs and the role of the public sector is fundamental and pivotal. At the same time the contribution of the private sector is indispensable.

The proponent must be committed to the SDG's through the proposed development in the following ways:

Goal 1 – No Poverty: Targets to be achieved

It states that, to end poverty, everyone should have basic healthcare, security and education. The project is a mining facility that will employ, thus will also directly contribute towards the goal.

Goal 6 – Clean Water and Sanitation: Targets to be achieved:

The project will contribute to improved water provision as a corporate association with the community through development of prioritized projects including safe adequate water distribution projects.

Goal 8 - Decent Work and economic growth: Targets to be achieved:

During construction and operation phases, employment creation will contribute to reducing the proportion of youth not in employment.

The project will also provide an environment that emphasizes on protection of labor rights and promotes safe and secure Working environments for all Workers

Goal 9 - Industry and infrastructure: Targets to be achieved:

This will involve building resilient infrastructure and fostering innovation. This project will meet international standards and will be the first of its kind outside the Capitol City of Nairobi. It will alleviate many other satellite sectors such as transport industry within the region, medical industry and others.

Goal 12 – Sustainable Consumption and Production process: Targets to be achieved:

The project is about exploitation of land resources and this comes with some alterations of usable land. The proponent is aware of this fact and is well known as an environmental sensitive institution. Each and every foot print within the production and consumption cycle is well understood and parallel measures to mitigate negative impacts are well established.

Goal 15 – life on Land: Targets to be achieved:

The proponent is aware that Human life depends on the earth as much as the ocean for our sustenance and livelihoods. Plant life provides 80 percent of the human diet, and we rely on agriculture as an important economic resource. Forests cover 30 percent of the Earth's surface, provide vital habitats for millions of species, and important sources for clean air and water, as well as being crucial for combating climate change. And therefore, must align policies to uphold this key principle.

5.4 Legal framework

5.4.1 Environment Management & Coordination (Amendment) Act, 2019

Section 58 (1) of the Act states "Notwithstanding any approval, permit or license granted under this Act or any other law in force in Kenya, any person, being a proponent of a project, shall, before financing, commencing, proceeding with, carrying out, executing or conducting or causing to be financed, commenced, proceeded with, carried out, executed or conducted by another person any undertaking specified in the Second Schedule to this Act, submit a project report to the Authority, in the prescribed form, giving the prescribed information and which shall be accompanied by the prescribed fee".

Section 59 (l) states that upon receipt of an environmental impact assessment study report from any proponent under section 58(2), the Authority shall cause to be published in the Gazette, in at least two newspapers circulating in the area or proposed area of the project and over the radio"

This Act provides a legal and institutional framework for the management of the environmental related matters. This report has been written pursuant to section 58 (I) of this Act and the proponent shall take note of its provisions. Involvement and disclosure on the project has been extended to the statutory stakeholder institutions, in tangent institutions, the community and the general public.

5.4.2 Environmental Management and Coordination (Environmental Impact Assessment and Audit) Regulations, 2003

Environmental Impact Assessment (EIA) is a critical examination of the effects of a project on the environment. The goal of an EIA is to ensure that decisions on proposed projects and activities

are environmentally sustainable. An EIA is conducted in order to identify impacts of a project on the environment, predict likely changes on the environment as a result of the development, evaluate the impacts of the various alternatives on the project and propose mitigation measures for the significant negative impacts of the project on the environment.

The EMCA, 1999 (rev 2019) requires that during the EIA process a proponent shall in consultation with the Authority seek views of persons who may be affected by the project or activity through posters, newspaper, radio and hold at least three public meetings with the affected parties and communities.

Environmental Audit (EA) is the systematic documentation, periodic and objective evaluation of activities and processes of an ongoing project. The goal of EA is to establish if proponents are complying with environmental requirements and enforcing legislation. The purpose of EA is to determine the extent to which the activities and programs conform to the approved environmental management plan. A comprehensive EA ensures a safe and healthy environment at all stages of project operations and decommissioning.

An initial environmental audit and a control audit are conducted by a qualified and authorized environmental auditor or environmental inspector who is an expert or a firm of experts registered by the Authority. In the case of an ongoing project the Authority requires the proponent to undertake an initial environmental audit study to provide baseline information upon which subsequent environmental audits shall be based.

Self-Audits are carried out after the environmental impact assessment study report has been approved by the Authority or after the initial audit of an ongoing project. The proponent shall take all practical measure to ensure the implementation of the environmental management plan by carrying out a self-auditing study on a regular basis.

This Report complies with the requirements of the Environmental Regulations in the coverage of environmental issues, project details, impacts, legislation, mitigation measures, management plans and procedures. The Proponent shall be required to commit to implementing the environmental management plan laid out in this report and any other conditions laid out by NEMA.

5.4.3 Environmental Management & Coordination (Water Quality Regulations)

Water Quality Regulations apply to water used for domestic, industrial, agricultural, and recreational purposes; water used for fisheries and wildlife purposes, and water used for any other purposes. Different standards apply to different modes of usage. These regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources. The objective of the regulations is to protect human health and the environment. The effective enforcement of the water quality regulations will lead to a marked reduction of water-borne diseases and hence a reduction in the health budget.

The regulations also provide guidelines and standards for the discharge of poisons, toxins, noxious, radioactive waste or other pollutants into the aquatic environment in line with the Third Schedule of the regulations. The regulations have standards for discharge of effluent into the sewer and aquatic environment. While it is the responsibility of the sewerage service providers to regulate discharges into sewer lines based on the given specifications, NEMA regulates discharge of all effluent into the aquatic environment.

Everyone is required to refrain from any actions, which directly or indirectly cause water pollution, whether or not the water resource was polluted before the enactment of the Environmental Management and Coordination Act (EMCA) Gazetted in 1999 (Rev 2019). It is an offence to contravene the provisions of these regulations with a fine not exceeding five hundred thousand shillings

The proponent has been advised to develop a closed system where all waste streams including toxic agents, waste water, and effluent from the facility is well managed to avoid pollution risks. The proponent has also been advised to develop emergency procedures to contain any potential incident that would result to local or community water contamination.

5.4.4 Environmental Management and Coordination (Waste Management Regulations)

The Minister for Environment and Natural Resources gazetted these regulations in 2006. These Regulations may be cited as the Environmental Management and Co-ordination (Waste Management) Regulations, 2006. Waste Management Regulations are meant to streamline the handling, transportation and disposal of various types of waste. The aim of the Waste Management Regulations is to protect human health and the environment. Currently, different types of waste are dumped haphazardly posing serious environmental and health concerns. The regulations place emphasis on waste minimization, cleaner production and segregation of waste at source.

The Proponent shall observe the guidelines as set out in the environmental management plan laid out in this report as well as the recommendation provided for mitigation /minimization /avoidance of adverse impacts arising from the Project activities.

5.4.5 Environmental Management and Coordination Controlled Substances Regulations, 2007 (Legal Notice No.73 of 2007)

The Controlled Substances Regulations defines controlled substances and provides guidance on how to handle them. This regulation mandates NEMA to monitor the activities of persons handling controlled substances, in consultation with relevant line ministries and departments, to ensure compliance with the set requirements. Under these regulations, NEMA will be publishing a list of controlled substances and the quantities of all controlled substances imported or exported within a particular period. The list will also indicate all persons holding licenses to import or export controlled substances, with their annual permitted allocations.

The regulations stipulate that controlled substances must be clearly labeled with among other words, “Controlled Substance-Not ozone friendly’’) to indicate that the substance or product is

harmful to the ozone layer. Advertisement of such substances must carry the words, “Warning: Contains chemical materials or substances that deplete or have the potential to deplete the ozone layer.”

Producers and/or importers of controlled substances are required to include a material safety data sheet. Persons are prohibited from storing, distributing, transporting or otherwise handling a controlled substance unless the controlled substance is accompanied by a material safety data sheet. Manufacturers, exporters or importers of controlled substances must be licensed by NEMA. Further, any person wishing to dispose of a controlled substance must be authorized by NEMA. The licensee should ensure that the controlled substance is disposed of in an environmentally sound manner. These regulations also apply to any person transporting such controlled substances through Kenya. Such a person is required to obtain a Prior Informed Consent (PIC) permit from NEMA.

The proponent shall put in place measures to track the use of all controlled substances and ensure that safety and health principles and systems are established to manage handling of such substances according to requisite standards. An orientation of all project-based Material Safety Data Sheets (MSDSs) shall guide on the use of such materials.

5.4.6 Environmental Management and Coordination (Conservation of Biodiversity regulations 2006)

Kenya has a large diversity of ecological zones and habitats including lowland and mountain forests, wooded and open grasslands, semi-arid scrubland, dry woodlands, and inland aquatic, and coastal and marine ecosystems. In addition, a total of 467 lake and wetland habitats are estimated to cover 2.5% of the territory. In order to preserve the country’s wildlife, about 8% of Kenya’s land area is currently under protection.

The country has established numerous goals, as well as general and specific objectives that relate to these issues, among others: environmental policies and legislations; involvement of communities; documentation of national biological resources; sustainable management and conservation of biodiversity; fair and equitable sharing of benefits; technical and scientific cooperation; biodiversity assessment; dissemination of information; institutional and community capacity building; and integration of biodiversity concerns into development planning

The Proponent has commissioned this environmental assessment study and seeks to obtain an EIA License from the Authority (NEMA) in compliance with the Act; the environmental management plan included in this report provides guidelines for the mitigation of potentially adverse impacts on natural resources. The proponent also notes that the project area hot-spots are known to be forest environment, water resource areas, rivers, and waste handling and these will be safeguarded as the project progresses.

5.4.7 Environmental Management and Coordination Draft Air Quality Regulations, 2008

This regulation is referred to as “The Environmental Management and Coordination (Air Quality) Regulations, 2008”. The objective 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, including as mobile sources (e.g. motor vehicles) and stationary sources (e.g. industries) as outlined in the Environmental Management and Coordination Act, 1999 (Rev. 2019). 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 following operations (provided they are not used for disposal of refuse), are exempt from these regulations:

i. Back-burning to control or suppress wildfires;
ii. Firefighting rehearsals or drills conducted by the Fire Service Agencies
iii. Traditional and cultural burning of savanna grasslands;
iv. Burning for purposes of public health protection;

The Proponent shall observe policy and regulatory requirements and implement the mitigation measures proposed in this document in an effort to comply with the provisions of these Regulations on abatement of air pollution. In addition to the above, the proponent is aware that the projects inherent factor will be dust activation from the proposed mines and roads during dry seasons, as well as from exhaust engines. In this consideration, measures have been put in place to ascertain minimal pollution impacts.

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

These Regulations determine that no person or activity shall make or cause to be made any loud, unreasonable, unnecessary or unusual noise that annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered:

- Time of the day;
- Proximity to residential area;
- Whether the noise is recurrent, intermittent or constant;
- The level and intensity of the noise;
- Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and,
- Whether the noise is subject to be controlled without unreasonable effort or expense to the person making the noise.

These regulations also relate noise to its vibration effects and seek to ensure no harmful vibrations are caused by controlling the level of noise. Any person(s) intending to undertake activities in which noise suspected to be injurious or endangers the comfort, repose, health or safety of others and the environment must make an application to NEMA and acquire a license subject to payment of requisite fees and meeting the license conditions. Failure to comply with these regulations attracts a fine of KES 350,000 or 18 months jail term or both.

The Proponent shall observe policy and regulatory requirements and implement the measures proposed in this documenting an effort to comply with the provisions of the Regulations. Measures such as observation of work hours, adequate maintenance of machinery, institution of reactive continuous and periodic monitoring, etc. Shall be factored.

5.5 Governance Framework in the Mining Sector

According to the Environmental Management and Coordination Act (EMCA, Cap 387), the management of all development activities in mining areas should be approved under appropriate legislation. The central legislation that is the bedrock for environmental protection is the EMCA, which is the framework and overarching legislation that takes precedence over other sectorial legislation that touch on any aspect of environmental management, including mining law. In the Second Schedule to the EMCA (as amended in 2019), mining is set out as mandatory activities that require submission of an EIA Study report, and the scope of mining is defined to include quarrying and open case extraction of - a) precious metals b) gemstones (c) metalliferous ores coal, e) phosphates, f) limestone and dolomite, g) large scale commercial stone and slate, h) commercial large scale harvesting of aggregate, sand, gravel, soil and clay, i) exploration for the production of petroleum in any form, j) extracting alluvial gold with use of mercury, and k) Geothermal energy exploration and production. Prior to 2015, the only legal provision was through Regulation 42 and 43 of the 2003 Environmental (Impact Assessment and Audit) Regulations. The laws governing the Mining sector Framework, Institutions and Roles are presented below:

Table 22: Governance framework for the mining sector in Kenya

Framework, Role, Designated focal institutions &agencies		
Policy		
1. Mining and Minerals Policy, 2016	The policy provides a firm foundation and basis for establishment of an enabling framework for accelerated and sustainable development of the country's mining and minerals resources sector. The policy is expected to ensure that benefits from the sector are shared by stakeholders, including investors, local artisan and small-scale miners, national and county governments, local communities and the people of Kenya	Ministry of Mining
Legal framework		
1. Mining Act, 2016	The Act of Parliament to give effect to Articles 60, 62, (1) (f), 66 (2), 69 and 71 regarding minerals. It provides the terms and conditions for prospecting, mining, processing, refining, treatment, transport and any dealings in minerals	Ministry of Mining
2. Local Content Bill, 2016	The Bill provides a framework to facilitate local ownership, control and financing of activities connected with the	Ministry of Mining

	exploitation of gas, oil, and other mineral resources; to provide a framework to increase the local value Capture along the value chain in the exploration of gas, oil and other mineral resources	Ministry of Energy & Petroleum
Regulations		
1. Mining (Local Equity Participation) Regulations, 2012	The regulations require that the mineral right in respect of which mining license is issued shall have a component of local equity participation amounting to at least thirty-five per cent (35%) of the mineral right	Ministry of Mining
2. Draft Mining (Use of Local Goods and Services) Regulations, 2016	The purpose of these regulations is to: - • promote job creation through the use of local expertise, goods and services, businesses and financing in the mining industry value chain and their retention in the country • create mining and mineral related supportive industries that will provide jobs and sustain economic development • achieve and maintain a degree of participation for Kenyans or companies incorporated in Kenya for the local supply of goods and the provision of services • provide for a robust, transparent monitoring and reporting system	Ministry of Mining
3. Draft Mining (Award of Mineral Rights by Tender) Regulations, 2016	The regulations are associated with award of mineral rights in order to ensure free and fair, open-market competition which encourages investment in the mining sector	Ministry of Mining
4. Draft Mining (Community Development Agreement) Regulations, 2017	The purposes of the regulations are to: - (1) provide a legal basis on which mining operations and mining-related activities are conducted throughout the entire life of the mine in order to ensure that: a) benefits of the mining operations or activities are sharedbetween the holder and affected community; b) mining operations are consistent with the continuing economic,social and cultural viability of the community; and c) mining operations significantly contribute to the improvedeconomic, cultural, and social welfare of the community;	Ministry of Mining
	(2) ensure accountability and transparency in mining related communitydevelopment; (3) define when Community Development Agreements (CDAs) are required and provide a framework for such agreements	
5. Draft Dealings in Minerals Regulations, 2016	The purpose of the regulations is to give effect to section 223(1) of the Mining Act in so far as it relates to dealings in minerals by providing for the scope and procedures to be followed by a person who requires a mining license or permit	Ministry of Mining

	including the renewal and revocation of such licenses and permits	
6. Draft Mining (Employment and Training) Regulations, 2017	The purpose of the regulations is to: - a) promote job creation through the use of local expertise in the mining industry and across the entire mining value chain and retain the skills within the country; b) develop local capacities in the mining industry value chain through education, skills and technology transfer, research and development; c) achieve the minimum local employment level and in-country across the entire mining industry value chain; d) provide for the submission of the Employment and Training Plan in the mining industry which should include: • a recruitment and training programme; and • the supervision, implementation and monitoring schedule of holders of mineral rights to ensure that Kenyan nationals are employed and properly trained	Ministry of Mining
7. Draft Mining (Mine Support Services) Regulations, 2016	The purpose of the regulations is to provide the scope and procedures to be followed by a person who requires a mine support service license including the renewal and revocation of such licenses	Ministry of Mining
8. Draft Mining (National Mining Corporation) Regulations, 2017	The purpose of the regulations is the establishment of the National Mining Corporation as the investment arm of the national government in respect of minerals	Ministry of Mining
9. Draft Mining (Reporting of Mineral Related Activities) Regulations, 2017	The purpose of the regulations is to provide directions on the submission of relevant reports on mining activities by mining companies	Ministry of Mining
10. Draft Mining (Use of Assets) Regulations, 2016	The purpose of the regulations is to ensure regular audit of all movable and immovable assets in mining activities	Ministry of Mining
11. Draft Mining (Licensing & Permitting) Regulations, 2016	The purpose of these regulations is to regulate the licensing and permitting of mineral rights and dealing permits in accordance with the Mining Act, 2016	Ministry of Mining
12. Draft Mining (Mineral Royalty) Regulations, 2017	The mineral royalty regulations apply to holders of mineral rights, dealers' licenses or permits under the Act and the former Act (Mining Act, 1940)	Ministry of Mining
13. Draft Mining (Strategic Minerals) Regulations, 2016	The purpose of the regulations is to provide clarity on the process through which strategic minerals are identified, declared as strategic and regulated based on a transparent and consultative process that includes technical review and expert	Ministry of Mining

	consideration. Strategic minerals apply to all radioactive minerals	
14. Draft Mining (State Participation) Regulations, 2016	The purpose of these regulations is to provide for State participation in prospecting or mining operations carried out by the holder of a mineral right	Ministry of Mining
Guidelines		
1. Draft Mining Guidelines for Work Programs and Exploration Reports, 2017	The purpose of the regulations is to give effect to sections 223(1) and 221(1) of the Mining Act in so far as they relate to guidelines for work programs and exploration reports. It provides guidance to applicants for, and holders of, reconnaissance, prospecting and retention licenses on how to prepare and submit compliant work programs and exploration reports	Ministry of Mining

5.5.1 Policy

The Government of Kenya formulated the Mining and Minerals Policy (2016) to enable the country obtain maximum benefits from its mineral deposits after operating without a clear policy for many years since the colonial times. Previously, the mining sector was mainly governed on the basis of the Mining Act Cap. 306, a legal framework enacted way back in 1940. The Mining and Minerals Policy (2016) comprehensively addresses the gaps that have existed in the mining sector and aligns them with the aspirations of Kenya Vision 2030, the provisions of the Constitution of Kenya (2010) and the African Union Mining Vision (2009). The African Union Mining Vision policy aims at positioning mining as a key driver of Africa's socio-economic development. In addition to the mining policy, there are other policies in Kenya, which directly impact the mining sector and therefore form part of the mining governance framework. The specific policy prescriptions in these policies in relation to environmental management and human rights are highlighted in the table below.

Table 23: Environmental and human rights prescriptions in the mining policy

Policy	Relevant prescriptions
Mining and Minerals Policy, 2016	3.2. Guiding principles i. Inter-generational equity and sustainable utilization of mineral resources ii. Integrating sound environmental protection, safety and health considerations in mineral resources development iii. Equitable access to mineral resources and benefit sharing iv. Transparency, accountability, and public participation v. Respect of socio-cultural values, access to justice, gender equality and inclusiveness vi. Value addition and development of horizontal and vertical linkages to the local economy

	Policy objectives are to provide a framework for: - • harmonizing mining, health and occupational safety and environmental legislation s • gender mainstreaming and eradication of child labour in mining industry • mainstreaming activities of artisan and small-scale miners • local participation in the mining investment ventures • equitable sharing of mineral benefits between the National Government, County governments and local community
	Policy strategies are to: - **Strategy 4**: Develop legislative mechanisms for accessing land for mineral development **Strategy 5**: Achieve an acceptable balance between mining and environmental conservation and ensure that the sector operates within the approved (national and where necessary international) standards of health, safety, human rights and environmental protection **Strategy 8**: Pursue a responsive regulatory framework that ensures that benefits accruing from the mining sector are maximized for greater socio-economic development **Strategy 9**: Design mechanisms for sharing benefits accruing from exploitation of minerals between the National Government, the County Governments and Local Communities **Strategy 10**: Develop and implement mechanisms to enhance participation of Government (National & County), affected communities and other stakeholders in mining investments **Strategy 11**: Develop a framework for mainstreaming and formalizing artisan and small scale mining operations in order to support livelihoods and entrepreneurship **Strategy 12**: Develop and implement frameworks, structures and mechanisms that ensure equitable participation, ownership and decision-making in mining value chains by women, youth, and disadvantaged groups
	Chapter four: Institutional framework – establishment of directorates with clear mandates as follows: - 1. Directorate of Mines • Arbitration of mining disputes • Mine health, safety and environment 2. Directorate of Geological Surveys • Evaluating and monitoring hazards associated with earthquakes, landslides, toxic minerals, subsidence and other ground failures 3. Directorate of Mineral Promotion and Value Addition • Promoting mineral value addition • Providing extension services to small scale and artisan miners on mineral processing and value addition 4. Directorate of Resource Surveys and Remote Sensing • Land use land cover mapping • Data generation for sustainable conservation; and • Mapping of land degradation

5.5.2 Mining & Minerals Policy - Environmental & Human Rights Considerations

The specific environmental and human rights considerations in the Mining and Minerals Policy (2016) are summarized in the table below.

Table 24: Environmental obligations considered - Mining and Minerals Policy (2016)

Impact dimension	Relevant statutes in Mining and Minerals Policy (2016)
Physical environment	• Mining hazard monitoring and management • Land degradation mapping and management
Biological environment	Nil
Social environment	• Inter-generational equity and sustainable utilization ofmineral resources • Mineral value addition • Equitable benefit sharing • Transparency, accountability and public participation • Stakeholder engagement • Gender equality and inclusiveness • Involvement of youth and disadvantaged groups • Occupational safety and health • Arbitration of mining disputes
Human rights	Eradication of child labour
Environmentalprotection	Environmental protection, safety and health
Environmental rehabilitation & restoration	Nil

5.5.3 Legal frameworks

Principally, the mining sector in Kenya is governed by the 2016 Mining Act, whose purpose is to; a) give effect to Article 60, 62(1(f), 66(2) and 69 of the Constitution, and b) provide for prospecting, mining, processing and any dealings in minerals. Previously, the mining sector was governed on the basis of the Mining Act Cap. 306 enacted way back in 1940, meaning that the industry was operating within an archaic legal framework which was out of touch with the constitution and current international best practices. The new mining law seeks to guide mineral resources wealth exploitation and address governance and environmental issues. It seeks to address key gaps in the Mining Act of 1940, and align the sector to the latest global trends such as value-addition and use of technology to spur investor interest. In addition to the mining legislation, there are other legal frameworks governing the mining sector, and which impact various elements of the mining sector, including investment promotion, employment, occupational safety and health, land legislation, physical planning legislation, and HIV/AIDs prevention and control. The specific legal prescriptions, from these legal frameworks, in relation to environmental management and human rights are highlighted in the table below.

Table 25: Environmental and human rights prescriptions in the mining law

Legal frameworks	Prescriptions
Mining Act, 2016	20(1) Responsibilities for the Director of Mines: – (i) facilitating access to information by the public (n) promoting co-operation among state agencies, county governments, the private sector, research bodies, non-governmental organizations and other organizations which are engaged in mining activities (o) advising on ways of ensuring that mining operations take into account local and community values 3) ensuring the health and safety of persons employed by a holder of a mineral right 21(1) Responsibilities for the Director of Geological Survey: – (c) undertaking geological, geophysical, geochemical, seismological and hydro-geological surveys, investigations and mapping aimed at defining the character and distribution of rocks and superficialdeposits and determining the mineral potential (d) conducting geo-environmental studies; monitoring of seismic processes and mapping of potentialgeo-hazards (f) conducting geological analysis and valuations (g) developing a national repository of geo-science information and facilitating access to this information by the general public (i) undertaking audits of mineral right holders 36(2) Responsibilities for the Mineral Rights Board including mining approvals through: - (a) National Land Commission, in relation to public land; (b) Relevant State agency where that mineral right is on public land (c) Appropriate Cabinet Secretary or other authority, where the area in respect of which a mineral right is in a place of burial, or an area of religious significance, a public building, or for any other public purpose; (d) Cabinet Secretary responsible for matters relating to wildlife conservation and management, where the mining land is situated within a marine park, a national park or a local sanctuary under the Wildlife Act (e) Cabinet Secretary responsible for matters relating to the environment, where the mining land is situated within a protected area, a protected natural environment, or a protected coastal zone under the Environmental Management and Coordination Act; (f)Director of the Kenya Forest Service (KFS), where the mining land is situated within forest area or; operations on, under or over an area, that has been declared a forest area under the Forests Act; 42. (1) Conditions before the granting of mineral right: - (a) the protection of the environment (c) community development (d) safety of prospecting and mining operations (e) health and safety of persons undertaking those operations (f) the protection of the lawful interests of the holders of any other mineral right 43. Improper mining practice (1)(a) engage in wasteful mining or treatment practices 46.(1) Skills transfer to and capacity building for the citizens of Kenya through recruitment and training: -

	(3) Replacement of expatriates, the number of years such expatriates shall serve and provide forcollaboration and linkage with universities and research institutions to train citizens 47. (1) Employment preference to members of the community and citizens of Kenya. (2) In the case of a large-scale operation, the holder of a mineral right shall: (a) conduct training programmes for the benefit of employees (b) undertake capacity building for the employees (c) only engage non-citizen technical experts in accordance with such local standards for registration as may be prescribed in the relevant law Artisanal mining operations 93. Establishment of offices in the county to: 3 (b) compile a register of the artisanal miners (c) supervise and monitor the operation and activities of artisanal miners (d) advise and provide training facilities and assistance necessary for effective and efficientartisanal mining operations (f) facilitate the formation of artisanal association groups or cooperatives; and (g) promote fair trade for artisanal miners 101(2) Information required in the application for a mining license under: (g) a plan giving particulars of the applicant's proposals with respect to the employment and training of Kenyan citizens. (h) a plan giving particulars of the applicant's proposals with respect to the procurement of local goods and services. (i) proof of submission and approval of an environmental and social impact assessment (EIA) reportand environmental management plan; and (j) a plan giving particulars of the applicant's proposals with respect to social responsible investmentsfor the local community. 103. Conditions for granting a mining license: – (c) the applicant has obtained an approved EIA license, a social heritage assessment plan and EMP; (d) proposal for procurement of local goods and services; (e) proposal with respect to employment and training of Kenyan citizens; (f) project feasibility study; (g) proposal with respect to engaging in community investments is socially responsible 106. Required mining license information: — (f) approved plan for the procurement of local goods and services; (h) approved plan to employ and train citizens; (i) approved EIA report, social heritage impact assessment and environmental management plan; 109. Compliances for mining license holders: - (b) approved programme for mining operations; (c) terms and conditions of the approved EIA license, social heritage assessment plan and EMP; (d) demarcation of mining areas; (g) stacking or dumping of any mineral or waste products in the manner provided for in the license; (i) Community development agreement (CDA). 110(1) complete and accurate record of the mining operations including: -

	(2)(1) copies of all maps, geological reports, sample analysis, aerial photographs, cores, logs andtests and other data obtained and compiled by the license holder; 115. Information required for application for the renewal of a mining license: - (c) approved EIA license, social heritage assessment plan, EMP and Community DevelopmentAgreement; **Part V - Mineral agreements** 117(2) Terms and conditions for mineral agreements: – (d) environmental obligations and liabilities, subject to the requirement of the EMCA Cap 387; (j) Community development plans. 119. (1) Subject to Article 35 of the Constitution and any other written law, all mineral agreementsshall be public and be made accessible to the public 128 Conditions for allocation of mineral rights in community land (1) Consent requirement for reconnaissance license or permit and prospecting license from: – (a) the authority obligated by the law relating to administration and management of community landto administer community land; or The county government in relation to the community land that is un-alienated. (2) Consent shall be deemed to have been be given for the purposes of this Act where the registeredcommunity land representatives have:— (a) entered into a legally binding arrangement with the applicant for the mineral rights or with theGovernment, which allows the conduct of mining operations; or (b) Entered into an agreement with the applicant for the mineral right concerning the payment ofadequate compensation. 133. Terms and conditions for holders of a prospecting permit for protection of the environment;140 Obligations to mining permit (c) demarcation of the mining area; (d) protection and restoration of the environment within the mining area; (f) stacking or dumping any minerals or building materials or waste products in the manner providedfor in the permit; (g) not using such equipment as may be prescribed in Regulations or chemicals such as cyanide andmercury. Part VIII—Surrender, suspension and revocation of mineral rights 144 (4) An application made under subsection (2) shall include – (c) proof of implementation of any EMPs 149. (1) The holder of a mineral right who applies to surrender the right shall furnish the CabinetSecretary with (c) Notification of any potentially hazardous substances. Part IX—Surface rights compensation and disputes 152. The owner or lawful occupier or user of an area of land which is the subject of a mineral right shall continue to enjoy the right to graze livestock on the land or to cultivate the land to the extentsubject to the following conditions– (b) does not, by virtue of those operations, constitute a danger or hazard to livestock or crops;

	(b) causing loss of or damage to buildings and other immovable property; (c) causing damage to the water table or deprives the owner of water supply; 153(1) Where the exercise of the rights conferred by a mineral right (b) causing loss of or damage to buildings and other immovable property; (c) causing damage to the water table or depriving the owner of water supply; (d) in the case of land under cultivation or grazing of domesticated animals, causes any loss of earnings (e) a demand or claim for compensation may be made to the holder of the mineral right to pay prompt, adequate and fair compensation to the lawful owner, occupier or user of the land in accordance with the provisions of this Act (8) The Cabinet Secretary in consultation with the community and the NLC shall ensure that the inhabitants or communities who prefer to be compensated by way of resettlement as a result of being displaced by a proposed mineral operation are settled on suitable alternate land, with due regard to their economic wellbeing, social and cultural values and the resettlement is carried out inaccordance with the relevant physical planning law 155. Subject to the provisions of this Act, the Cabinet Secretary may inquire into and determine thefollowing matters: (a) a dispute of the boundaries of an area held under a prospecting or mining right; (c) a claim by any person to be entitled to erect, cut, construct or use any pump, line of pipes, flume,race, drain, dam or reservoir for mining purposes; (d) a claim to have any priority of water taken, diverted, used or delivered for mining purposes, asagainst any other person claiming the same; or (e) assessment and payment of compensation where provided for under this Act. Part XI - Health, safety and environment 176 (1) A mineral right or other license or permit granted under this Act shall not exempt a personfrom complying with any law concerning the protection of the environment. (2) A mining license shall not be granted to a person under this Act unless the person has obtainedan EIA license, social heritage assessment plan and the EMP has been approved. 177. A provision of this Act and any right or entitlement conferred under a mineral right shall not exempt a person from compliance with the provisions of the Water Act, 2016 concerning the right to the use of water from any water resource. 187(1) A provision of this Act and a right or entitlement conferred under a mineral right shall not operate to exempt a person from compliance with the provisions of the Occupational Health and Safety Act, 2007 concerning the safety of workers and mine operations. (2) In addition to provisions in subsection (1), the Cabinet Secretary shall make regulations for safety and health of persons employed in mines, and the carrying on of prospecting or mining operations in safe, proper, sanitary and effectual manner. 179. Conditions for holders of a permit or license to ensure that: - (a) the sustainable use of land through restoration of abandoned mines and quarries; (b) the seepage of toxic waste into streams, rivers, lakes and wetlands is avoided and that disposal any toxic waste is done in the approved areas only; (c) blasting and all works that cause massive vibration is properly carried out and muffled to keep such vibrations and blasts to reasonable and permissible levels in conformity with theEMCA Cap 387; and

	(d) upon completion of prospecting or mining, the land in question shall be restored to its original status or to an acceptable and reasonable condition as close as possible to its original state. 180. (1) The Cabinet Secretary shall not grant a prospecting license, a retention license or a mining license to an applicant, unless the applicant has submitted a site mitigation and rehabilitation or mine-closure plans for approval. (2) The Cabinet Secretary may prescribe regulations for site rehabilitation and mine-closure obligations. 181. (1) An applicant for a prospecting license, a retention license or a mining license shall provide a bond or some other form of financial security in this section called an environmental protection bond sufficient to cover the costs associated with the implementation of the environmental and rehabilitation obligations. (2) An environmental protection bond required under subsection (1) shall be in a form and for an amount as may be determined by the Cabinet Secretary having regard to the particular characteristics of the project. **Part XIV—Monitoring, compliance and enforcement** (k) require such changes, as may be necessary in regard to the safety of the operation and protection of employees, to be implemented within a specified time, failing which the license holder will be considered in breach; (l)order the temporary cessation of operations where he considers that the mining or processing activities are so hazardous as to constitute a serious and imminent danger to life; (m) enter into any premises used in or connected with prospecting, mining or mineral processing operations to examine the circumstances surrounding any accidents or incidents affecting the health of employees including the subsequent actions taken by license holder; and **Part XV—Miscellaneous provisions** 221(1) The Cabinet Secretary may publish and disseminate manuals, codes or guidelines relating to large scale and small-scale operations, including in relation to environmental matters. (2) In developing manuals, codes and guidelines for the purposes of subsection (1), the Cabinet Secretary shall ensure that any such publications are consistent with guidelines issued by other Government departments, agencies and authorities. (3) Evidence that a person - (a) has complied with manuals, codes and guidelines may be used to show that the person has complied with his environmental obligations under this or any other Act; and 223(2) Without prejudice to the generality of the foregoing, the Cabinet Secretary may make Regulations prescribing, (h) the measures to be observed to protect and rehabilitate the environment;
Local ContentBill, 2016	Part II – Role of the national and county governments 6. Obligations for national and county governments 7. establishment of the Local Content Development Committee 20. Local content plan 20(5): (a) employment and skills development plan; (b) research and development plan;

	(c) technology transfer plan (i) employment and skills development plan; (ii) research and development plan; (iii) technology transfer plan 23. Capacity building 24. Employment and skills development plan 25. Education and training for nationals 26. Consideration of employment of local persons 28. Strategies for transfer of technology 30. Transfer of technology plan 40. Preference of local companies 41. Preference of local goods and services 43. Thresholds for Kenyan equity stake in operator 51. Public participation

5.5.4 Human rights issues in the mining sector

The mining sector throughout the world has been considered as having a high risk of violating human rights in a number of ways. The Constitution of Kenya, 2010 has clearly pronounced the various types of human rights which all the people of Kenya are entitled to, and which should not be violated by any development including activities in the mining sector. These rights are provided in Chapter 4 of the Constitution of Kenya under the Bill of Rights shown in Table below. Article 42 of the Constitution of Kenya provides the right to a clean and healthy environment for the benefit of present and future generations. This right to a clean and healthy environment includes a procedural right, under article 70, that creates a legal pathway for anyone whose environmental right has been violated, or about to be violated, to apply to a court for redress through legal remedies. In addition, article 42 is to be fulfilled through the measures and mechanisms that are set out in article 69 of the Constitution, which include, among others, several obligations on the Kenyan state to

a) ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;

b) work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya;

c) protect and enhance intellectual property in, and indigenous knowledge of, biodiversity and the genetic resources of the communities;

d) encourage public participation in the management, protection environmental conservation;

e) protect genetic resources and biological diversity;

f) establish systems of environmental impact assessment,

g) environmental audit and monitoring of the environment;

h) eliminate processes and activities that are likely to endanger the environment; and

i) utilize the environment and natural resources for the benefit of the people of Kenya.

In addition, article 35, 43, 46 and 47 set out the rights of access to information, the economic and social rights, consumer rights and rights for fair administration, respectively. The specific environmental and human rights considerations in the Mining Act (2016) and Local Content Bill are summarized in the table below.

Table 26: Environmental obligations considered in the Mining Act (2016) & Local Content Bill

Impact dimension	Relevant statutes in Mining Act 2016 and Local Content Bill
Physical environment	• Mapping of potential geo-hazards • Prevention of wasteful mining practices • Protection of surface water and groundwater resource • Mitigation for massive vibration
Biological environment	• Protection of forests • Protection of wetlands • Protection of protected areas, national parks and sanctuaries
Social environment	• Community development agreements (CDAs) • Local employment plan (LEP) • Approved plan to employ and train citizens • Approved plan for the procurement of local goods and services • Skills transfer and Capacity building • Replacement of expatriates • Employment and training • Adequate and fair compensation for land for and property damage • Compensation for displacement • Proper resettlement • Dispute resolution • Protection of burial sites • Protection of areas of religious significance • Health and safety of prospecting and mining operations • Health and safety of mining workers • Mining accidents or incidents affecting the health of employees • Social heritage impact assessment (SHIA) • Heritage restoration plans
Human rights	No environmental obligation
Environmental protection	• Environmental impact assessment (EIA) • Environmental management plans (EMPs) • Demarcation of mining areas • Sustainable stacking or dumping of mineral waste • Controlled use of toxic materials such as cyanide and mercury
Impact dimension	**Relevant statutes in Mining Act 2016 and Local Content Bill**
	• Notification of any potentially hazardous substances • Prevention of toxic waste disposal into streams, rivers, lakes andwetlands • Environment, health and safety
Environmental rehabilitation and restoration	• Sustainable restoration of closed or abandoned mines and quarries • Environmental rehabilitation and restoration plans

	• Environmental protection bonds
Environmental framework referencing	• EMCA Cap 387 • Water Act, 2016 • Forest Act, 2005 • Wildlife Conservation and Management Act, 2013 Occupational Healthand Safety Act, 2007

5.5.5 Regulations governing the Mining Sector

The key regulations for the governance of the mining sector has previously been the Mining (Local Equity Participation) Regulations, 2012. However, up to 13 additional draft regulations are under preparation to support the implementation of the Mining and Minerals Policy 2016 and enforcement of the Mining Act 2016. These are: -

1. Mining (Use of Goods and Services) Regulations, 2016
2. Mining (Award of Mineral Rights by Tender) Regulations 2016
3. Mining (Community Development Agreement) Regulations, 2017
4. Dealings in Minerals Regulations, 2016
5. Mining (Employment and Training) Regulations, 2017
6. Mining (Mine Support Services) Regulations, 2016
7. Mining (National Mining Corporation) Regulations, 2017
8. Mining (Reporting of Mineral Related Activities) Regulations, 2017
9. Mining (Use of Assets) Regulations, 2016
10. Mining (Licensing and Permitting) Regulations 2016
11. Mining (Royalty) Regulations, 2017
12. Mining (State Participation) Regulations, 2016
13. Mining (Strategic Minerals) Regulations, 2016

5.5.6 Legal Prescriptions Pertaining Human Rights

The specific legal prescriptions in relation to environmental management and human rights are highlighted in the table below.

Table 27: Environmental and human rights prescriptions in the mining regulations

Regulations	Prescriptions
1. Mining (Local Equity Participation) Regulations, 2012 (LN 118, 2012)	3. Every mining license issued shall have a component of local equity participation amounting to at least thirty-five per cent (35%) of the mineral right

2. Mining (Use of Local Goods and Services) Regulations, 2017	3. The purpose of these regulations is to: - (a) promote job creation through the use of local expertise, goods and services, businessesand financing in the mining industry value chain and their retention in the country; (d) create mining and mineral related supportive industries that will provide jobs andsustain economic development; achieve and maintain a degree of participation for Kenyans or companies incorporatedin Kenya for the local supply of goods and the provision of services (f) provide for a robust, transparent monitoring and reporting system; (g) provide a plan for provision of goods and services;
3. Mining (Award of Mineral Rights by Tender) Regulations 2016	No relevant environmental & human rights prescriptions
4. Mining (Community Development Agreement) Regulations, 2017	3. The objects of these regulations are: - (1) to provide a legal basis for ensuring that the entire life cycle of mining operations andmining-related activities is conducted in a manner that ensures the following: - (a) Equitable sharing of benefits between the holder and affected community; (b) mining operations are consistent with the continuing economic, social and culturalviability of the community; and (c) mining operations significantly contribute to the improved economic, cultural socialwelfare of the community and its members; (2) to ensure accountability and transparency in mining related community development 5.(1) A holder, as part of the ESIA and with the approval of the NEMA, shall assess potential community impacts of its proposed operations and identify one or more communities with which it proposes preparation of a Community Development Agreement (2) The holder shall notify, in writing, the affected mine community or communities with copy of such notice to the Cabinet Secretary within seven days of the grant of a mining license. (3) A community that has not been identified by the holder may give notice to a holder that it should be identified as a party to a Community Development Agreement. (4) Where a community gives notice to a holder that it should be identified as a party to a Community Development Agreement and the holder is not in agreement, that community may give notice to the Cabinet Secretary. (5) The Cabinet Secretary in consultation with the County Government and the National Environmental Management Authority shall notify the holder within thirty (30) days from the date of such notice, specifying whether the community should be made a party to a Community Development Agreement. 6. (1) Where a holder is required to enter into a Community Development Agreement (CDA) with more than one affected mine community, it shall enter into one agreement that includes multiple affected mine communities (2) Where there are several affected mine communities located in more than one county, the holder may have a separate Community Development Agreement with an affected minecommunity that is located in a different county.

	8. Drafting of community development agreement (4) The issues to be addressed in the CDA may include but not limited to the following: (b) educational scholarship, apprenticeship, technical training and employment opportunities for the people of the affected mine community; (c) employment for members from the affected mine communities; (d) financial or other forms of contributory support for infrastructural development and maintenance such as education, health or other community services, roads, water and power; (e) assistance with the creation, development and support to small-scale and micro enterprises; (f) special programmes that benefit women; (g) special programmes that benefit youth; (h) protection of natural resources; (i) support for cultural heritage and sports; (j) treatment of cultural and sacred sites; (k) treatment of ecological systems, including restoration and enhancement, fortraditional activities such as hunting and gathering; (l) how cultural values will be respected; (m)funding and control mechanisms to ensure funds are utilized as intended and aretransparent and auditable; (6) Special programmes that will benefit persons with disabilities. 10. (1) The holder and the affected mine community shall establish a schedule of consultations to be published in a manner that is acceptable to the affected mine community or any other mode of publication mutually agreed upon by the parties. 11. (1) The content of a Community Development Agreement shall comprise of an explanation of the Community Development Agreement goals, objectives, obligations and activities aimed to achieve sustained community development • description of environmental and social impacts; • description of environmental and social impacts including a gender awarenessassessment; 16. (1) The parties shall use best efforts to establish meaningful mechanisms that ensure transparent transactions relevant to Community Development Agreement commitments 18. Where a mining license is transferred to another holder in accordance with the Mining Act, the transferee shall, in writing, assume all rights and obligations of the transferor under any Community Development Agreement relating to the mining license or transitional mining right 20. Where a holder of a mining lease or special mining lease has entered into a Community Development Agreement or has started some community development initiative, scheme or social development programme prior to the coming into force of these regulations, the holder shall ensure that such a scheme, initiative, programme, agreement or howsoever described shall be in compliance with the requirements of these regulations within eighteen months after coming into force of these regulations. 24. Dispute resolution 25. Dispute resolution committee 26. Meetings and decisions of the committee

	27. Dispute resolution procedure schedules
5. Dealings in Minerals Regulations, 2016	No relevant E&HR prescriptions
6. Mining (Employment and Training) Regulations, 2017	5. (2) Where experienced expatriates are needed, a plan for the progressive replacement of expatriates by Kenyan nationals shall be required. 6. (1) Every holder of a large-scale mineral right or a mine support service license shall, within ninety days of the coming into force of these regulations, submit to the Cabinet Secretary a detailed Employment, Training and Succession Plan which corresponds with the work programme or programme of mining operations that accompanied the applicationmade by the holder for the grant of the license. (6) A holder of a mineral right shall comply with the relevant labour, employment, social security laws and any regulations made under such laws of Kenya. (7) A holder shall provide to the Director of Mines a half yearly report on the employment and training activities for the reporting period not later than fourteen days after the end ofthe reporting period. 7. (1) A holder of a mineral right or mine support service license shall employ only Kenyansin junior level or middle level positions. (2) For the purpose of sub regulation (1), a junior or middle level position includes the position of foreman, supervisor or any other corresponding position or grades designated by the holder. (1) A holder of a mining license shall, within one (1) year of the commencement of mining operations, submit a programme to the Director of Mines for the promotion of education, research and development in Kenya in relation to its overall activities or operations (1) A holder of a mineral right or a mine support service license shall, not later than thirty days of the beginning of each year, submit to the Director of Mines an annual performance report covering all the activities related to employment and training for the year under review. 7. (1) Every holder of a large-scale mineral right or a mine support service license shall, within ninety days of the coming into force of these regulations, submit to the Cabinet Secretary a detailed Employment, Training and Succession Plan which corresponds with the work programme or programme of mining operations that accompanied the applicationmade by the holder for the grant of the license. (8) A holder of a mineral right shall comply with the relevant labour, employment, social security laws and any regulations made under such laws of Kenya. (9) A holder shall provide to the Director of Mines a half yearly report on the employment and training activities for the reporting period not later than fourteen days after the end ofthe reporting period. (10) (1) A holder of a mineral right or mine support service license shall employ only Kenyansin junior level or middle level positions.

	(2) For the purpose of sub regulation (1), a junior or middle level position includes the position of foreman, supervisor or any other corresponding position or grades designated by the holder. 9. (1) A holder of a mining license shall, within one (1) year of the commencement of mining operations, submit a programme to the Director of Mines for the promotion of education, research and development in Kenya in relation to its overall activities or operations 10. (1) A holder of a mineral right or a mine support service license shall, not later than thirty days of the beginning of each year, submit to the Director of Mines an annual performance report covering all the activities related to employment and training for theyear under review.
7. Mining (Mine Support Services) Regulations, 2016	11. Environmental obligations of mine support services providers • A person granted a license under these regulations to provide mine services shall comply with the conditions and obligations of the environmental license or any other authorization that may be issued to the person or any mineral right holder being offered a mine supportservice. • A person contracted by a holder of mining license or permit to provide mine support services shall be liable for the restoration or reclamation of any damage caused to the • environment as a result of its operations.
8. Mining (National Mining Corporation) Regulations, 2017	No relevant E&HR prescriptions
9. Mining (Reporting of Mineral Related Activities) Regulations, 2017	4. (1) A holder including the National Mining Corporation shall submit to the CabinetSecretary, not later than the first day of March every year, a report on, (a) gross revenue from the sale of minerals, disaggregated by mineral; (b) total number of persons directly employed by the holder including expatriates if any; (c) the identities of beneficial owners of holders of licenses of privately owned reportingcompanies or persons. 6. (1) For each year, the report shall include but not be limited to the following information (h) total land area or blocks held under mineral rights; (i) total area or blocks surrendered during the year; (j) total number of each type of mineral right in force at end of the year; (k) number of mineral agreements entered into during the year; (l) number of mineral agreements in force at end of the year; (m) number of new operating large-scale mines that commenced production during theyear; (n) number of operating mines; (o) number of community development agreements entered into during the year; (p) total number of community agreements in force at end of the year; (q) identities of beneficial owners of mineral rights; and (r) any other statistics or information that the Cabinet Secretary may deem necessary. 7(1) The Cabinet Secretary shall ensure that a comprehensive and detailed report,prepared in accordance with regulations 5 and 6 above, is published annually by way of publication on the official website of the Ministry of Mining.

10. Mining (Use of Assets) Regulations, 2016	No relevant E&HR prescription
11. Mining (Licensing and Permitting) Regulations, 2016	8. Online Mining Cadastre (OMC) information management (6) Public access to the Online Mining Cadastre by the Mining Cadastre Office (MCO) 16. Charges and fees, obligations and penalties(c)Other payments (vi) Environmental bonds 20. Environmental and social information in support of applications (2) ESIA Report (3) An environmental and social screening (ESS) report shall be required before thecommencement of activities under the following mineral rights (a) reconnaissance license; (b) prospecting license; (c) retention license; (d) reconnaissance permit; (e) prospecting permit; (f) artisanal mining permit (4) ESIA, ESMP and ESS reports shall comply with the requirements of the EnvironmentalManagement and Coordination Act (EMCA) and any regulations or guidelines 22. Areas designated for small-scale mining or artisanal mining (1) The Cabinet Secretary may, by notice in the Kenya Gazette, designate land exclusivelyfor small-scale mining and/or artisanal mining operations. 37. Boundary disputes 38. Land surface rights 39. Consent from land holders to conduct mining operations 40. Categories of land (1) Restricted or excluded land (2) Private land (30) Community land 41. Inheritance of artisanal mining rights 42. land compensation guarantee bond 52. Management of assets and hazardous materials on expiry or revocation of mineral right Part VIII – Large scale mining operations **Part IX – Small-scale mining operationsPart X – Artisanal** mining operations **Part XI – Schedules**
12. Mining (Royalty) Regulations, 2017	5. Royalty base 8. Royalty rate

13. Mining (State Participation) Regulations, 2016	6. State Right to Free Equity Participation 7. State Right to Participation Interest 8. State Participation in Prospecting Operations
14. Mining (Strategic Minerals) Regulations, 2016	1. Submission of request to declare a mineral, minerals or mineral deposit asStrategic 10. Authority to declare a mineral, minerals or mineral deposit as strategic 11. Declaration of Strategic Minerals and Strategic Minerals Deposits 12. Multiple Strategic Minerals 13. Mining of Strategic Minerals 14. Storage and Stockpiling of Strategic Minerals 15. Processing of Strategic Minerals 16. Transport of Strategic Minerals

5.5.7 Specific Environmental and Human Rights Considerations

The specific environmental and human rights considerations in various management regulations in the mining sector are summarized in Table 21.

Table 28: Environmental and human rights obligations - various Mining management regulations

Impact dimension	Relevant statutes in mining various managementregulations
Physical environment	No relevant obligation
Biological environment	No relevant obligation
Social environment	• Community consultation and outreach • Community Development Agreements (CDAs) • Employment of mining affected communities • Mining benefits for youth and women • Mining benefit for persons with disabilities • Equitable benefit sharing • Employment, Training and Succession Plans (ETSPs) • Alternative livelihoods plans (ALPs) • Transparent monitoring and reporting • Improved economic, cultural social welfare of the community • Education, health or other community service CSR • Protection of cultural and sacred sites
Human rights	No relevant obligation
Environmentalprotection	• Environmental impact assessment (EIA)
Environmental rehabilitation and restoration	• Mine closure plans (MCPs) • Environmental restoration and enhancement • Post-mining environmental monitoring

5.5.8 Guidelines Associated to the Mining Act 2016

The key guidelines associated with the mining sector are the Guidelines for Work Programmes and Exploration Reports, 2017. The specific legal prescriptions in relation to environmental management and human rights are highlighted outlined in Table 23.

Table 29: Environmental and human rights prescriptions in the mining guidelines

Guidelines	Prescriptions
Guidelines for Work Programmes and Exploration Reports, 2017	These regulations are to give effect to sections 223(1) and 221(1) of the Mining Act in so far as they relate to guidelines for work programmes and exploration reports. (2) Work programme for new applications: A work programme submitted in support of a new mineral right application will be assessed in relation to the known geology and mineralization in the area. The proposed work will be expected to take account of all available geological maps and reports (Geological Survey and previous company exploration reports, where these are available), and should build on past results. (4) Work programmes for renewal applications: • The new work programme must make clear how it advances the geological understanding of the area and takes it to the next stage, • In the case of the second renewal of a prospecting license, the work programme and expenditure must cover the entire renewal period applied for (maximum (3) years). This must include plans for a feasibility study, EIA study and all other mine planning investigations necessary for a subsequent mining license application. 7. Confidentiality (2) It should be noted that all environmental and community reports are regarded as non-confidential and are, by definition, open to public scrutiny. Annex E: Checklist for Feasibility Study Mine closure plan - Financial plan; timetable and implementation; restoration/rehabilitation of land; alternative uses of mined out ground; safety considerations; social impacts; alternative livelihoods plan; removal of plant & machinery; alternative uses (conversion) of infrastructure; post-mining environmental monitoring of mine area (including tailings); contingencies; etc. ESIA - Full, expert assessment and modelling of effects of mining on the environment and social structures; hazard analysis; mitigation plan; monitoring programme. Annex G: Allowable Exploration Expenses - Environmental activities – includes baseline studies; environmental and social/cultural impact assessments; rehabilitation and mine closure/rehabilitation studies; environmental management and rehabilitation; community consultation and outreach

The analysis of the above frameworks during the EIA process will be undertaken in order to identify the specific governance prescriptions in the mining sector in Kenya.

5.6 The Standards Act Cap 496

The Act is meant to promote the standardization of the specification of commodities, and to provide for the standardization of commodities and codes of practice; to establish a Kenya Bureau of Standards, to define its functions and provide for its management and control. Code of practice is interpreted in the Act as a set of rules relating to the methods to be applied or the

procedure to be adopted in connection with the construction, installation, testing, sampling, operation or use of any article, apparatus, instrument, device or process.

The Act contains various specifications touching on shale products. The Proponent shall ensure that commodities and codes of practice utilized in the project adhere to the provisions of this Act.

5.7 County Government Act (2012)

This is an ACT of Parliament to give effect to Chapter Eleven of the Constitution; to provide for county governments powers, functions and responsibilities to deliver services and for connected purposes. The act helps Authorities ensure effective utilization of the sewage systems. It also allows the right to access to private property at all times by County Authorities, its officers and servants for purposes of inspection, maintenance and alteration or repairs of sewers. According to the Act, any charges so collected shall be deemed to be charges for sanitary services and will be recoverable from the premise owner connected to the facility. The Act also requires that all charges due for sewage sanitary and refuse removal shall be recovered jointly and severally from the owner and occupier of the premises in respect of which the services were rendered. This in part allows for application of the "polluter-pays-principle".

5.8 The Wildlife (Management and Conservation) Act

This Act was enacted to consolidate and amend the law relating to the protection, conservation and management of wildlife in Kenya, and for purposes connected therewith and thereto. Section 9 of the Act states that 'the Director of Wildlife Conservation shall, through the officers of the service, control, manage and maintain all national parks'. It also states that within the National Park, the Director may:

- Reserve or set aside any portion of the park as a breeding place for animals or as nurseries for vegetation;
- Authorize the construction of such roads, bridges, airfields, buildings and fences, the provision of such water supplies, and the carrying out of such other works, as may be necessary for the purposes of the park;
- With the approval of the Minister, let sites for the erection of hotels, or other accommodation for the visitors to the park provided that nothing in any document connected with the letting shall be construed as in any manner abridging the overall control of the Park by the Service, or as preventing the Director from giving directions as to the manner in which the premises concerned shall be managed.

The Proponent shall implement the proposed measures in this document towards protection and conservation of wildlife in the project areas.

5.9 The Agricultural Act

Legislative control over soil conversation and land development are mainly controlled within this Act, and many of the provisions can be generally applied beyond those lands suitable for agriculture. The Minister administering the Act, after concurrence with the Central Agricultural Board and consultation with the District Agricultural Committee, can impose land conservation orders on lands to control cultivation, grazing and clearing. These controls may be necessary to

protect the land against soil erosion, to protect fertility, and to maintain catchments. Local authorities are generally empowered to administer these sections of the Act, and the County Agricultural Committee is entitled to make regulations relating to these controls. Agricultural Rules are prescribed under the Act, whereby vegetation clearing in steep slopes areas or adjacent watercourses, without authorization, is controlled.

The Proponent shall adhere to the proposed measures in this document towards land conservation orders on land cultivation, grazing and clearing in the project areas.

5.10 Land Acquisition Act cap 295

It is possible, under the provisions of this Act, for land to be acquired or granted access to for the purposes of new projects. Acquisition or access must be shown to be in the public benefit and compensation must be provided to the land owners whose land is acquired or damaged.

There is a plethora of enactments all governing land and transactions in land. Thus, the substantive land law is to be found in two different statutes while the adjectival land law is to be found in five different statutes not forgetting the customary land law of the various tribes in Kenya.

There are two systems of substantive land law, three systems of conveyance and five systems of registration. The two systems of substantive law are under:

- The Indian Transfer of Property Act 1882 as amended by 1959 Amendment Act
- The Registered Land Act
- The three systems of conveyance are those applicable to land registered under:
- Government Lands Act Cap 280, part X Laws of Kenya and Land Titles Act Cap 282, Part III Laws of Kenya
- Registration of Titles Act
- Registered Land Act.
- Registration Systems

The five registration systems are those under:

- The Government Lands Act (G.L.A)
- Registration of Titles Act (R.T.A)
- The Land Titles Act (L.T.A)
- The Registration of Documents Act Cap 285 Laws of Kenya (R.D.A)
- The Registered Land Act (R.L.A)

The Registration of Documents Act is not peculiar to land law, as documents completely unrelated to land are resistible under it.

The Proponent has undertaken a baseline socio economic survey and identification of those who will be affected by the proposed project. The Proponent shall adhere to the requirements of the Act in the implementation of land acquisition.

5.11 Way Leaves Act (Cap. 292)

The Act provides for certain undertakings to be constructed e.g. exploration activities, pipelines, canals, pathways etc., through over or under any lands. This project is under the provision of the Act. Section 3 of the Act states that the Government may carry any works through, over or under any land whatsoever provided it shall not interfere with any existing building or structures of an ongoing activity.

In accordance with the Act (section 4), notice will be given before carrying out works with full description of the intended works and targeted place for inspection. Any damages caused by the works would then be compensated to the owner as per section.

5.12 Land Ownership

Complete ownership can be said to be in the state. Under G.L.A the commissioner of Lands, on behalf of the Republic of Kenya grants leases of town plots for any term not exceeding ninety nine (99) years and of agricultural land for 999 years. The grantee becomes owner and subject to the terms and conditions of the lease he possesses the bundle of rights of ownership. The 999-year leases can be converted into freehold and the 99 years to 999. On conversion or expiry of lease the new grant may be issued under R.T.A or R.L.A. All un alienated land other than trust land and all reversion of government leases are vested in the government. Others whether held on freehold or leasehold are vested in grantees as owners having the rights over them. The power of the state to qualify (extinguish) property rights in the public interest is embodied in Section 75 of the Kenyan Constitution. The section however makes the exercise of that power subject to the process of law. Section 117 of the Constitution further provides that an Act of Parliament may empower a county council to set apart trust land for: The use and occupation of any public body or authority for public purposes; or Prospecting or mining purposes; or the use and occupation of any person or persons for a purpose which is likely to benefit the residents of the area.

Section 117 part 4 stipulates that the setting apart is void unless the law under which it is made makes provision for the prompt payment of full compensation. The Trust Land Act, in Sub-sections 7 to 13, makes provision for the setting apart of land and payment of compensation with regard thereto. All land in urban areas of Kenya and much of the land in rural areas has a registered title. The title to land is either freehold or leasehold. The development and use of freehold title are controlled by land planning regulations which are administered by both the Central Government and the Local Authority in which the Land is situated. (A Local Authority is either a County Council or a Municipal Council whose activities are established and controlled by Local Government Legislation). Leasehold land is held on leases from the Central Government or, less frequently, from the Local Authority and such leases will contain provisions governing the development of the land and the use to which the land can be put. The leases frequently contain provisions against any dealing with the land without the consent of the landlord. The Central Government administers its land through a Department of Lands which is headed by a Commissioner of Lands.

5.13 The National Land Commission Act, 2012 (No. 5 of 2012)

Section 5 of the Act outlines the Functions of the Commission, pursuant to Article 67(2) of the Constitution as follows 5(1): (a) to manage public land on behalf of the national and county governments; (b) to recommend a national land policy to the national government; (c) to advise the national government on a comprehensive programme for the registration of title in land throughout Kenya; (d) to conduct research related to land and the use of natural resources, and make recommendations to appropriate authorities; (e) to initiate investigations, on its own initiative or on a complaint, into present or historical land injustices, and recommend appropriate redress; (f) to encourage the application of traditional dispute resolution mechanisms in land conflicts; (g) to assess tax on land and premiums on immovable property in any area designated by law; and (h) to monitor and have oversight responsibilities over land use planning throughout the country.

5.14 Bamburi Land Acquisition Procedure

A reconnaissance survey is first done to search for the area that has shale deposits that can be mined. Legal and acceptable procedures are employed with involvement of all stakeholders in order to arrive at a fair and just, well balanced agreed upon settlement leading to land acquisition.

5.15 The Occupational Safety and Health Act, 2007

This Act applies to all workplaces where any person is at work, whether temporarily or permanently. The purpose of this Act is to secure the safety, health and welfare of persons at work, and protect persons other than persons at work against risks to safety and health arising out of, or in connection with, the activities of persons at work. Some of the areas addressed here are machinery safety, chemical safety and health, safety and welfare special provisions are also provided in the ILO conventions on safety and health in construction recommendation, 1988 R175. Failure to comply with the OSHA, 2007 attracts penalties of up to KES 300,000 or 3 months jail term or both or penalties of KES 1,000,000 or 12 months jail term or both for cases where death occurs and is in consequence of the employer.

5.15.1 Safety

The Act makes a provision that ensures that for the interest of public, all dangerous points of the projects are clearly marked. Fencing of premises and dangerous parts of other machinery is mandatory. Training and supervision of inexperienced workers, protection of eyes with goggles or effective screens must be provided in certain specified processes. Special precaution against gassing is laid down for work in confined spaces where persons are liable to come in contact with dangerous fumes. Air receivers and fittings must be of sound construction and properly maintained. Adequate and suitable means for extinguishing fire must be provided in addition adequate means of escape in case of fire must be provided.

5.15.2 Health

The premise must be kept clean, ensuring daily removal of accumulated dust from place of work. The circulation of fresh air must secure adequate ventilation of workrooms. There must be sufficient and suitable lighting in every part of working place. There shall also be sufficient and

suitable sanitary conveniences separate for each sex, must be provided subject to conformity with any standards prescribed by rules. Food and drinks shall not be partaken in dangerous places or workrooms. Provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear, goggles, gas masks, and head covering, maintained for the use of workers in any process involving expose to wet or to any injurious or offensive substances.

5.15.3 Welfare

An adequate supply of both quantity and quality of wholesome drinking water must be provided. Maintenance of suitable washing facilities and, accommodation for clothing not worn during working hours must be provided. Sitting facilities for all female workers whose work is done while standing shall be provided to enable them take advantage of any opportunity for resting. Section 42 stipulates that every premise shall be provided with maintenance, readily accessible means for extinguishing fire and person trained in the correct use of such means shall be present during all working periods. Section 45 states that regular individual examination or surveys of health conditions of industrial medicine and hygiene must be performed and the cost will be met by the employer. This will ensure that the examination can take place without any loss of earning for the employees and if possible within normal working hours. Section 55B provides for development and maintenance of an effective program of collection, compilation and analysis of occupational safety. This will ensure that health statistics, which shall cover injuries and illness including disabling during working hours, are adhered to.

The report advices the Proponent on safety and health aspects, potential impacts, personnel responsible for implementation and monitoring, frequency of monitoring, and estimated cost, as a basic guideline for the management of Health and Safety issues in the proposed project.

5.15.4 The Work Injury Benefits Act, 2007

This is an Act of Parliament to provide for compensation to employees for work related injuries and diseases contracted in the course of their employment and for connected purposes. The Act was published on 26thOctober 2007.

The salient features addressed by the Act include the following:

- Obligations of employers
- Right to compensation
- Reporting of accidents
- Compensation
- Occupational diseases
- Medical aid and
- Appeals

According to section 7 (1) of the Act, every employer is required to obtain and maintain an insurance policy, with an insurer approved by the Minister in respect of any liability that the employer may incur under the Act to any of his employees. In addition, every employer carrying on business in Kenya shall within the prescribed period and in the prescribed manner register

with the Director - section 8 (1). Pursuant to section 10 (2) of the Act, it is the duty of every employee to ensure his/her safety at the place of work and hence where an accident, not resulting in serious disablement or death, is caused by the deliberate and willful misconduct of the employee, such an employee is not entitled to compensation. However, according to section 12 if an employee is injured in an occupational accident or contracts an occupational disease while the employee, with the consent of the employer, is engaged in any organized first aid, ambulance or rescue work, fire-fighting or other emergency service, the accident or disease is for the purposes of this Act, deemed to have arisen out of and in the course of the employee's employment. In a circumstance where an accident occurs in the course of employment, section 21 makes it a requirement for a written or verbal notice of such an accident to be given by or on behalf of the employee concerned to the employer who shall send a copy of the notice to the Director within twenty four hours of its occurrence in the case of a fatal accident. In line with section 22 (1), an accident that has occurred should be reported to the Director by the employer in the prescribed manner within seven days from the date of receiving a notice of the accident or having learned that an employee has been injured in an accident. Similarly, it is the responsibility of the employee to report to his/her employer the occurrence of an accident not later than 12 months from the date of such an accident or else the right to benefits, in accordance with section 27 (1), shall lapse if the accident is not reported within such a period of time (12 months). According to section 46 (1), the employer shall be responsible for availing necessary means of transport where an employee is injured in an accident, which necessitates his conveyance to a hospital medical facility and from a hospital or medical facility to his residence.

5.16 Public Health Act 1986 Revision

The public Health Act regulates activities detrimental to human Health. An environmental nuisance is one that causes danger, discomfort or annoyance to the local inhabitants or which is hazardous to human health. Although the Act is primarily concerned with domestic water supplies and sources of water used for human consumption, its regime may be extended to cover rivers, streams, lakes and underground water resources since these are the basic water sources for the majority of Kenya's population.

It also outlines the standards of construction of various facilities of any place. In terms of air pollution thermal plants are said to emit a variety of gases, volatile organic compounds and particulate matter depending on the amount and type of fuel used and method used for burning. It is therefore necessary to monitor the air pollution. The Act prohibits activities (nuisances) that may be injurious to health. The primary purpose of the Act is to secure and maintain public health. It defines nuisances on land and premises and empowers public health authorities to deal with such conditions.

Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injuries or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injuries or dangerous to human health.

On responsibility of the Local Authorities Part XI, section 129, of the Act states in part "It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing any pollution dangerous to health of any supply of water which the public within its district has a right to use and does use for drinking or domestic purposes. Section 130 provides for making and imposing regulations by the local authorities and others the duty of enforcing rules in respect of prohibiting use of water supply or erection of structures draining filth or noxious matter into water supply as mentioned in section 129. This provision is supplemented by section 126A that requires local authorities to develop by laws for controlling and regulating among others private sewers, communication between drains, power lines, and sewers as well as regulating sanitary conveniences in connection to buildings, drainage, cesspools, etc. for reception or disposal of foul matter. Part XII, Section 136, states that all collections of water, sewage, rubbish, refuse and other fluids which permits or facilitates the breeding or multiplication of pests shall be deemed nuisances and are liable to be dealt with in the matter provided by this Act.

The Proponent shall observe policy and regulatory requirements and implement measures to safeguard public health and safety.

5.17 Public Roads and Roads of Access Act (Cap. 399)

Sections 8 and 9 of the Act provides for the dedication, conversion or alignment of public travel lines including construction of access roads adjacent lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent land owners seeking permission to construct the respective roads.

During the Mining phase of the project, access to the site areas will be required for the vehicles. Where existing roads do not exist, the Proponent shall seek permission from the appropriate authorities to create such access during the construction phase.

5.18 Local Government Act

The Local government Act is concerned with a wide range of matters that affect the day to day activities of individuals and organizations. The sections, which have the most direct relevance, are Sections 145, 146, 147 and 163:

Section 145 is concerned with the miscellaneous powers of local authorities. Subsection (w) empowers a local authority to take measures that may be necessary or desirable for the preservation or protection of wildlife, and provide amenities for the observation of wildlife. Section 146, Subsection (d) empowers a local authority, with the consent of the Minister, to make grants for the establishment and maintenance of game parks and other related facilities. Section 147, Subsection (d) controls the cutting of timber and the destruction of trees and shrubs.

Section 163, Subsection (e) empowers municipal councils, town councils and urban councils to control or prohibit all businesses, factories and workshops which by reason of smoke, fumes, chemicals, gases, dust, smell, noise or vibration or other cause may be a source of danger

discomfort or annoyance to the neighbourhood and to prescribe the conditions subject to which business, factories and workshops shall be carried on.

The Proponent has commissioned a RAP study to identify such Trust Lands that may be affected by the Mining project. The Proponent shall comply with the provisions of the Act in seeking the required authorizations from the Local Authorities as stipulated in the Act.

5.19 The Water Act

The water Act, 2002 provides the legal framework for the management, conservation, use and control of water resources and for the acquisition and regulation of right to use water in Kenya. It also provides for the regulation and management of water supply and sewerage services. In general, the Act gives provisions regarding ownership of water, institutional framework, national water resources, management strategy, requirement for permits, state schemes and community projects. Part IV of the Act addresses the issues of water supply and sewerage. Specifically, section 59 (4) of the Act states that the national water services strategy shall contain details of:

- Existing water services
- The number and location of persons who are not being provided with basic water supply and basic sewerage
- Plans for the extension of water services to under-served areas
- The time frame for the plan; and
- An investment program

The project shall have no adverse impact on the local water supply during operations. Observation of the requirements of the act shall be observed by the Proponent especially during the construction phase.

5.20 The Constitution of Kenya

The provisions of Chapter V (Protection of Fundamental Rights and Freedoms of The Individual) shall have effect for the purpose of affording protection to those rights and freedoms subject to such limitations of that protection as are contained in those provisions, being limitations designed to ensure that the enjoyment of those rights and freedoms by any individual does not prejudice the rights and freedoms of others or the public interest. The constitution protects citizens from deprivation of property. No property of any description shall be compulsorily taken possession of, and no interest in or right over property of any description shall be compulsorily acquired, except where it is necessary for public interest.

5.21 Forests Act 2005

The Act highlights the integration of the community on the management, utilization and conservation of forests and its resources. It prohibits wanton destruction of the forests. As hydro dams depend on good water catchments protection and management, on the upstream and around the reservoirs the enforcement of this Act will minimize the flow of sediments into the rivers which are being utilized for generation of hydroelectric power generation. There are no

formally identified forests within the proposed site, but there are some localities with significant tree and vegetation cutting needs.

5.22 Government Lands Act, Cap. 280 (revised 1984)

This Act deals with all actions, suits and proceedings by or on behalf of the Government respecting; Government land or any contract relating to Government land or any breach of any such contract, any trespass on Government land or any damages accruing by reason of such trespass, the recovery of any rent, purchase money or other monies in respect of Government land, any damages or wrongs whatsoever in any way suffered by the Government in respect of Government land or any other land, the recovery of any fine or the enforcement of any penalty under this Act The Government may at any time enter upon any land sold, leased or occupied under a license under this Act, and may there set up poles and carry electric lines across such land, and may lay sewers, water-pipes or electric lines therein, without paying compensation, but making good all damage (Sec 86). Where any damage or loss has been caused to any land by or as a result of entry thereon under section 86 or section 87 by reason of the injury or destruction of trees, bushes or shrubs planted thereon, a reasonable sum, not exceeding the market value of the standing trees, bushes or shrubs, shall be paid by way of compensation for the damage or loss notwithstanding that compensation is not otherwise payable under any of those sections.

5.23 Trust Lands Act Cap. 288 of 1962 (revised 1970)

This Act applies to all land which for the time being is Trust land. Under section 38 a way leave license may be granted to any person empowering him and his servants and agents to enter upon Trust land vested in the council and to lay pipes, make canals, aqueducts, weirs and dams and execute any other works required for the supply and use of water, to set up electric power or telephone lines, cables or aerial ropeways and erect poles and pylons therefore, and to make such excavations as may be necessary for the carrying out of any such purposes, and to maintain any such works as aforesaid. However, compensation for loss of the use of land in any case where the usefulness of the land for agricultural purposes is impaired must be made before the license is awarded.

5.24 Land Adjudication Act, Cap. 284 of 1968 (revised 1977)

This Act applies to any area of Trust land where the county council in whom the land is vested so requests; and the Minister considers it expedient that the rights and interests of persons in the land should be ascertained and registered; and where the Land Consolidation Act does not apply to the area.

The Proponent has undertaken a survey and commissioned a Resettlement Action Plan (RAP) study which complies with the provisions of the Act. Public consultations have also been undertaken extensively in the affected project area

5.25 Physical Planning Act (Cap 286)

An Act of Parliament to provide for the preparation and implementation of physical development plans and for connected purposes enacted by the Parliament of Kenya Under this

Act, no person shall carry out development within the area of a local authority without a development permission granted by the local authority under section 33. The local authority concerned shall require the developer to restore the land on which such development has taken place to its original condition within a period of not more than ninety days. If on the expiry of the ninety days' notice given to the developer such restoration has not been affected the concerned local authority shall restore the site to its original condition and recover the cost incurred thereto from the developer.

The site layout plan appended to this report shows the proposed Mining area which will be refined accordingly. The Proponent shall secure all mandatory approvals and permits as required by the law.

5.26 Registered Lands Act, Cap 300 of 1963

This is an Act of Parliament to make further and better provision for the registration of title to land, and for the regulation of dealings in land so registered, and for purposes connected therewith.

The project traverses some areas with Registered Land. The Proponent shall comply with the provisions of the Act in the acquisition of Registered Land.

5.27 Employment Act No 11 of 2007

The Act is enacted to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations and federations. Its purpose is to promote sound labour relations through freedom of association, the encouragement of effective collective bargaining and promotion of orderly and expeditious dispute the protection and promotion of settlement conducive to social justice and economic development for connected purposes. This Act is important since it provides for employer – employee relationship that is important for the activities that would promote management of the environment within the energy sector.

5.28 Labour Institutions Act No. 12 of 2007

The purpose of the Act is to establish labour institutions and to provide for their function, powers and duties. The Act provides for the establishment of National Labour Board, which provides advice to the Minister on all matters concerning employment and labour.

5.29 Traffic Act Cap 403

This Act specifies that motor vehicles use proper fuel. The Traffic regulations promulgated under the Act specifies that every vehicle is required to be so constructed, maintained and used so as not to emit any smoke or visible vapour.

5.30 Penal Code Cap 63

Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water from 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 vitiates the atmosphere in any

place to make it noxious to health of persons /institution, dwelling or business premises in the neighbourhood or those passing along public way, commit an offence.

The Proponent shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendation provided for mitigation/ minimization/ avoidance of adverse impacts arising from the project activities.

5.31 Local Authority Act (Cap. 265)

Under this act, the Local Authority is the custodian of Trust Land and has to authorized various sites where the lines could be passing.

The Proponent has commissioned a RAP study to identify such Trust Lands that may be affected by the proposed project. The Proponent shall comply with the provisions of the Act in seeking the required authorizations from the Local Authorities as stipulated in the Act.

5.32 Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulation, 2009.

This Act applies to all wetlands in Kenya whether occurring in private or public land. It contains provisions for the utilization of wetland resources in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services.

The rivers in this area discharge into the nearby Indian Ocean. The Proponent shall comply with the provisions of the Act in protecting wetlands, preventing and controlling pollution and Siltation in rivers.

5.33 The Civil Aviation Act, Cap 394

Under this Act, the Kenya Civil Aviation Authority (KCAA) has to authorize and approve the height of masts and other structures for the purpose of ensuring the safety of flying aircraft over the proposed project area. This is under the provision of Legal Notice No. 131, The Civil Aviation (Aerodromes) Regulations, 2008, Part VIII. Section 63 of the act has indicated that the regulation applies for all scopes of Aerodromes and advises that if the proximity may be thought to be at close proximity, then the developer will be required to fill an “Aerial Masts and Other Structures Height Approval Application Form” and submit to the authority for approval. Section 64 has defined the scope of obstacles and apart from the physical structure, it has highlighted illumination of light that may intrude into air crafts, mobile vehicles, communication masts and logically, including activated pollutants such as industrial dust and smoke. Below are relevant descriptions of location with relevance to Aviation ways.

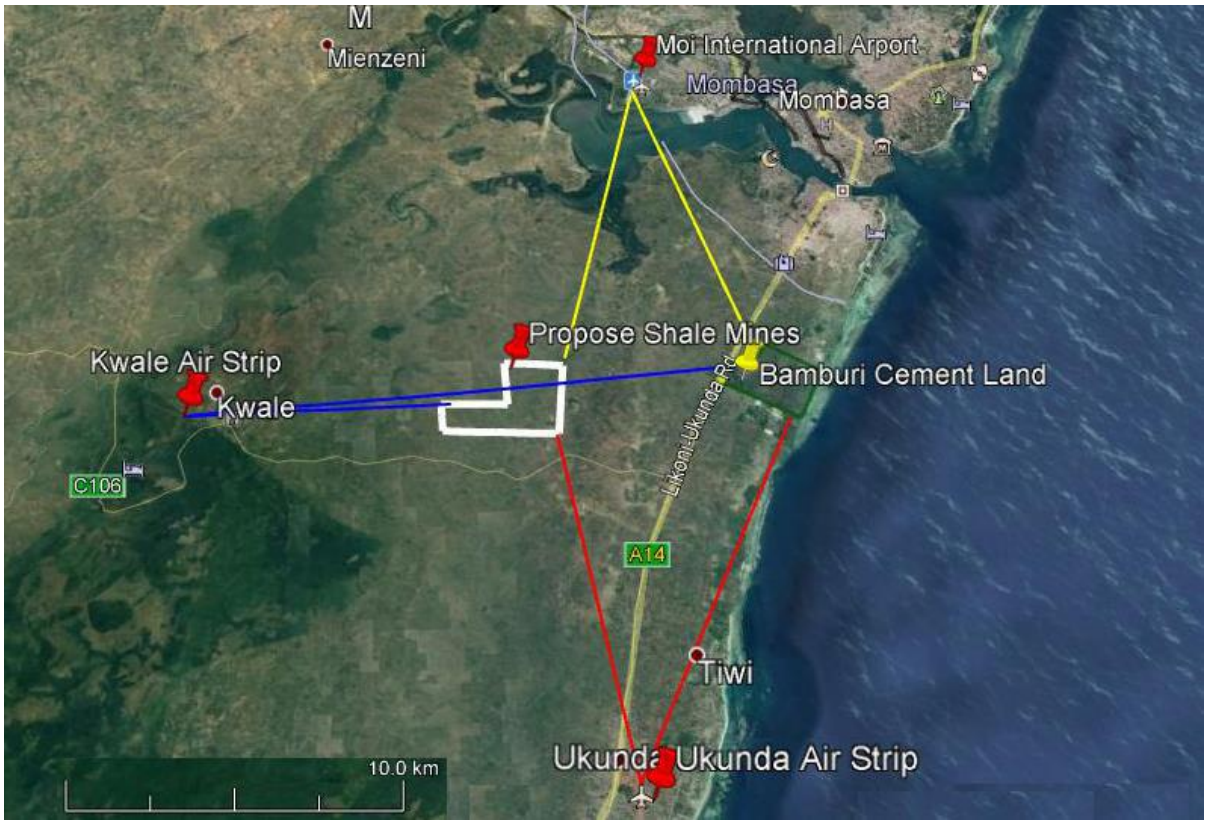


Figure 20: Satellite Image - Positions of runways in relation to the Shale Mining Area (Source: Google Earth, Field)

Distance from runways: The white L-Shaped image shows the approximate shale mining location. There are three runways identified from the proposed Shale Mineral Facility. These are the Moi International Airport which is about 12.88 kilometers linear direction from the Proposed project site, Kwale airstrip at about 9.83 kilometers linear direction and the Ukunda Air strip which is at about 12.64 Kilometers from the airstrip. The direction of the Moi International Airport runway is NE to SE, while that of Ukunda is approximately North to south. That of Kwale airstrip faces NW to SE direction which is tuned off from the proposed mine location. Moi International Airport accommodates larger aircraft while the Kwale air strip can only accommodate lighter air-crafts. The Ukunda airstrip can accommodate mid weight air-crafts.

The height of structures to be put up will not rise above a height of 20 meters. During dry seasons, dust emissions may only be concentrated locally and at a low altitude. Strong winds will quickly diffuse the unavoidable inherent emissions, considering the high wind characteristics of the area. The wind emission characteristics integrated over a number of years is elaborated below:

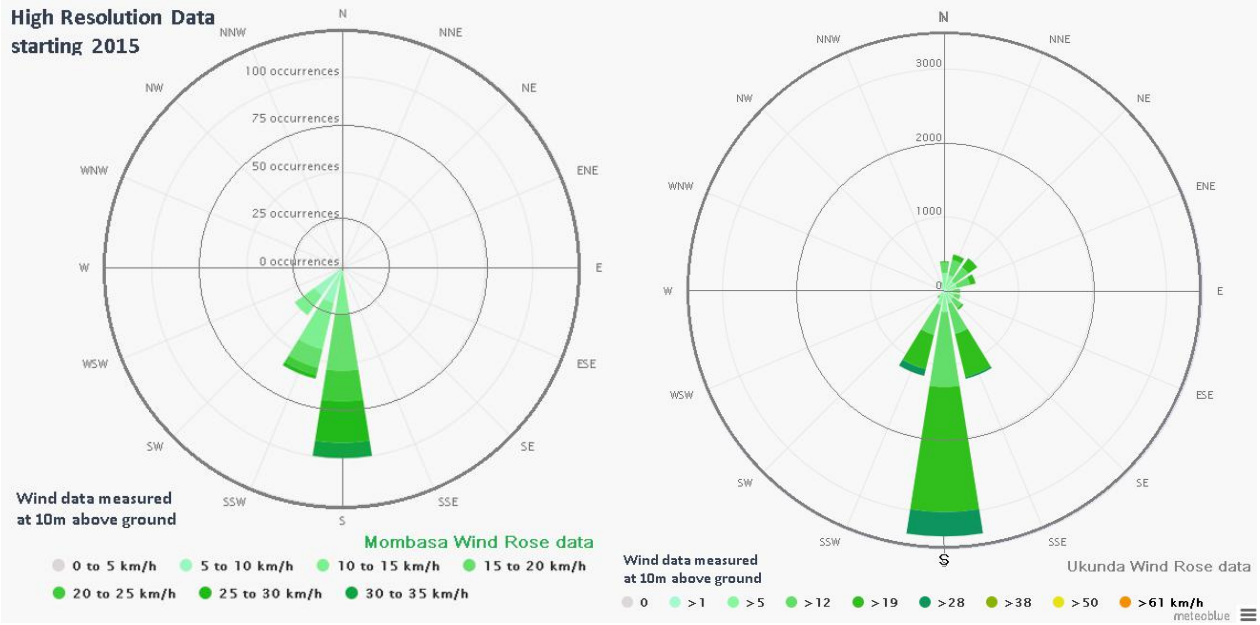


Figure 21: Wind Rose Data, Mombasa and Kwale Counties (Source: www.meteoblue.com)

The circles in the wind rose images indicate number of occurrences that wind blew towards the direction of the air strip location where the data was collected over years. The green images point towards the centre of the circle which indicates the direction where the wind blows to, the centre of the circle circle being the measuring point. These data represent a wide area of over 30kms radius, not considering micro locations which could be distorted by terrain. The wind rose data for Mombasa shows that strong winds blow south to north most of the times of the year, stronger winds blowing at 30 to 35Kms/h at about 100 occurrences. The wind however is useful in diffusing local ground based smog, which is not expected to be evident at the proposed site. The data for Ukunda is not very different from that of Mombasa, only that winds are stronger at this location. Looking at the data, the winds favor the project in that the direction is off potential emission if off the fly path, the facility is at a safe distance from any of the runways and the potential emission is not expected to be high enough to distract fly paths.

The distances from Aerodromes declared under this section are considered safe from associated aviation risks. The Proponent is advised to comply with the provisions of the Act in ensuring the height of any structure related levels of dust or exhaust emission or light impacts adhere to the Act and does not interfere with the safety of flying aircraft.

5.34 The Antiquities and Monuments Act, 1983 Cap 215

The Act aim to preserve Kenya's national heritage. Kenya is rich in its antiquities, monuments and cultural and natural sites which are spread all over the country. The National Museums of Kenya is the custodian of the country's cultural heritage, its principal mission being to collect, document, preserve and enhance knowledge, appreciation, management and the use of these

resources for the benefit of Kenya and the world. Through the National Museums of Kenya many of these sites are protected by law by having them gazetted under the Act.

The report includes consultations held with the National Museums of Kenya to identify physical cultural resources that may be impacted by the implementation of the proposed project as well as the appropriate mitigation measures to protect such resources.

5.35 International Laws, Conventions, Treaties and Guidelines

International laws are considered for guidance of the project design, or to cover where national laws are perceived to be weak or absent, provided that they do not contradict, or dilute the strength of the existing national laws. For guidance purposes, as well as for strengthening the scope of social safeguards, International Labour laws, the World Bank Environmental and Social Safeguards Standards (ESS) were considered. The standard practices considered for application are presented in the AMLA (2017) report referenced herein.

Kenya is signatory to a number of international agreements and conventions relating to environmental management, community rights and Indigenous Peoples. The international conventions are not always translated into national legislation. Some of the key agreements are listed in in the table below.

Table 30: International Agreements Relevant to Environmental and Social Issues in Kenya

CLIMATE CHANGE/AIR QUALITY		
Agreement/Convention	**Notes/Comments**	**Relevance**
Vienna Convention forthe Protection of the Ozone Layer, 1985	Protection of the ozone layer, came into force in1988,	Sets international standards for protection of the ozone layer; emissions from project potential to harm ozone layer
Montreal Protocol on Substances that Deplete Ozone Layer,1989	Protection of the ozonelayer.	As above
United Nations Framework Conventionon Climate Change (UNFCC), 1994	Control of greenhouse gas emissions.	Sets international guidelines on restrictions of GHG emissions in order to prevent climate change; Project will emit greenhouse gases from power generation through heavy fuel combustion
Kyoto Protocol, 1997	Greenhouse gas emissions targets.	As above
BIODIVERSITY/PROTECTED AREAS		
Agreement/Convention	**Notes/Comments**	**Relevance**
Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention),	The conservation and sustainable utilization of wetlands, i.e. to stem progressive encroachment on and loss of wetlands now and in the future, recognizing the fundamental ecological functions of wetlands,	Sets international requirements for the protection of wetlands; project has potential to impact local wetland area

1971	their economic, cultural, value.	
Convention on the International Trade of Endangered Species of Wild Fauna and Flora (CITES), 1973	To ensure that international trade in specimens of wild animals and plants does not threaten their survival and it accords varying degrees of protection to more than 33,000 species of animals and plants.	Sets international restrictions/bans on trade of certain wild animals/plants. Project takes place in high biodiversity area
United Nations Convention on Biological Diversity, 1992	Promotes development of national strategies for the conservation and sustainable use of biological diversity. Often seen as the key document regarding sustainable development.	Sets guidelines for protection and promotion of biological diversity. Project takes place in high biodiversity area.
United Nations Convention to Combat Desertification, 1994	To combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.	Sets guidelines to combat desertification. Project has potential to impact local water resources and quality and land use
LABOR/HEALTH/SAFETY		
Agreement/Convention	**Notes/Comments**	**Relevance**
Constitution of the International Labor Organization	Promotes opportunities forwomen and men to obtain decent and productive work, in conditions of freedom, equity, security and human dignity in a safe and healthy environment.	Sets international labour standards; project will employ large workforce
World Health Organization	To improve health and Living standards of the people in the World	Sets guidelines to improve health and living standards; projecthas potential to impact local health/living Standards.

Source: EREL, 2021

6. CONSULTATIONS AND PUBLIC PARTICIPATION

According to Environmental Management and Coordination Act, while undertaking an Environmental Impact Assessment (EIA) study, institutional and public consultation is mandatory. This enables the institutional and public views, opinions, fears and aspirations to be integrated in the report. It also is a way of disseminating the proposed project based information.

As the planned project is likely to have some impacts on the surrounding community, a varied sample of interviewees from the administrative institutions and the community was interviewed so that they could shed some light on their perceptions and expectations from the planned project. The purpose for such interviews was to identify and promote the positive impacts while using the information obtained to mitigate the negative ones. It also helped in identifying any other miscellaneous issues which may bring conflicts in case project implementation proceeds as planned.

6.1 Approach to Public Consultation

Methods used for the consultation include: Community household occupant's consultation, lead and private Institutional expert's consultation, Discussions with random informants, Consultative meeting with community elders and a meeting with the host local administrative stakeholder.

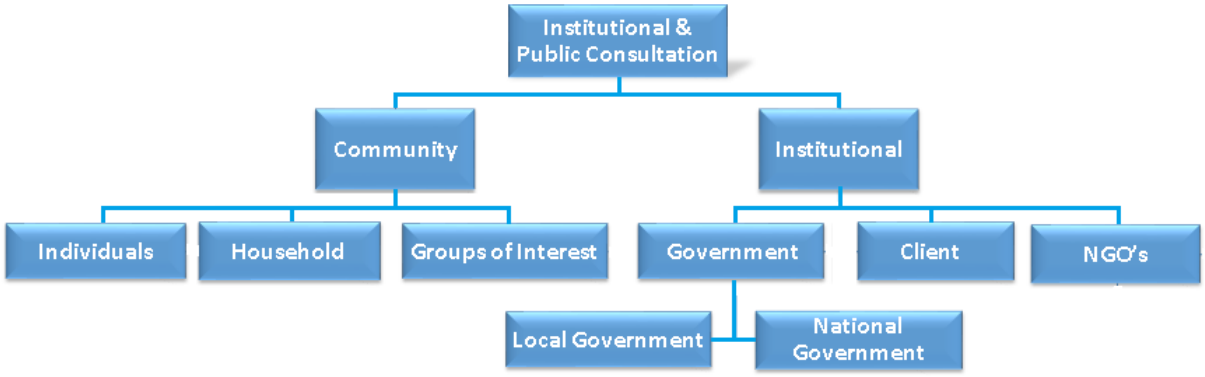


Figure 22: Considerable Groups for Public Consultative meetings

6.1.1 Community Household Occupant's Consultation

This group comprises majority of the project area Residents. The exercise was conducted by a team of experienced enumerators selected from the community and headed by certified team leaders. The consultations were carried out through administration of per-designed questionnaires and by interviewing neighbours surrounding the proposed project site. A total of 275 No. Households were sampled and interviewed. A sample of 10 No. (out of the 275) Community Household questionnaires and the list with details of each household respondents is attached in appendix 2 and 3 and 4 respectively.

The questionnaire issued had details of the proposed project, reasons for conducting public consultation, legal provision pertaining to public consultation and spaces for providing personal details including:

a. Name/Organization of respondents
b. National Identification or passport number and
c. Independent views regarding the proposed project (Social, economic and Environmental sections)

6.1.2 Institutional Consultation (Statutory, Public and private)

These are the decision makers that inform policy implementation regarding their department's position on the project. This makes the group of respondents significant to the project. The questionnaire tool was designed to inform them of the project and to pull out their views on the proposed project. The discussions were made open to allow freedom of expression and to permit the respondents to discuss any information that would be useful to the project. A total of 15 No. Statutory institutional stakeholders were reached out to for this set of interviews. A list of Institutional Visit Discussion Guideline (Plan) is presented under appendix 6, while the discussion summary is appended under appendix 7 herewith.

In addition to the organized groups, Public and private institutions such as those from the business communities (formal and informal), research institutions and organizations, lobby groups, etc fall under this category. The community assessment attempted to reach such groups that were available (see section 6.4 of this report).

6.1.3 Community Engagement

Full public meetings were not held due to crowd control enforcement under the Kenya Covid-19 management policy, which has been reiterated by Public Health Officers and the President of the republic of Kenya. In line with the policy, representatives were sourced from the various communities covering the project area and were mobilized for the sensitization and interactive meetings with the chiefs. 2 No community meetings were held on 27th April 2021 at Matuga and Kundutsi sub-locations. This is discussed in detail under section 6.5 of this report.

6.2 Discussions from Household Respondents

81% of the household respondents were in favor of the project while 19% opposed the projects development. The respondents, both who had positive and negative attitude had a diverse range of mixed views towards the project.

6.2.1 Perceived Impacts on Project Area Households

The Environmental Section probed to understand if the proposed project would affect the household in any way. And so, the responses triggered a wide range of answers bearing three magnitudes. These were: 1). Yes with a positive degree, 2). Yes with a negative degree, and 3). No meaning the respondent did not see how the project would relate to them. This question had two parts. The design of the first part was a closed question requiring a (Yes) or a No, answer and the second part required an open-ended response, allowing the respondent to expound on that first answer.

Although the respondents said Yes or No to this question, the Yes answer constituted about 70% and gave some details which shade light on positive or negative impacts. Some of those who said No were 17% of the household respondents, and also gave some responses which were as well on positive or negative impacts. The open-ended responses were analyzed by clustering common answers and describing the out-layer responses aside. Unanswered responses were about 13%. The pie chart and graphs below illustrate the outcomes:

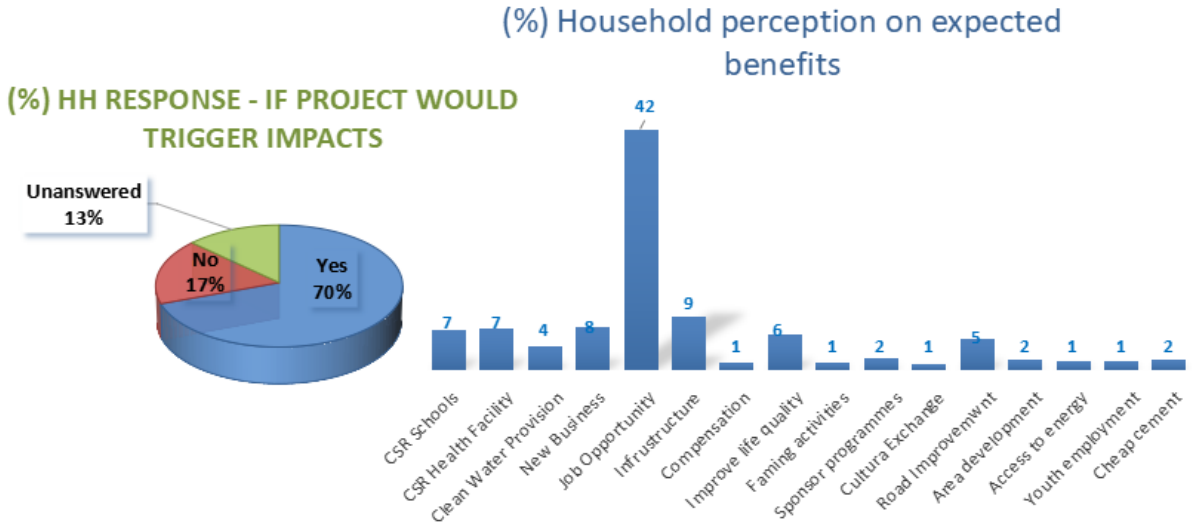


Figure 23: Perceptions on Project Impacts, Perceived Potential Benefits (Source: Field - 2021).

This was an open-ended response (unassisted). Many of the respondents (42%) valued the fact that the project would potentially trigger jobs in the area. The response level was considerably high compared to the rest of responses. 9% valued the fact that the project would trigger improvement of infrastructure and 8% appreciated that the project would open up opportunities for more businesses. CSR interventions for schools and health facilities triggered 7% respectively while 6 % thought that the project would result in improvement of life quality in the area. 5% appreciated opportunities for road improvement. Others mentioned as opportunities were potential for clean water, area development and opportunities for good land value compensation. The following were highlighted as potential negative project impacts;

Figure 24: Review of Household Survey Process at Ganze & Mwachome in Matuga (Field - 2021).

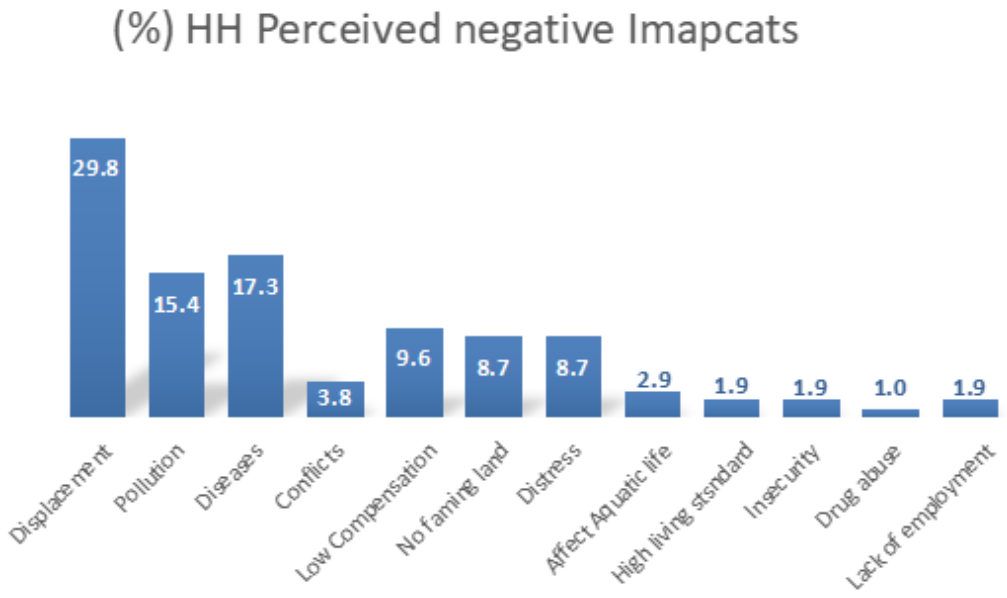


Figure 25: Perceived Anticipated Negative Impacts (Source: Field - 2021).

Most of the household residents (29.8%) think that the project would result in displacement which is a negative aspect in their view. 17.3% fear potential disease incidences while 15.4% fear potential pollution. 9.6% thought that the project would offer low compensation to the affected, and 8.7% though the project would degrade farming land and another 8.7% thought that the project would result in distress. 3.8% of the residents perceived potential conflict, 2.9% thought that the project would affect aquatic life while less than 2% respectively feared for high living standards, insecurity, drug abuse and lack of employment. Among the out-layer descriptions from these questions were two prominent issues which were the thoughts by some respondents that there were some negative project influences that were thought to have been hidden to permit the project to go through. Another said the he just did not want the project with no further detail. However, the later was from one household out of the sample of 275 No households.

According to the results above, positive interventions would include: Enhancement of Employment Opportunities, Improvement of infrastructure, Enhancement of direct and indirect employment as well as CSR opportunities, Adequate and fair resettlement and compensation and control of diseases and pollution incidences among others. Continuous sensitization and liaison with the community should be enhanced to eliminate aspects of doubts and to enhance clarity. Coordination with the local authority should be prioritized.

6.2.2 Perceived project impacts on Current Community Operations

The community members were asked if the project would affect their current operations and in which way. The community considerations here were distance from the proposed project site,

roads and farms near the project site, client base of their private businesses from the proposed project location, pollution impacts from the project, etc. The response analysis indicates 8% of the respondents did not respond to this question. Those who perceived that their operations would potentially be affected were 43%. while those who saw that their operations would not be affected were 49%. Open ended responses of both positive and negative impacts were registered from both the "Yes" and "No" respondents. The details were as presented in the figures below:

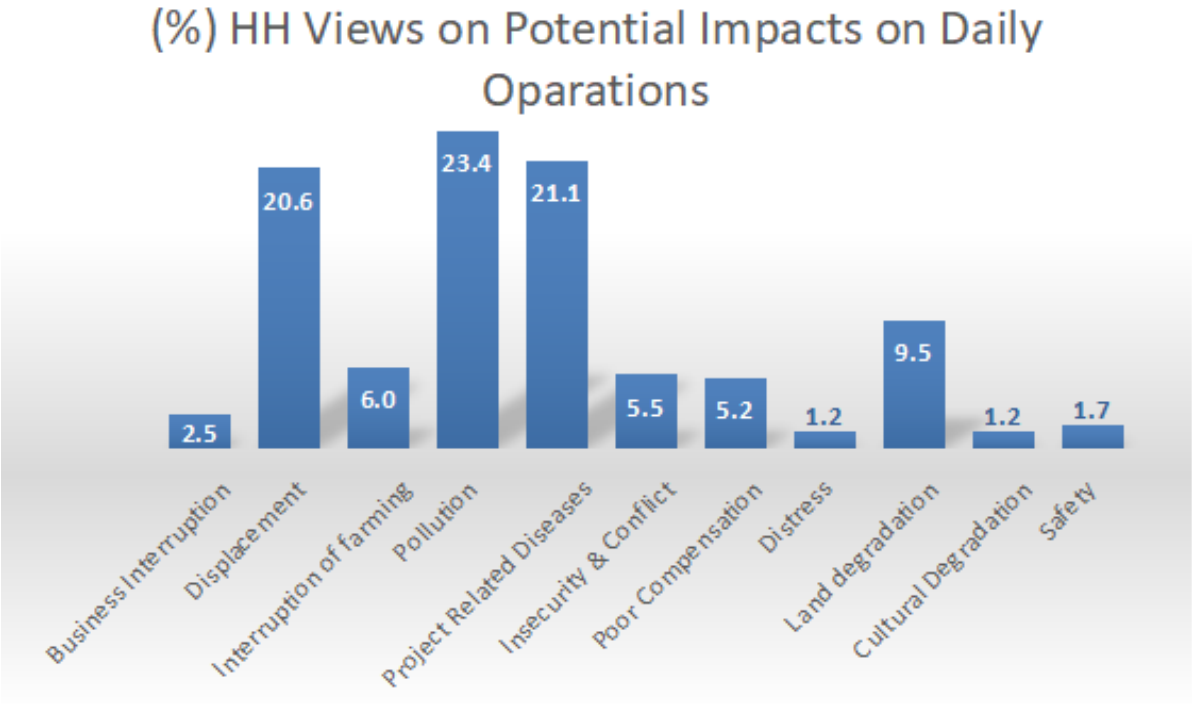


Figure 26: Potential Environmental Impacts during Daily Operations (Source: Field 2021).

From the analysis, 23.4% perceived pollution mostly characterized by dust, water degradation and noise would affect the respondent's operations. Some said that the pollution would potentially affect their crops and livestock. 21.1% though that project related diseases, triggered by the pollution impacts and pooling of abandoned pits would affect the community. 20.6% feared for displacement, others describing it as land grabbing. Land degradation by abandoned pits and loss of fertility or soil erosion. 6.0% sited interruption of farming which we equate to interruption of businesses which scored 2.5%. Insecurity and conflict, as well as poor compensation each scored 5.5% and 5.2%. Others with a score of less than 2% each were safety issues mostly relating to driving, distress to the community and cultural degradation, some siting influence of community young women to "fast lifestyle" or changing the way the community manages itself locally. Beside the above views, some key outlier points and responses mentioned the following:

Negative Impacts

- One of the prominent outliers was the perception about increased population in the area, which was seen as a potential positive or negative aspect to the community crime, Cultural erosion, Increased businesses, etc.
- At least one respondent said that he doubted if the project would be really of benefit to the locals.
- Impacts on livestock was captured within the interference of farming section.
- Impacts on women include health issues affecting particularly mothers with babies as well as business women.
- At least one respondent highlighted climate change as a potential negative issue.
- A number of respondents highlighted safety risk issues and others notified that the roads are poorly designed and maintained, thus they would get worse if not rehabilitated by the company operating heavy trucks.

Positive Impacts

- Improved Business
- Improved Environment
- Improved lifestyle
- Improved Infrastructure
- Improved Local and County Economy

The respondents were then asked to suggest mitigation measures for the perceived negative impacts on the community daily lifestyle and businesses. The following suggestions were recorded:

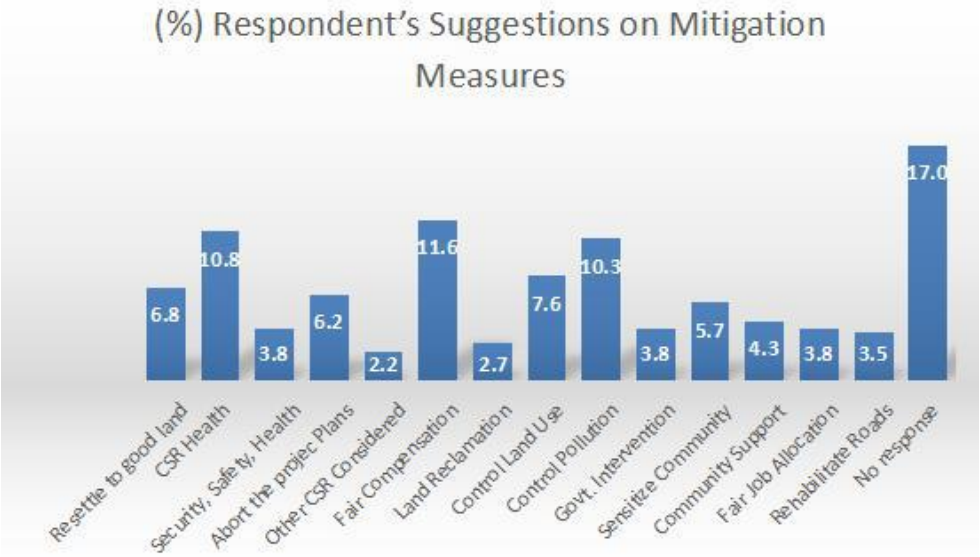


Figure 27: Respondent's Suggestions on Mitigation measures (Source: Field 2021).

This question was not responded to by 17% of the 275 No household population. 11.6% of the responses sited fair compensation for the community settlement distortions and some even suggested that squatters should not be left unsettled. 10.8% suggested that CSR on health performance should be a priority considering the negative health impacts that may be associated with the project. 10.3% suggested that the company should control pollution impacts from noisy activities such as driving and industrial cycles, dust during dry weather, water pollution and potential fugitive pollutants such as oils and any other agents. The project activities were perceived to potentially damage land or venture into unplanned uses. Therefore, 7.6% thought that the project should have clear plans on land use and control the same accordingly. 6.8% thought that the project should resettle everyone on good land that is as worthy as the original lands. 6.2% thought that the idea of having this project at the location should be aborted.5.7% though that it would be important to sensitize the community. Community support by the company was seen as a good way of mitigating social issues as suggested by the respondents. 3.5% advised that the project should consider fair job allocation and another 3.5% suggested that matters to do with security, safety and health should be put in first as a key priority. With a similar score of 3.8%, the community suggested that Government and Local administration control should be well coordinated within the project to safeguard community interests. 3.5% thought said that the company should improve roads or add new routes, 2.7% suggested land reclamation and 2.2% suggested that the project should consider other CSR areas in the field of Agriculture, Education and provision of clean water. The following key outlier points and suggestions were also mentioned by a small section of the community:

- The developer should consider leasing the land and avoid potential ideas of purchasing from the community.
- Other suggestions were that the developer should lease the land, use and reclaim before returning to the community.
- Another suggested tree planting and establishment of project control procedures for biodiversity management.
- A few advised that the project should avoid any form of displacement as much as possible.
- There were some suggestions indicating that the project should adopt conflict resolution mechanisms to cope with diverse issues that are likely to come up.

6.2.3 Ranking of issues according to household respondents

The parameters of measures were pre-set for this section, basing on initial rapid research for Kenyan rural setup environment. To achieve the rankings, each respondent was asked to indicate problems affecting their individual homesteads. Results from each respondent were then fed into a matrix sheet and used to produce the graph below (basing on frequency of issues covered). The colour coding in the graph was used to cluster the response frequencies into cohorts with close scores (according to priorities).

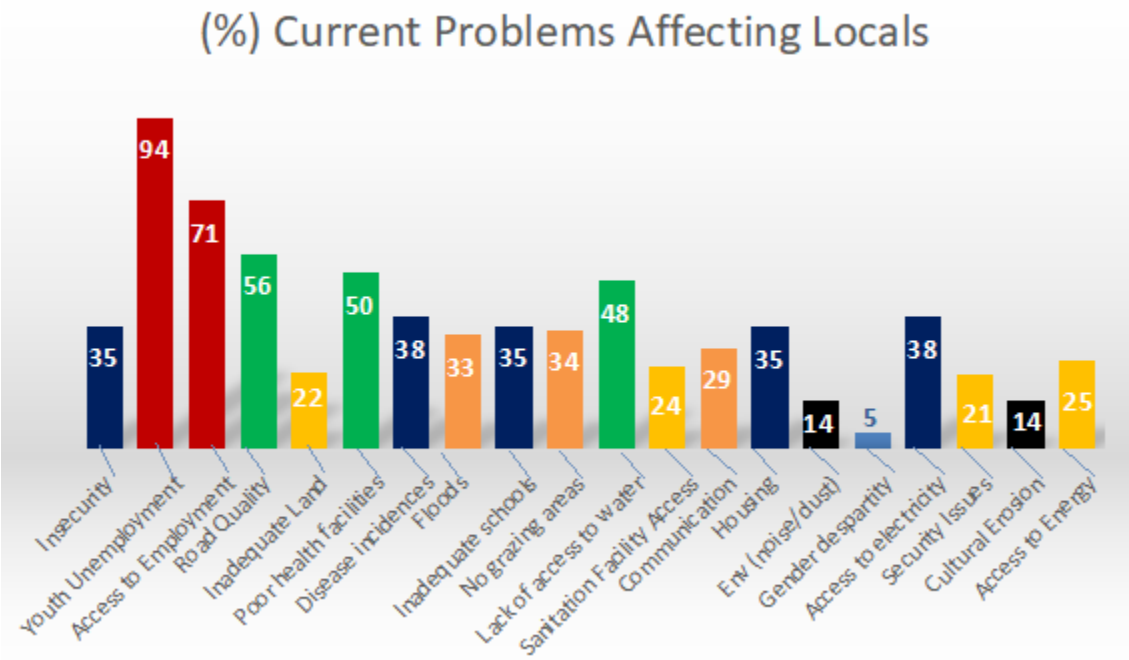


Figure 28: Ranking of problems according to respondents.

According to results issues to do with employment seemed to occupy major popularity within the community. It is adversely noted by other research and Kwale County management as well as national reports that the employment rate in Kwale is one of the lowest in the country. The result scored 94% as a major issue in the county, followed by general employment which ranked at 71%. Roads within the area are difficult to navigate during rainy seasons, are narrow and trigger dust during heavy rains. They also bear high gradients into stream valleys and are with many sharp blind corners and potholes. The community scored road quality as a major problem, prioritized at 56% from the preset list. Poor health facilities (or provision of health services) scored 50%, while access to water scored 48%. the community relies on traditional methods to light their houses, thus access to electricity was seen to be a problem at 38%, followed by rampant disease incidences at another 38%. Insecurity, inadequate schools and poor housing each scored 35% in the list. Lack of grazing areas, flooding and poor communication scored 34%, 33% and 29% respectively. Access to cooking energy has pushed the community to rely on environmental resources, subjecting the area to desertification. Access to energy was ranked at 25%. Another major problem is lack of good sanitation facilities causing the community to rely on poorly built communal latrines of the bush. This inadequacy was ranked at 24%, while inadequate land was ranked at 22%. Environmental Pollution and Cultural Erosion was each prioritized at 14% and the least from the list was Gender Disparity which the community interpreted at 5%. here were some key outliers which were captured as additional notes prominently highlighted by the respondents. These were:

- Formalized agreement as well as resettlement areas to be disclosed before the project commences.

- Management should be very well qualified because Development comes with lot of disturbance and risks if poorly managed.
- There was a fear of potential drug abuse by the youths should they be subjected to project monetary benefits.
- Some residents wished for borehole construction where difficult to supply pipped water.
- Some mentioned the inadequacy of health professionals renders the community subjected to high mortality from curable diseases.
- The Government should be felt adequately during project implementation.
- Humanity must be a clearly considered factor.
- Many appreciated the employment potentials by the project.
- Worship areas should be respected and safeguarded.

This information was additional to assist in determining severity of issues among households located within the specific project area. The details may aid the project when prioritizing the best or most preferable CSR undertakings should there be need to facilitate some within the project program.

6.3 Results from Statutory Institutions Expert's Consultation

This research also covered key government ministries and departments who are the custodian stakeholders of the project area management either through county or national authorities. The method of survey carried out with this group of stakeholders was through open discussions. In the process, the respondent was sensitized on the proposed project, the target location (using map reference) and explaining the mining cycle as well as general potential impacts from the project. Some of these institutions had been visited in 2017 and 2019 over the same project. There was a preset list of about three or four discussion issues developed for each stakeholder (see appendix 6) which was used to capture the major project related aspects which we needed for the ESIA documentation purposes. Additional information came up in the course of progressive discussions.

Each of the stakeholders interviewed had their generalized views on how the proposed project would relate with their respective operations and how they would coordinate within the projects value chain. The institutional visits were formalized by scheduling meetings with the respective heads and presenting written letters seeking audiences with the respective respondents. A sample copy of the letter is appended herein (appendix 9). The institutions selected as key stakeholders present in the county are presented in the table below:

Table 31: Institutions visited and respective dates of visit

	Institution	Date of Visit
1	County Development and Social Services	26th 03 21
2	County Education Office	01st 04 21
3	Kenya Forest Services	29th 03 21
4	Kenya Wildlife Services (Shimba Hills National Reserve)	25th 03 21
5	Department of Petroleum and Mining (Regional Geologist)	29th 03 21
6	Department of Livestock	29th 03 21
7	Asst Chief 1, Tsimba, Kundutsi Sub Location	25th 03 21
8	Deputy County Commissioner Office (Acting ACC)	25th 03 21
9	Public Health Department (Representative Officer)	26th 03 21
10	Youth and Gender Services (National Office)	29th 03 21
11	County Roads and Public Works Department	29th 03 21
12	County Lands Office (District Survey and Settlement Office)	01st 04 21
13	Social services and Talent Management	29th 03 21
14	Chief County Finance Office	01st 04 21
15	Kwale Water Services Company	01st 04 21
	A detailed Institutional visit report is appended under appendix 6	

In general, the stakeholder institutions presented themselves as the link between the national Government and the County Government. Some departments associate with the community by virtue of supporting their wellbeing, assisting in their organization to align fiscal planning, supporting their economic interests, monitoring quality of the environment, etc. This is achieved by working closely with certain community groups associated with the relevant departments, or by directly administering government services without any direct link with the community. Some of the departments have stratified the locality into management units, each with a field representative to handle certain mandates of the departments. It was noted that land issues are delicate in the locations of interest and we were subsequently advised to relate closely with the respective departments as we carry on with our initiatives.

The following section presents general views abstracted from the consultations held. Samples of tools used are attached at the appendices section.

a. County development and Social Services

- There are 50 registered groups in Ngombeni being assisted in various capacity
- The groups have issues with leadership, resource mobilization and structural organization
- Current issues affecting the area include;
  - ✓ Teenage pregnancies
  - ✓ Drug abuse hence rehabilitation needed
  - ✓ At Kokotoni; Noise and Dust exposure as a health hazard
  - ✓ Widows, single families and disability have various plights calling for dialogue and sensitization
  - ✓ Culture issues though each location has a committee to brainstorm
  - ✓ There are some vigilante groups which needs mentorship
  - ✓ Scholarships needs to be distributed to the community as they have been doing

- ✓ Exchange programme and skill management is also needed

b. Kenya Forest Services Ecosystem Conservator

- There are no major forests managed by the KFS within this proposed area
- There are mangrove forests located not far from the proposed location. Some of these are officially recognized while others are not.
- The planned mining should be accompanied with a restoration plan in conjunction with the KFS
- The Kayas located close to the area include;
  - ✓ Kaya Sije (has more than 50 medicinal plants)
  - ✓ Kaya Lunguma
  - ✓ Kaya Chonyi
  - ✓ Other smaller stands of Kayas
  - ✓ There are registered community forest associations which can benefit from conservation programs.
- Evaluation of the tree and amenities such as conservation dams must be done with the help of the KFS.

c. Kenya Wildlife Services

- There are no wildlife designated areas within the vicinity of the project areas, but fugitive and cohabiting wildlife may exist in such environment.
- Communities liaise with the KWS to manage stray wildlife. There have been few complaints which are managed adequately.
- Setting up a cement factory at the proposed location may trigger migration of snakes and aquatic animals when vibrations emanate from the lower parts of the facility.
- The existing forest patches and coastal forests are Important Bird Areas and serve as migratory corridors.
- He proposed that the project conducts a baseline survey to determine local flora and fauna on land and proximal aquatic bodies before establishing the plant.
- He pointed out that there was little understanding about the Kaya forests and it would be good if the project did a study on the closest kaya either at matuga or at the coastal strip.

Collaborative opportunities

- KWS can only collaborate with the community within areas owned by the community to manage wildlife in such areas.
- Within the wildlife act, there are provisions for institutions which may want to keep certain wildlife for conservation purposes objected at promoting Eco-tourism.
- The officer is interested in the project conducting local biodiversity analysis at Matuga area and at the Bamburi facility.

d. Department of Mines and Geology

- The Regional Geologist was positive about the initiative taken by Bamburi Cement, but however urged that all requisite statutory procedure must be adhered to.
- He highlighted that the mining process should operate under a committee as stipulated in the statutory regulation supporting Local Content mechanisms. The regulation has also provided guidance on revenue allocations from mining benefits.

- He noted that the department makes a follow-up during operation phase on extracted mineral value for accounting purposes.

e. Asst Chief 1 office, Tsimba, Kundutsi Sub location

- He mentioned the need to involve the right people in project implementation cycle.
- Health issues as a result of mining should also be addressed.
- CSR should be geared towards helping the community.
- Land tenure system should also be addressed as per the relevant structures and project to cover in tangent areas for conflict reduction.
- Introduction of a compensation kitty was also encouraged.
- Ownership can only be realized through local content involvement and with the rightful individuals.
- The locals are welcoming the project so long as issues at hand are handled amicably.

f. Deputy County Commissioner Office (Acting ACC)

- The project would result to job creation, CSR interventions and other benefits which will boost the community.
- Since relocation will be involved there is need to sensitize the community.
- Local content issues touching on CDAs should be considered a key factor.
- Land ownership issues have created conflict between current occupiers, perceived owners and registered certificate owners-Where all the 3 may be claiming the same land.
- Bamburi Cement should engage an independent consultant to sensitize the community on the magnitude of such projects, benefits, challenges and how to go about it.
- Consider taking the community for a bench-marking experience where the current factory operates in North coast with a main objective of exposing benefits, negative aspects and how to cope with the mentioned.
- The CSR process is very key and should be tailored to the needs of the community.
- The company should engage the local learning institutions to enhance skill sets.

g. Public Health Department

- Dust related disease incidences will be on the rise.
- If not well managed, open quarries will contain water encouraging water and parasitic related diseases including Malaria and schistosomiasis.
- Open pits also pose as health hazards in terms of drowning (at Pungu Ziwani a case was reported).
- The major project impact would impact on the eyes and respiratory organs due to dust.

Suggestions

- Tree planting will be useful in trapping fugitive dust.
- CSR activities should target remedial measures.
- It's important to use local based volunteers who understand the area well.
- Social vices like drug abuse, homosexuality, HIV that comes along due to unemployment should be addressed as the trends are growing.

h. Youth and Gender Services (National Office)

- There are 342 No. registered community groups in the County of a variety of background, some were dormant, and others active, while others were newly registered.
- Trending issues affecting the youth include;
  - ✓ Regulations associated with Covid-19 pandemic.
  - ✓ Drug abuse-the usage of bhang is more prevalent. The boy gender has been mostly affected.
  - ✓ School drop outs are on the rise due to prolonged holidays.
  - ✓ Teenage pregnancies.
  - ✓ Cases of minor offence have gone up (Bhang, petty theft, etc) impacting 16-35 year old.
  - ✓ Sexually transmitted diseases.
- Unemployment is very rampant in the region and Bamburi has been requested to employ the youth as a means of curbing this vice.

i. County Roads and Public Works Department

- Designs of every individual facility constructed must be declared and certified by the roads and civil engineering departments.
- All roads within the county are weighted and should there be excess pressure of use, the contractor should participate in employing remedial measures in conjunction with the department.
- The roads and public works operate as separate departments which complement each other as a single unit. Each has a separate representative.
- The department partners with the business community and community groups as a stakeholder involvement measure in infrastructure rehabilitation and maintenance.

j. County Lands Office

- The department can identify land boundaries and help track the registered mutation of land ownership.
- The respondent officer took the consultants through a detailed land acquisition process (see attached report in appendix 7 section A 19).

Sensitive issues and how to handle acquisitions

- The major challenge involved in the county relating to land issues are majorly Succession and Uncollected Title deeds, and this is due to community illiteracy as well as ignorance.
- Succession issues involve death of title owners following unidentified procedural succession of the titles.
- Internal conflicts emerge as a result of the above (further triggering demographic change).
- Boundary conflicts may also exist as a result of the aforementioned Initial PID methodology of mapping (Measurement Techniques).

Way Forward

- Conduct Alternative Dispute Resolution (ADR) techniques which are carried out by ADR experts. The objective should be to foster a “Win-Win” Solution.
- ADR Mechanism include: Negotiations, Mediation and Reconciliation.

k. Social services and Talent Management

- The department contributes towards safeguarding the Kaya forest, medicinal plants and cultural practices in the area.

- A key function of the department is the preservation of National Heritage and Cultural Practices within the county.

l. Chief County Finance Office

- Building plans must be approved and all processes to be declared during Project development and constriction as well as operation of the facility. This permits the department to tease out areas of financial interest.
- The Physical Planning department will advise on these areas. Other departments involved will include lands department on revenue allocation.
- Raw materials will be charged on transport. In the process, stickers will be issued for all vehicles involved.
- The basic guideline on revenue is stipulated under the Cess and minerals regulation. Other licenses including mining and single business license permits as well as plans and approvals are advised in the county regulations.

m. Departments where official letters were issued and officially received (see sample letter in appendix 9)

i. Department of Livestock and Fisheries
ii. Education Department
iii. Head of County Public Health Department
iv. Department of Roads and Public Works, Kwale

For some institutions, only the introduction letters were delivered due to absence of potential respondents, busy schedules affecting the respondents, short notice issues, etc.

6.4 Private and Public Institutions Assessments (Formal and Informal)

The survey considered institutions and institution categories which bear a direct or indirect relationship with the proposed project. The importance was to categorize them as potential stakeholder institutions which would potentially benefit from the project in a positive of negative or both magnitudes. The institutions are listed in the table below.

Table 32: Institutions visited and respective dates of visit.

	Institution	Date of Visit
1	Bamburi Cement Liaison Office	23rd 03 21
2	G4S Officer in Charge, Kwale Bamburi Facilities	23rd 03 21
3	World Wide Fund for nature (WWF), South Coast Region	23rd 03 21
4	Transporters Service Operators	01st 04 21
5	Fuel Service Station Operators	01st 04 21
6	EREL - Prospecting & Exploration Drilling Team (Safety & Health Issues)	23rd 04 21
7	Women Firewood Collectors Community (Magandia)	23rd 04 21
8	Coast Calcium Mining Limited	
	A detailed Institutional visit report is appended under appendix 6	

Each stakeholder presented their association with the proposed projects detailing their issues, views, opportunities and some presented challenges faced. The details can be accessed in the report annexed under appendix 6 of this report. The summaries are presented below:

a. Bamburi Cement Liaison Office

- Poverty in the areas is associated with low economic performance at grass root level and poor education structure and resulting attitude by the youth.
- Some of the CSR interventions by Bamburi Cement in the area so far include:
  - ✓ Construction of classrooms in public schools
  - ✓ Construction of perimeter walls for Ndenyenye and Ng'ombeni primary schools.
  - ✓ Provision of desks
  - ✓ Tree growing in schools (Many schools have benefited)
  - ✓ Provision of 10,000litres water tanks
  - ✓ Construction of offices for chiefs in the area
  - ✓ Motivation talks particularly for Girl's schools
  - ✓ Recently, a talent empowerment centre in Kwale
- The community themselves developed seedlings (about 60 community groups) and these are the same ones planted at the forest at Bamburi cement Limited facility.

Plans and Recommendations

- Bamburi cement should continue identifying opportunities such as supporting the best performing students and advising the community on the best available courses in order to permit themselves to align with the planned development.
- Bamburi cement as well as the local authority and lead institutions should focus on skewing the community education courses towards mining considering the counties rich mineral base.

Challenges faced

- Monotonous claims by some community members suggesting that historic injustices came into play on acquisition of the land by Bamburi Cement. The aggrieved believe that the land should have been given to them. This is a source of potential queries.
- Potential political influences have also been cited as potential hindrance to the project.

b. G4S Officer in Charge, Kwale Bamburi Facilities

- The company provides security for the Bamburi cement facility at Magandia, and will likely provide security fro the Shale Mining facility.
- The staffs patrol around to confirm that no encroachment takes place in the facility.
- Hazards such as stray animals and broken fences are also reported.
- There is no major conflict with the community apart from those who perceive that the land belongs to the community without considering formal complaint mechanisms.

Challenges

- Encroachment into the facility by individuals from the surrounding villages.
- Dumping of foul waste as well as sewage into the property (including sewage waste).
- Community members living around the area have no proper toilet facilities, they end up using the forest premises.

c. World Wide Fund for nature (WWF), South Coast Region

- Environmental and Social Impact Assessments and continuous auditing should continue contributing towards the company's sustainability measures.
- The management should appreciate the active works by the existing local non-governmental and community-based stakeholders in sustaining components of the environment in terms of biodiversity enhancement and community involvement in order to be in line with their conservation efforts.
- The local community should enjoy the benefits of the presence of the company through CSR and by employing those that are qualified to carry out available jobs.
- Any unusual adverse negative change of the immediate local biodiversity (birds, land, marine, insects) around the area should be recorded and investigated to rule out activities of the cement Processing facility, either at the Shale mining area, along the roads in use or at the Magandia facility.

d. EREL - Prospecting & Exploration Drilling Team (Safety & Health Issues)

Objective of the reporting: To demonstrate the strict application of the OSHA (2010) provision in Bamburi cement business.

The Induction took about 30 minutes. The entire team that had been selected for the site works was involved. They were addressed by the technical field representative on the engineering aspects and by the EREL-EHS representative on the Safety and health aspects.

- At each sector, clear roles were defined, and all hazards were identified. Mitigation measures were highlighted and appreciated.
- Potential hazards and associated challenges were discussed and means of dealing with these were also highlighted. These include potential crowding by the locals, gradients, rainy weather, injuries, etc.
- The team was advised to avoid unnecessary indulgence with the locals.
- They were cautioned to carry enough drinking water and emergency food ration.
- The Bamburi Health and Safety Site Rules were advanced to the team as follows;
  - ✓ Assess and control risks before starting and tasks (Observe Job Safety Analysis and Hazard Identification and Reporting). Major risks may be associated to driving, gradients, snakes and scorpions as well as insects, caught between moving machines, fatigue, dehydration, etc
  - ✓ Only perform authorized activities (apply permit to work systems).
  - ✓ Never override or misuse health & safety devices, and always use the required PPE.
  - ✓ Do not work under the influence of alcohol or drugs.
  - ✓ Report all incidents and practice emergency response plans as trained.
- In addition, the team was advised to consistently observe equipment inspection and equipment isolation when necessary.
- The team leader was advised to select one of the team members to take care of first aid issues.
- The use of Bentonite which is a sample contaminant is prohibited. The alternative should be declared.
- The team was advised to keep the work area clean and to leave it better than was when occupied.
- To avoid social tensions, payments to the locals to be very detailed and clear.

- Tool box talks should be practiced on a daily basis, covering engineering, environment safety and health topics and should only take about 15 minutes of each day.

e. Coast Calcium Limited (Mining Company)

- The respondent remarked that Coast Calcium has no objection to the proposed development.
- He advised that Bamburi cement to expect challenges related with foul access into the facility forests by the community members.
- Coast Calcium has heavily invested in CSR programs such as paying school fees for the needy, organizing sports events, employing locals from within the area.
- Issues at hand relate to labour problems as it may be a challenge obtaining the right employees from the local area due to lack of adequately qualified experts. (most of the locals are form four leavers).
- They face no major issues from statutory institutions so long as all legal requirements are complied with.

6.5 Community meeting held with Local admin and community reps.

2 No community meetings chaired by Mr. Martin Owiny were held at Matuga and Kundutsi Sub-Counties on the 27th of April 2021. As earlier mentioned, it was not possible to meet the entire community representative team due to restrictions governed by the Covid 19 management guidelines (see https://www.health.go.ke/covid-19/). Both meeings at Matuga nd Kundutsi were attended by 15 no community leaders representatives. Each meeting was commissioned by the respective area Chiefs (Mr. Said Ali Tsozi - Kundutsi Sub Location and Chief Bakari Chuphe - Matuga) and were reported to the County Commissioners office as formal processes. The agenda for both meetings was to give an overview of the proposed project, update on where the project had advanced to, disclose the role of the public and statutory institutions, and to gather stakeholder concerns and opinions. The views/ concerns of the stakeholder's present were noted and their identification and contact details taken as required by NEMA. See full minutes of the meeting details under appendix 10 with list of attendants.

6.5.1 Procedures of the meetings

The chiefs had been notified about the project during the Mineral Prospecting and Exploration period in 2019, and in this occasion, were earlier visited by the research team to introduce the project ad intentions of the client to explore the proposed project area for shale material.

The chiefs were given time to formalize our visits, a process which was necessary for their logistics which include placement of appropriate dates for the meetings, mobilization and harmonization of their offices with the County commissioner's office on the issue. They were also keen to understand real time prevailing issues pertaining the ongoing Covid-19 pandemics and to ascertain that requisite standards such as provision of masks and hand sanitizers was taken into account.

The nature of the meeting was interactive, permitting the attendants to air their views in order to facilitate absolute documentation of all issues related to the propose project location and the surrounding environment.

Meeting 1a: Matuga Chiefs Office

Meeting 1b: Matuga Chiefs Office

Meeting 2a: Kundutsi Chiefs Office

Meeting 2b: Kundutsi Chiefs Office

Figure 29: Public Baraza attendants and the sensitization processes.

6.5.2 Summary Outcomes of the meetings

The community meetings were objected at sensitizing the community on the proposed shale mining project and the associated overall project attributes. At the same time, they were designed to permit collection of project area based challenges. Following introduction of the project and the project cycle, the following were discussed.

a. Kundutsi Meeting Summary

The meeting was attended by 15 no community representatives. The response to community concerns were as follows (details attached under appendix 10).

- **On land ownership conflicts:** All stakeholders attached to the land will be called for arbitration action and the land ownership issue will be tracked back to acquisition level before any decision is made. The process will see to it that not a single person that is defined as a “legal land owner” will

lose at the end of it all, so long as the ownership is justified. There are laws to protect all forms of stakeholders in the resettlement action process.

- The controls for community benefits particularly in the extractives industry are formalized and are embedded in the law under the CDA Regulations which require holders of mining license (granted under the new Mining Act), mining leases and special mining leases (granted before the coming into force of the new Mining Act) to enter into CDAs with one or more communities located around their exploration and mining operations areas.
- Besides the CDA requirements, Bamburi Cement is a key contributor to the community under the CSR good practice, which is not a compulsory obligation by the company. Some of the benefits that will come along the above include:
    - ✓ Local Employment
    - ✓ Improvement of key facilities and infrastructures
    - ✓ Forest development programs
    - ✓ Environmental rehabilitation
    - ✓ Livelihood programs, etc.
- There will be no forcing of locals to vacate or grant mining consent where cases involving an unwilling community member among willing ones arises. In fact, such will be reference points of where access and protection of his property will be highly considered by the technical team and process.
- On disclosing the prospecting and exploration (during the pre-prospecting period), the target land owners were contacted for consent and agreement purposes. Then after granting access, the machines and teams were moved in and then the process was carried out. Associated dimensions were explained as well as the related payment conditions.
- On resettlement conditions - destination areas: The Resettlement Action Plan considers all factors that may come into play. The current land is evaluated including all items on it. Before resettlement, the destination is also evaluated and a study is done to ascertain that no though of issues will arise from the very land. The affected will be given time to determine satisfactory status after the process.
- The attendants were told that the compensation value for the shale extraction will be calculated from the value of extracted shale material and not from the finished cement product. The evaluation process of the extracted mineral will include the local based stakeholders and the arms of Revenue Authorities at National and County levels.

Environmental and Social issues noted through discussions during the meeting

- There are some difficult access areas as well as immovable structures such as power lines and these may fall on their land. Such may be avoided.
- Vulnerable points such as community dams and high gradient areas will be avoided.
- Noise, Soil erosion and dust activation may will require mitigation in the course of the project.
- Some drifts are broken and require rehabilitation.
- The roads will require signage and careful driving. The drivers will be required to observe speed. The roads will require bumps to ascertain that speed limits are maintained.
- Sharp blind corners with obstacles will have to be addressed.
- The company should frequently sensitize the community on development and plans to keep them less anxious.
- The technical team should be aware that there is a water catchment area at Madziwani (between Mwangate and Mtsarani) as well as a mosque at Mwachome.
- The technical team emphasized that Kayas and water points were being avoided.

Matuga-Kundutsi Priority Areas

- Establishment of a primary school followed by supply of drinking water at Mtsarani.
- Drilling of borehole water source for domestic use, followed by establishment of a skilled polytechnic to support local youths and capacity building.
- Bursary for Secondary School, then jobs for youths.
- Mwachome dispensary requires a health nurse.

b. Matuga meeting Summary

The meeting was attended by 15 no community representatives. The response to community concerns were as follows (details attached under appendix 10);

- Necessary permits have to be acquired before commencement of the project. The construction and setting up will take about a year and a half. The mining will take about 54 years before the limestone resource is exhausted at the Bamburi Magandia facility. Restoration of the exploited land will be ongoing alongside the mining and completion will take a little longer after exhaustion of the resource at Magandia. Before commencement of the project, there will be a public disclosure.
- On Local Content and community benefits, refer to bullets 2 and 3 of Kundutsi meeting summary.
- Bamburi cement has a sister company called LaFarge whose basic mandate is ecological restoration where Bamburi Cement has left foot prints. Therefore, the exploited land will be restored after exhaustion of resources.
- After restoration the land may or may not be returned to the community, depending on the nature of agreement made by the community. If the community decided to collectively hand over the land as a block and agree on such restoration, the value will be integrated accordingly for that to be considered.
- The community was explained to that every single project bears positive as well as negative impacts on implementation and during operation. For this particular project, dust and noise will constitute the most common pollution sources. Their impacts may be respiratory diseases, eyes irritation and nuisance from noise. It is up to the company to develop mechanisms for reducing the impacts as much as possible.
- There will be some resettlement action required which will be a separate process after the ESIA process. The exploration results will show the exact land parcels to be affected and this is when the owners will be engaged for a resettlement action plan. The process will employ a Grievance Resolution Mechanism (GRM) which will empower affected stakeholders on which way they should pursue.
- The vulnerable community properties will all be accounted for in order to relocate those that may be affected by the process, through the Resettlement Action Plan (RAP).
- The RAP process will categorize the various forms of preferred compensation designs in order to determine how to deal with each group. The individual property owner will be dealt with at individual level if this will be the most preferable means by that particular property owner. Evaluation will consider current market value.
- On water table reduction: Earth Benches and water pits are incorporated to ascertain optimal water recharge into the ground. Beside this, where the risk of loosing water is real, the project incorporates sustainable water projects to the satisfaction of the community.

Additional (sharpened) priority areas to the Kundutsi priority list

- A secondary school and a day school at Kenya School of Government (Matuga). The community walks very far to attend school.

- There is fresh water at Mwatete which is far from the location. The community requested for a piping system to avail the water much closer to the villages through piping.
- Closest Kaya forests: Kaya Nagende at Mwauchi, Kaya Mwazidi at Mwanunje and Kaya Mwauchi.

The environmental and Social Safeguards process was explained before closure of both meetings meeting. The explanation highlighted the project planning, implementation and operations processes, impact identification and mitigation processes as well as the relevance of the ESIA process in the project development cycle. Monitoring and evaluation concepts were explained as well as the role of stakeholders of diverse scopes in the processes.

6.6 Matuga-Kundutsi Baseline Survey findings

Below are highlights of findings that were presented to the Matuga-Kundutsi consultation process. The objective was to formally present what the field research found out to the key community stakeholders and to verify that the findings were within their scope of expectations. The sample questionnaire used to obtain baseline survey details is appended under appendix 4 of this report.

Table 33: Matuga- Kundutsi Consultative Meeting Baseline Findings

	Field	Key Points
1	**Household size:**	• The mean population of the individual households (Kundutsi and Matuga) was 5.7 persons per household (47% female and 53% male) and 52% in Matuga and 48% in Kundutsi.
2	**Travel distances and accessibility:**	• Mean distances to major facilities - trading centres (3.1Km), -health dispensaries (3.1Km) and primary schools (2.65Km) respectively. Roads, particularly for those living in the interior areas require upgrading to improve access to key centers.
3	**Water Accessibility:**	Main water source is Well/spring (37%), Communal piped water (20%), Stream/river (18%), Borehole 17%, rain water (8%) • . The few water pipe outlets whose source is from Kwale Water Supply in the study area are centrally shared between villages by the road side. Average distance to water points in the County is two (2.45) Kilometres. • In Matuga and Kundutsi sub location, 30.9% of the households took less than 30 minutes to fetch water. 29.1% took about 31 to 60 minutes and 15.6% took about 1 hour to 2 hours. Water access fluctuates with seasons, dry and wet period.
4	**Per Capita Consumption of drinking water:**	• The per capita consumption of water within the surveyed households was at a mean of about 21.05 litres per person per day. • This represents an over value by about just about 4 litres of the WHO recommended minimal standard value. • This value seems to fluctuate with season considering that the research applied the same approach in December 2020 when it been hot and dry for a long period, rivers had shrunk and water was scarce. • The results indicated a low mean water consumption of about 10.2 litres per capita, which was below the mean recommended quantity of about 17.5 litres per person per day.
5	**Water Treatment:**	• Only the piped water supply is pre-treated by the Water Service Provider

		Company before delivery to clients.
6	**Sanitation:**	• In Kwale County the main type of toilet facility is the pit latrine. In 2018 the latrine coverage in the County was 55%, which was below the national target of 90%. • During the survey, it was determined that the major toilet designs options distributed among the households were usage of bush and pit latrines at about 41% and 57% respectively.
7	**Solid Waste Handling:**	• 78.5% burn their waste, 22.9% discard into the environment, 4.7% use open dump sites and 3.3% decompose their waste • . Some residents practice more than one method of waste handling.
8	**Housing Construction materials sources:**	• 53.5% source their house construction materials from local markets. 49.5% source from the surrounding bushes and forests. 26.9% source from the compound, 18.2 source from other markets, 16.4% source from hedges and 9.8 source from local stones. 5.1% source from waste products, 2.5% source from grasses and 1.5% source from other sources.
9	**Health Care:**	• The County has a total of five (5) government hospitals, ten (10) health centres and ninety (90) dispensaries located in Msambweni, Matuga, Lunga-Lunga and Kinango Sub-Counties. • The doctor and nurse population ratio stands at 1:76,741 and 1: 3,133 respectively. In addition, the county has a total of thirty-six (36) private health facilities and nine (9) health facilities owned by faith-based organizations.
10	**Alternative Medical treatment:**	• There are many varieties of forest medicinal products used and sold by local community trades from the local forests.
11	**Mining and Industries:**	• Kwale County has a huge potential for mineral exploitation. Clay and Shale soils, limestone, silica are among these resourceful materials.
12	**Form of Employment:**	• About 41% of household occupants covered in this survey were not eligible for employment (below 18Yrs). • 71% were considered unemployed. 20.1% were self-employed, 7.8% were paid employees, and 0.8% were employers. From this ratio, a few were students or were engaged in forms of learning institutions.
13	**Sources of Income:**	• Most of the households rely on kitchen gardens. Those that have larger farms take excess harvests to the local markets.
14	**Household Income levels:**	• Mean monthly income (Kshs): less 3.999 (325%), 4,000 to 12,999 (40.3%), 13,000 to 17,999 (24.7%), above 18,000 (20.6%). • In some instances, monthly income is dependable on seasonal variation of markets and products.
15	**Air Quality & Water Quality tests**	• Recently done at Mwembeni spring, Mwachome River, Bububu River, Shallow wells at Patanane and Matuga.

6.6.1 Conclusion from the baseline Survey findings.

Following an analysis from the baseline survey, we highlighted some of the associated key points. The key points suggest both the positive and negative aspects to be put into consideration during the project implantation phase:

Positive Project aspects

- Job creation at Cement plant and during shale extraction.

- Reduced cost of cement for the local community due to reduced transport costs.
- Other CSR benefits such as nursery for school going students, road repair and water supply.
- Improved business in the community hence improved standards of living.
- Sustainable and Optimal use of land based resources.
- Increased revenue base as a County and National secondary advantage.

Negative aspects

- Air pollution resulting from the Shale Extraction activities and transportation of the raw resource.
- Noise and Vibrations from heavy equipment operating in the facility, as well as from heavy vehicles transporting the raw material.
- Increased morbidity resulting from potential project pollution sources.
- Resettlement of individuals, which can be transformed into a benefit to all stakeholders if handled well.
- Potential water pollution if management of the environment is not adequately implemented.
- Loss of agricultural land (and grazing land) at the expense of the mining project.
- Potential reduction of water table if the process does not observe adequate water conservation measures.

6.7 Consultative meeting with Bamburi Cement Management

Bamburi cement run an operational cement processing facility located in Bamburi suburb of Mombasa. This is about 40 kilometers by road from the current proposed shale mineral mining location and 30 kilometers from the proposed new clinker manufacturing plant. The facility was established in 1951 and commenced operations in 1954. Over the years the facility has seasoned with the surrounding community, developing through numerous successes and challenges. The facility commenced with old design equipment for its production unit and has managed to develop with trending social and environmental developments, pausing challenges, successes and progressive transformation to cope with existing standards. The communities there have been transformed by the presence of the factory and are consistently involved in development matters in a stakeholder involvement capacity. The same environmental and social issues associated with the facility are likely to compare with the proposed plant in Kwale County, as well as the shale mining and transportation aspect. The following are characteristics which were considered and prompted the research to seek for consultation from the Bamburi cement management located at Bamburi, Mombasa:

- Similar Community at the operating facility location to those at the proposed location (differences may be associated with certain surrogates highlighted in this report).
- Easily accessible distance from the site.
- The environment is geographically similar to where a Cement Processing plant has been proposed at Kwale County.
- Similar industrial activities expected with the proposed facility (resources and processes).
- Industrial, Environmental and Social, Safety and health informational challenges and successes from establishment to current day.

- The same management is in charge of the proposed clinker processing location at kwale County and thus they are aware of the project design, timelines and other certain useful details pertaining to the proposed project.

The Bamburi Cement Limited company representatives met for the discussions are in charge of the following plant sectors: **1).** The Environment Health and Safety representative, **2).** The company Geologist, **3).** The Plant Manager and the **4).** The Project Manager. The following key points came out of discussions;

6.7.1 Bamburi Cement Environment Safety and health

- The new plant planned for South-Coast (Magandia - Kwale County) is scheduled to be implemented about mid-2021, and will take about 8 months to complete.
- The major environmental, social, safety and health impacts from the plant include: Dust and particulate emission, Fatigue, Material spillage, Complaints from the public and statutory offices, infrequent failed filters.
- Improvements on plant will involve plant upgrade to match contemporary global standards
- Wind direction is a key factor in the placement of cement factories.
- Recommendations for duct control include: Paving of roads, use of water boozer (sprinklers), Tree planting along perimeter and within the mining facility where permissible, Road diversions across the perimeter instead of along perimeters, Strategic placement of the plant to prevent wind path dust from settling in habitable areas.
- A vibration from mines is a public issue. Measurements are frequently taken to control the impacts on surrounding areas.
- Bamburi Cement are normally informed when vibrations are high and they respond through remedial measures and feedback.
- As a marine wildlife conservation measure, Bamburi cement collaborates with turtle culturing initiatives.
- Cement processing is an intensive energy utility process consuming both electricity and fuels. Electricity supply is from Kenya Power and coal is sources from South Africa via ship, and ferried on land by trucks. Heavy fuel is used to heat the coal.
- Alternative fuels consumed include waste from steel industry, aflatoxins, Pyre-diesel oil (used tires).
- At plant level, community engagement is supported by four pillars, namely: Environmental Management, Health management, Education and Infrastructure.
- CSR are key interventions by Bamburi Cement.

6.7.2 Bamburi Cement Geology Department

- The type of mining conducted by Bamburi cement is open-cast mining (uncovering, removing the mineral and then covering).
- Infrequent blasting may apply where hard obstacles are met.
- The process sequence includes:
    - ✓ Bush Clearing
    - ✓ Stripping (drilling, casting)

- ✓ Crushing
- ✓ Load materials and transporting

- Machinery and materials include a variety of mining machines, drilling machines, ammonia nitrate, excavators and trucks.
- After the above (mining) process, is the material preparation process
- Waste from the process include scrapes, oil, containers, filters, spares, paint, contaminated oil, etc
- Other wastes include biological waste from growth, soils and debris which are not required. These are returned, buried or mulched where mine extracts are exhausted.
- Quarry rehabilitation is determined by the mining plan which is developed before commencing the process. The rehabilitation contains short term and long-term interventions.
- Biodiversity studies are very important during the process considering restoration requirements stipulated in the environmental regulations. The biodiversity development plan is developed by the Bamburi cement in conjunction with statutory lead institutions as well as local based stakeholders.
- Environmental impacts realized from the mining process include vibrations, truck and machinery (equipment) noise.
- The mining processes near the sea normally leave an altitude clearance of about 2 meters above high tide sea level beacon to prevent backwash effects. Personal (physical) checks are additionally useful.
- To mitigate air pollution, the size of blast is controlled. The explosives are also confined. Their storage is approved by the mines and geology department.
- Roads are placed across the plant instead of having them along the perimeter fence.
- Marine life has never been encountered near sites of interest that are close to the sea, studies are facilitated to ascertain the same.
- The regulation states that the closest distance to the sea that Bamburi Cement can venture into the mining is not less than 50 meters from high tide (with a logical due diligence consideration based on site conditions).
- A Lafarge ecosystem is a limited company which manages the biodiversity component.
- Quarry staffing includes outsourced and in-house staffs.
- The processes subsequent to the crusher include stockpile management and site management.
- Crusher to raw mill - Raw mill Preparation - Raw mill production - Clinker Production - Product realization.
- Current production is at about 3,000tons per day, the new plant will produce an estimate of about 5,000tons per day at optimal production.

6.7.3 Summary from Bamburi cement Visit

- The plant will incorporate contemporary designs built with considerations of trending effective pollution abatement measures.

- Bamburi cement incorporates biodiversity quality improvement measures through her sister company Laferge limited. The same will be factored in the upcoming facility to ensure that most stringent pollution control measures are incorporated.
- In addition to compliance to the Local Content statutory requirements through adherence to CDA regulations, Bamburi cement will influence a number of CSR projects which will be beneficial to the community.
- From the community survey, County Planning Documents, Statutory and private institution respondents it is evident that the county local community suffers majorly from lack of employment. Bamburi cement will play a major role in creating direct as well as indirect employment.

The full Bamburi cement Visit report is appended under appendix 11 of this report.

7. IDENTIFICATION OF THE PROPOSED IMPACTS

7.1 Introduction impacts

This chapter focuses on the positive and negative impacts that are likely to occur as a result of the proposed Project Development and mining activities. These were identified according to the proposed project phases namely: Construction (Setting Up of facilities) Phase, Operational (Mineral extraction and transportation) Phase, and the Decommissioning Phase. For ease of reference, the impacts due to or affecting certain elements during construction and operation are presented in matrix form in the Environmental and Social Management and Monitoring Plan. The table below provides a snapshot view of the anticipated impacts (both positive and negative) of the proposed project:

Table 34: Impacts of the proposed project

Environmental & Social Impact	+Ve or -Ve	Direct/ Indirect	Temporary/ Permanent	Major/ Minor	Occurrence		
					Construction	Operation	Decommissioning
Socioeconomic Impacts							
Electricity supply	+Ve	Direct	Permanent	Major	x	√	x
Creation of employment	+Ve	Direct & indirect	Temporary/ Permanent	Major	√	√	√ x
Security	+Ve	Direct	Permanent/ Temporary	Major	√	√	x
Revenues to Government	+Ve	Direct	Permanent	Major	√	√	x
Development of Business opportunities	+Ve	Direct	Temporary/ Permanent	Major	√	√	x
Growth of agro-based industries	+Ve	indirect	Temporary/ Permanent	Major	√	√	x
Interference with natural flora and fauna	-Ve	Direct	Permanent	Minor/ Major	√	√	x
Interference with socioeconomic activities due to relocation & resettlement	-Ve	Direct & indirect	Temporary/ Permanent	Major/ Minor	√	√	√
Employment Opportunities	+Ve	Direct	Permanent/ Temporary	Major	√	√	√
Gains in the Local and National Economy	+Ve	Direct	Permanent	Major	√	√	x
Interference with infrastructure	-Ve	Direct	Temporary/ Permanent	Major/ Minor	√	√	x
Visual Impact	-Ve	Direct	Temporary/ Permanent	Major/ Minor	√	√	x

Biophysical Impacts							
Clearance of vegetation cover	-Ve /+ve	Direct	Temporary	Major	√	√	√
Increased solid waste	-Ve	Direct	Temporary	Minor	√	√	√
Interference with water quality	-Ve	Direct	Temporary	Minor	√	x	√
Increased demand of sanitation	-Ve	Direct	Temporary	Major	√	x	√
Natural habitats	-Ve	Direct	Permanent/ Temporary	Minor	√	√	√
Health and Safety Impacts							
Air pollution GHG	-Ve	Direct	Temporary	Major/ Minor	√	√	√
Noise and Vibrations	-Ve	Direct	Temporary	Major/ Minor	√	√	√
Dust	-Ve	Direct	Temporary	Minor	√	√	√
Increase in social vices	-Ve	Direct	Permanent/ Temporary	Major/Minor	√	√	√
Injuries and accidents to animals and workers	-Ve	Direct	Temporary/ Permanent	Major	√	√	√
Development of other sector such as health, education, industries among others	+Ve	Direct/ Indirect	Permanent	Major	x	√	x

Summary of activities: In a nutshell, field processes include hauling equipment to field, ground clearance, setting up offices and operation area, opening up unwanted cover layers and cutting mineral occupied ground by ripping and bulldozers to the required depth. The follows scooping and loading to conveyor which will transport to a crusher and then to an accumulation point to await collection by trucks. The trucks will be transporting the shale mineral between the mines and the processing facility located about 15 to 20 kilometers from the project site. Usually, visual impacts may be an eyesore and very little may be done to avoid this particular impact. The operation is in a cycle of the above, and on ground, when a mine is exhausted, the next in-tangent area is opened up and the previous is restores and rehabilitated.

The following are some of the potential positive impacts that could result from the proposed prospecting and Exploration they include;

- The major impacts of the proposed project will be reduced poverty and improved living standards within the county. These will result from employment creation (direct and indirect) and increased investments especially in value addition processing of primary products.
- Improved incomes and poverty reduction will also occur through provision of opportunities to facilitate direct and indirect employment.

- Job creation for both skilled and unskilled labour to work during prospecting and Exploration activities.
- Boost the economy through investment and expansion of businesses and income generation opportunities. This will increase productivity and competition.
- Households and institutions can be connected to electricity thereby providing household level lightning system. This will in effect create market for electronic goods.
- Improve security in the beneficiary communities through better lighting.

The potentially adverse impacts have been discussed in greater detail the following section:

7.2 Impacts on the Biophysical Environment

7.2.1 Terrestrial Habitat Alteration

Terrestrial habitats are ones that are found on land, like forests, grasslands, deserts, shorelines, and wetlands. Terrestrial habitats also include man made habitats, like farms, towns, and cities, and habitats that are under the earth, like caves and mines.

i. Setting up and Mineral Extraction phase

If proper care is not observed, the process will result in alteration and disruption to terrestrial habitat, including impacts to avian species. Clearing activities will transform habitats, depending on the characteristics of existing vegetation, topographic features lines. Examples of habitat alteration from these activities includes fragmentation of vegetation; loss of wildlife habitat, including for nesting; establishment of non-native invasive plant species; and visual and auditory disturbance due to the presence of machinery, Movement of personnel and vehicles. The construction phase is also expected to be associated with woody species removal along the proposed area resulting in destruction of species habitat or its simplification.

Terrestrial Habitat Alteration will be limited to a degree within the project location where the camp will be set up and where the mining operation will be taking place. This will occupy just a small portion of land at a time. Thus, only those points will suffer the impacts. Remedial measures applied before opening up an area will include biodiversity studies with an objective of integrating relocation of animal species that will need assistance where necessary, and recovery of plant species for transplant (only those which may need scientific assistance to regenerate efficiently. Therefore, an ecological study with emphasis on biodiversity will aid the process as well as engineering approached such as exploiting a small section at a tie to exhaustion before moving to the next portion and at the same time rehabilitating and re-vegetation enhancement where the resource is diminished. Vegetation clearing should be done manually by use of pangas and slashers. Where there are big trees, portable power saw mills (petrol powered) will be used. The monitoring parameter should be the deforested location and area, major species affected, major species trans planted or replanted and resulting forest cover. By so doing, the proposed project will not affect the integrity and ecological functions of the habitats of the project the client will be dealing with section of the site to extract the resource.

7.2.2 Alteration of Aquatic Habitats

i. Setting up and Mineral Extraction phase

Soil erosion from the Mining activities, road development and transportation may result in siltation of watercourses. River Manjera and the connecting seasonal river valleys draining the location to the Indian Ocean through the Mteza and Bombo Creek may transport fugitive materials on account of the project activities if mismanaged. This will define the health of the coastal and mangrove environment as well as their ecology. This impact is however expected to be minimal if properly managed. At the proposed site there will be Exploration activities and earthworks will be involved in this project.

7.2.3 Wildlife Species

i. Setting up and Mineral Extraction phase

The wildlife seen in the area include squirrels, moles, bush rats, hare, small reptiles such as the agama lizard, common lizards, small snakes, and millipedes, scorpions, spiders and small insects. Among larger animals are the dik-dik, stray antelopes, and rare forest wildlife. Setting up and extraction is not expected to have significant negative impact on wildlife owing to the area where the site is has low wildlife density. The behavior of wildlife species in this area precludes any significant negative impacts although some species may be affected during the construction phase.

7.2.4 Soil

i. Setting up and Mineral Extraction phase

During this phase, the contractor is expected to strip the top soil in order to access the shale material which may lead to soil erosion. Similarly, road to transport material between exploration sites. The exposed soil will be prone to wind and water erosion during the exploration phase. The soil problems may be exacerbated by topography of some areas, especially across riverine and dry river-beds, mainly during the wet season. The remedial condition should be as presented in section 7.2.3.1.

ii. Decommissioning

During the decommissioning phase, the contractor is expected to loosen the soil along the project site for the purpose of accessing Shale which may lead to soil erosion. Similarly, the road to transport decommissioning materials from the proposed project sites. The exposed soil will be prone to wind and water erosion during the decommissioning phase. The soil problems may be exacerbated by topography of some areas, especially across riverine and dry river-beds, mainly during the wet season.

7.2.5 Air

i. Setting up, Mineral Extraction and Transportation phase

During the process, some dust will be generated from the few project vehicles as they make their way through the mainly murram roads leading to project sites. This dust may not be significant in the low population density areas but may become a nuisance as the vehicles cross the areas of dense settlements as they transport the material from the site, will pass close to houses and the road surface is murram which is in just a fair condition. Fugitive dust may be measured periodically using particulate samplers.

7.2.6 Water Quality

i. Setting up and Mineral Extraction phase

There is a risk of pollution of permanent and seasonal wetland resources, as well as water ways and potentially ground water it the safeguards are not well observed. Water resources may be polluted on account of stock piling loose top soils without compacting and vegetating it during the setting up and mining operations. The loose material may migrate into water bodies through wind action, mechanical or hydrology action. All nearby community water resource points should be marked and frequently monitored for potential pollution impacts.

7.2.7 Hazardous Substances

i. Setting up and Mineral Extraction phase

Use of engines (Mining vehicles and equipment vehicles) on site has the potential to lead to spillage of petroleum products. It is however worth noting that the risks of a major oil spillages occurring are minimal because major maintenance on site will not be encouraged. Besides this, only perfectly functioning vehicles will be registered on site. The impact during setting up and mining will not be significant. However, emergency remedial measures must not be ignored considering that as much as accidents may be minimal, they may as well be unavoidable.

ii. Decommissioning

The machines on site are built with moving parts, which will require continuous oiling to minimize the usual corrosion or wear and tear. Possibilities of such oils spilling and contaminating the soil and water on the site are likely to occur. The workers will be required to undergo through pollution abatement measures to keep the possibilities as low as reasonably possible. These dangers can be contained by maintaining the machinery in specific designated areas designed for this purpose.

7.2.8 Loss of plant species and communities

i. Mineral Extraction Phase

Direct impact results from disturbances that cause changes in temperature, light, moisture and nutrient levels; removal activities (e.g. clear-cutting, bulldozing); impacts resulting from air and water pollution (e.g. turbidity, eutrophication). Indirect impacts result from changes in natural

community processes or invasion of non-native plant species. Loss of plant communities also results in decreased water quality, increased erosion because of unstable soil, nutrient imbalances in the soil, and/or compaction of soil. The proposed setting up and extraction of earth minerals will be within an area considered to be habitat to a variety of plant and animal species, both wild and domesticated.

In order to minimize the environmental impacts, it is recommended that clearing be done manually as much as possible with no burning of the cleared vegetation. It is important to note that vegetation clearance in protected areas will be done through acquisition of the necessary permits and supervised by the relevant authorities (also refer to section 7.2.1.1).

7.3 Impacts on Health and Safety

The health and safety impacts of the proposed project are detailed briefly in the following sections.

7.3.1 Noise

i. Setting up and Transportation phase

There will be noise and vibrations generated during the setting up and associated Transportation phase. The noise impact during setting up is expected to be negative and short-term. The major receptors are expected to be the workers as well as any immediate neighboring residential premises as well as those along the transport corridor. Sources of noise will be trucks and the off-road vehicles in transit, use of compressor/Excavator to break hard ground and the use of motorized chain saws for vegetation clearing.

The noise from the project vehicles is only significant in areas where the setting up of site will be taking place and trucks passing through dense settlements, for example, close to the towns' neighborhoods, institutions and schools. The noise from compressors/excavator will only be significant where hard ground breaking is carried out. Noise from the motorized chain saws will only be experienced in the wooded areas but it will not be a significant impact since the density of settlements is not very high. Impacts of noise include noise-induced hearing loss for the project employees and nuisance for the affected settlements.

The audio disturbances can be controlled by application in accordance to agreed parameters such as time and duration with the community as well as measuring by decibel meters in accordance to the provisions of Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

ii. Mineral Extraction and Transportation phase

Sources of noise during extraction of Shale and transportation will be infrequent blasting (shale is relatively loose and will not require frequent blasting), crushing, and vehicles. Crushing would be continuous for about 16 hours per day Monday to Saturday. Large trucks would move to and from the site anytime during daylight hours. This would normally be limited to 12 hours per day

and would be intermittent. Sources of noise at the site would include noisy equipment such as the crusher.

iii. Site Decommissioning

The decommissioning works will most likely be a noisy operation due to the moving machines, communication of workers and outgoing vehicles transporting project materials and workers to and out of the proposed site. However, it will also be a source of disturbance in populated areas. The immediate surrounding will experience an increase in human traffic and noise during ground preparation. In the decommissioning site, noise is likely to be produced by the decommissioning machinery. To prevent this, machine operators and workers who will be in close proximity to the machinery will be required to wear protective gears such as earmuffs. The prevalence of acute noise damages occurs when the ear is exposed to a single or relatively few exposures of sound at threshold levels of 100-120 dB and these damages to the ear can be either temporary or permanent. However, during the decommissioning phase measures will be put in place to ensure the exposure level is within the permissible limits.

7.3.2 Possible exposure of workers to diseases

i. Mineral Extraction and Site Decommissioning phase

During the extraction and decommissioning phase, workers are likely to be exposed to diseases enhanced by inherent project materials and location attributes. It is therefore recommended that before the Mine Operation commences, there is need for the materials to be well inspected according to the occupational health and safety standards. Other concerns will include incidences of vector borne and water borne disease. When solid wastes are not well managed there is potential of disease outbreak due to suitable breeding conditions for vectors of cholera and typhoid. If the wastes find their way to a water body its quality may be lowered. Malaria outbreak could also be exacerbated by the presence of open water ditches particularly those enhanced by the project activities for breeding of anopheles mosquitoes. The most vulnerable groups are children who could be exposed to these conditions. Long exposure to suspended particulates may also result upper and lower respiratory disease incidences.

7.3.3 Physical Hazards

i. Setting up, Mineral Extraction and Site Decommissioning phase

Exposure Hazards: The main aspects to be considered in site preparation activities include manual clearing of bushes (using slashers and machetes) for access to proposed site and breaking of hard ground using compressors and heavy earth movers and other machinery, as well as driving.

During the manual clearing of vegetation using slashers and machetes, excessive or prolonged use leads to ‘white hand syndrome’ which affects the palms of the worker to an extent that they are unable to engage in further physical tasks involving the hands. Prolonged manual handling activities and overexertion will lead to ergonomic issues relating to pains in the lower back and in the joints (of legs and hands/arms). Potential injuries may result from slips and falls from

material left on walk ways in the project site. Such falls will cause fractures that could lead to loss of ability to use limbs normally and in extreme cases fatalities. The use of vibrating equipment's, will subject the project employees to Whole-body vibrations that may impair functions of the chest, abdominal organs, and musculoskeletal systems, contribute to fatigue and decrease concentration. Prolonged exposure to noisy environment may result to health conditions, to worse extents, permanent physical impacts.

Accidental Hazards: Potential accidents around mines may include caught between moving parts, crushed under heavy loads during lifting, Vehicle accidents affecting the operator and passengers, Blasting materials flying in work areas, etc. Site precautionary measures need to be established and put into self-controlled practical action with adequate monitoring interventions.

Community Safety: Around community areas, health hazards include exposure to vehicular noise particularly where frequent in populated areas, accidents on roads on account of careless driving, fly rocks outside limited blast areas or when blast areas are infringed by community members, etc. Impacts on community from pooling grounds as discussed above and pollution of community water sources particularly dams and poorly discarded waste which may attract deadly scavengers such as wild dogs into the area are considered safety hazards. Child labor may expose safety breaches if proper measures are not taken.

7.4 Socio-Cultural Impacts

7.4.1 Spread of Disease

i. Mineral Extraction Phase

During the Mineral Extraction phase of the project, Exploration personnel brought in from outside the community may be infected with HIV/AIDS and other sexually transmitted diseases, and could introduce these diseases to the community members they interact with. Communicable diseases within the work areas exposed to community members interacted with are also not spared as hazards.

7.4.2 Alteration of Settlement

i. Setting up and Mineral Extraction Phase

Potential Relocated Community Stakeholders: The mineral extraction phase will trigger reallocation of certain affected community members from their current land by virtue of land lease or acquisition for the mining operation, or by virtue of relocation of neighbouring facility owners to enhance safe operations. This is a delicate operation considering that land issues in many parts of Kenya are considered vulnerable to deal with particularly when patient issues are not handled with care. This impact is perceived from the targeted project location, as well as from the destined settlement location point of view (where the affected community member will be reallocated to must be compatible).

Pressure from Induced Settlement: During Mineral Extraction Phase, works, there will be some direct employment opportunities for both skilled and unskilled labour. Furthermore, indirect employment opportunities are bound to arise from the provision of services to the mining teams. The mineral extraction teams have the potential to cause natural resource degradation in terms of accelerating tree felling, and vegetation clearance at the location, solid and oil/petroleum wastes are also usually produced. They may settle in centers near the facility increasing population pressures and certain service demands, hence increasing the pressure into micro economy of the location, including needs for service provision.

7.4.3 Employment creation

i. Setting Up and Mineral Extraction Phase

Employment opportunities are one of the long-term major impacts of the setting up and mineral extraction Phase of the project that will be realized during setting up, mineral extraction and maintenance of the project components. These will involve security personnel, operators, drivers, waste management staff and creation of businesses that will be located within the project sites.

7.4.4 Increased Revenue

i. Mineral Extraction Phase

There will be positive gain from the revenue obtained through sale of cement to consumers and this adds revenue base for the Company and the Government (GOK) at national and local levels.

8. IMPACT MITIGATION MEASURES

This chapter focuses on measures that can be incorporated into the design, and taken during the improvement works and operation stages of the project in order to mitigate the negative environmental impacts and enhance the positive ones highlighted in chapter 7.

8.1 MITIGATION MEASURES: BIOPHYSICAL ENVIRONMENT

8.1.1 Terrestrial Habitat Alteration

i. Setting up Phase

- Study the ecology and biodiversity of target areas with an objective of establishing species statistics.
- Use human labour as opposed to heavy machinery to avoid herbaceous layer destruction and exposure of the soil to wind and water erosion.
- Give the community priority on use of the removed vegetation for construction or any other purpose.
- Undertake selective clearance by clearing demarcated areas for Mine Operation Offices and for Extraction of Shale Mineral.
- Avoid unnecessary harming of fauna species. Relocate where necessary and if harmful, liaise with the Kenya Wildlife service for assistance.
- The demarcated section for Shale mining should be exhausted before opening a new section and rehabilitated as the newly demarcated section is extracted.
- Create buffer zone with vegetation.

ii. Mineral Extraction and Maintenance Phase

- Implementation of an integrated vegetation management approach. The selective removal of tall growing tree species and the encouragement of low-growing grasses and shrubs is the common approach to vegetation management in site;
- Vegetation management should not eradicate all vegetation; excessive vegetation maintenance may remove unnecessary amounts of vegetation resulting in the continual replacement of successional species and an increased likelihood of the establishment of invasive species.
- Monitor associated development.

8.1.2 Soil

i. Setting up and Mineral Extraction Phase

- Soils excavated from the project area should be used for re-filling and should not be left exposed to wind or water for long periods. Stabilization may be done using rapid grasses.
- The contractor should avoid steep terrain during the transportation of material by using alternative routes or use light vehicles where appropriate.

- Vegetation should be minimally disturbed during the exploration phase to reduce soil erosion.
- Re-plant degraded areas with local species common in the area to complement natural vegetation regeneration to improve ground cover.
- The project should monitor for potential fugitive mechanical or hydrology aided migration as a result of operation of the project or maintenance of roads. The most appropriate monitoring points should be between the Sije Drift crossing Manjera River and upstream riverine environment connecting to the project area. The parameter of measure should be turbidity.

8.1.3 Air Pollution

i. Setting up and Mineral Extraction Phase

- Regular maintenance of vehicles, plant and equipment to reduce emissions.
- Control speed of vehicles to minimize generation of dust on access roads.
- Prohibit idling of vehicles on site to reduce emissions.
- Compact and enhance fast grasses on temporary mounts of surface soils to prevent erosion by wind.
- Periodically, and whenever necessary monitor dust and particulate accumulation.

8.1.4 Water Quality

i. Setting up, Mineral Extraction and Decommissioning Phase

- Location of the mines should be at a safe distance from Community Water-point Facilities and should bear adequate barriers to prevent hydraulic migration.
- Stock piling of mining equipment and spares for unnecessarily long periods and unprotected from weather should be avoided.
- Water points near the proposed facilities should be monitored periodically and whenever necessary.

8.1.5 Solid Waste

i. Setting up, Mineral Extraction and Transportation Phase

- The project engineer should ensure that the contractor disposes any remaining solid wastes such as metals, paper, plastics, etc. away from the site to an approved disposal site.
- Segregation of waste must be practiced.
- Employ a NEMA certified waste handler to handle the waste.

8.1.6 Hazardous Substances

i. Setting up, Mineral Extraction and Transportation Phase

- Use of designated areas for repair and maintenance of vehicles (e.g. local licensed garages) and powered machinery to avoid fuel and lubricant spills at the site.
- Segregating waste and assigning appropriately licensed waste handlers.

- Employing a spillage mitigation plan.
- Sensitization and strategic storage.

8.1.7 Fire Risk

i. Mineral Extraction and Transportation Phase

- Carry out routine thinning, slashing, and other maintenance activities, within and adjacent to Rights-of-way in order to minimize the risk of fire.
- Install appropriate classes of fire extinguishers at strategic positions of the facility.
- Each assigned heavy vehicle to have at least 5kgs of fire extinguisher.
- A trained fire marshal to be employed on site at all times.

8.2 MITIGATION MEASURES: HEALTH AND SAFETY

8.2.1 Noise

i. Setting up, Mineral Extraction and Transportation Phase

- Noise reduction technologies - silencers/mufflers and provision of hearing protection devices for workers using equipment such as power saws (for vegetation clearing) and compressors.
- Implement Noise programme to worker who are exposed to Noise.
- Carry out periodic medical examination to worker exposed to Noise.
- Monitor and record noise performance to establish operation norms and mitigate outlier situations, as the Noise regulation Parameters are being observed.

8.2.2 Slips and Falls

i. Setting up, Mineral Extraction and Transportation Phase

- Testing structures for integrity prior to undertaking work;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures;
- Inspection, maintenance, and replacement of fall protection equipment;
- Hazard identification in the project site to avoid slips and trip hazards.
- Avoid working alone where hazards are potential or high.
- Carry out pre task briefs to discuss on hazard within the workplace.

8.2.3 Physical Hazards

i. Setting up, Mineral Extraction and Transportation Phase

- Appropriate hand and foot protection (PPE) during the clearing of vegetation.
- Adopting ergonomic work flow designs that fit physical tasks to employees and not vice versa while maintaining a balance with productivity.
- Training of workers on how to identify dangerous vibrations of the equipment's.

8.3 MITIGATION MEASURES: SOCIO-CULTURAL

8.3.1 Visual Impact from dust storms

i. Setting up and Mineral Extraction Phase

- To mitigate the visual impact of projects, the following mitigation measures should be implemented:
- Extensive public consultation during the planning of project;
- Erecting tarpaulin buffers, re-vegetation, wetting the ground, avoiding high wind area and during dry period, limiting high-speed of vehicles,

8.3.2 Spread of Disease

i. Mineral Extraction Phase

- All communicable diseases should be acknowledged and control measures put in place.
- Rules should be put in place to highlight means through which diseases can be triggered by virtue of setting up the mines and preventive measures communicated to avoid such.
- Provide counseling and testing for HIV/AIDS to incoming exploration personnel.
- Strengthen advocacy through awareness training in HIV/AIDS and other STDs; encourage the use of preventive measures like condoms.
- Avail condom dispensers to staff.

8.3.3 Alteration of Settlement

i. Setting up and Mineral Extraction Phase

Potential Relocation of Community Stakeholders

- Reallocation must only be according to the proposed Resettlement Action Plan (RAP) which should consider all standard requirements.
- The destination of resettled persons must be monitored for an agreed period before being considered successful.
- Work with the various scopes of authority to ascertain that the resettlement action was well achieved.

Induced settlement Pressures:

- Settlements must be well observed and planned to avoid emerging shanty structures on the roadside.
- The RAP process should be well designed to mitigate all negative impacts from the resettlement process.

9. ANALYSIS OF PROJECT ALTERNATIVES

This section analyses the project alternatives in terms of site, technology scale and route options.

9.1 Land Use Options

During the public consultative meeting the community was given a chance to air their view on their preferred options regarding if the project should go on or not and if it should go on, then what are the preferred options regarding land use. A mixed reaction was realized as demonstrated in chapter 6 of these report. We analyzed these options with technical applications which led the developer to see potential for this particular location and not any other. The considered options, public opinion and remarks made are as presented below:

Table 35: Land Use Options

	Alternatives	Public Opinion	Remarks
1	No Project Option	From the HH survey,19% of the general respondents opposed the project. However, on a follow-up question prompting the respondents to elaborate their individual thoughts on the project, a total of 17% of the sample offered no remarks (logically, this consisted those that opposed and those that were for the project). Only 6.2 indicated that they did not want the project to go on at all. Their views are represented in this report under section. Most are manageable through a RAP process	This option was evaluated with view of what the various stakeholders had presented, as well as from a Government Policy on industrialization, employment creation, community empowerment, and natural resource use perspective. **Sub-Section 9.1.2** elaborates this option.
2	Implement at a different location	Existence of Shale Mineral is site specific. The current location has adequate deposits of the material. A few of who opposed the project suggested that the project should be implemented elsewhere and not at the proposed location.	This was found uneconomically favourable to the proposed project considering several aspects described under **sub-section 9.1.1 below**
3	Purchase or not to purchase the target land	While many suggested that the developer should not engage in purchasing to own the land but lease and return, most signaled options suggesting reallocation of good land, fair compensation, consider the “squatter community” etc. This implies that a good percentage were concerned about handling of land issues.	This concern responds to the potential resettlement action that may be involved. The research has proposed implementation of a comprehensive Resettlement Action Plan (RAP) process before land acquisition.
4	“Squatter Handling” during the process	There are three categories of land owners. Those with title deeds, those with allotment letters, those that are on the land without any documentation but own the land, and those	This is a matter to be handled during the RAP Process before occupation of the project area by the proponent.

		that acknowledge that they occupy the land illegally.	
5	Project to be Implemented at the propose site as planned	This means that the developer occupies the land and implements the project as proposed.	All matters at hand will need to be settled amicably, all statutory laws considered and all stakeholders involved (see **section 9.3 below)**

9.1.1 Shale Mineral Exploitation at a different location

Relocation option to a different site is an option available for the project implementation, but the current location was found to be economically and logically preferable for a number of reasons. At present the developer does not have an alternative site at hand. This means that he has to survey for another site that has Bankable Shale resources. Surveying another site that has shale will take time and money to do survey.

The developer will spend another two years on prospecting of an area that has shale, carrying out tests to determine the quality and quantity and approvals since prospecting and planning has to be according to client requirement. Project prospecting and planning before the stage of implementation will cost the developer millions of Kenya shillings. Whatever has been done and paid to date will be counted as a loss to the developer. Assuming the project will be given a positive response by the relevant authorities including NEMA, this project would have been delayed for about two (2) years period before implementation. This is a delay that our economy can ill afford. This would also lead to a situation suggesting a No Project Alternative option.

Furthermore, the current location is strategically close to land owned by Bamburi Cement Limited that is targeted for mining of shale, which together with shale is a resource material for clinker production. The advantage is that both are located within the same county which makes it easier to handle requisite statutory obligations, and will be more beneficial to the local community.

9.1.2 No Project Option

The *No Project option* in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to the proponent, government and the society as a whole. The *No Project Option* is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- There will be no added values to the reference plot.
- There will be no added value to other establishments in the neighbourhood.
- The proponent will not benefit from the revenue expected from the facility.
- The government kitty will not benefit from the revenue to be earned due to the establishment of the proposed project.
- The economic status of the Kenyans and the local people would remain unchanged.
- The local skills would remain under-utilized.

- Reduced interaction both at local, national and international levels.
- No employment opportunities will be created for thousands of Kenyans who will work in the project.
- Increased urban and rural poverty and crime in Kenya.
- Discouragement for investors to produce this level of affordable facility to the public.
- Development of infrastructural facilities (roads, electrical etc. will not be undertaken).

From the analysis above, it becomes apparent that the No Project Option is no alternative to the proponent, local people, Kenyans, and the government of Kenya.

9.2 Transportation (Routing)

The project area can be accessed through several roads which consist a mix of seasonal, compacted earth and tarmac roads. The transport corridor is divided in two sections. One section covers transportation between Matuga centre and the Shale mining area and the other covers transportation between Matuga and the Bamburi cement Magandia site where the Clinker processing plant will be constructed. The rational is to separate the roads according to the two separate ESIA projects (Shale mining at Matuga /Kundutsi and Limestone at Ng'ombeni) as illustrated below:

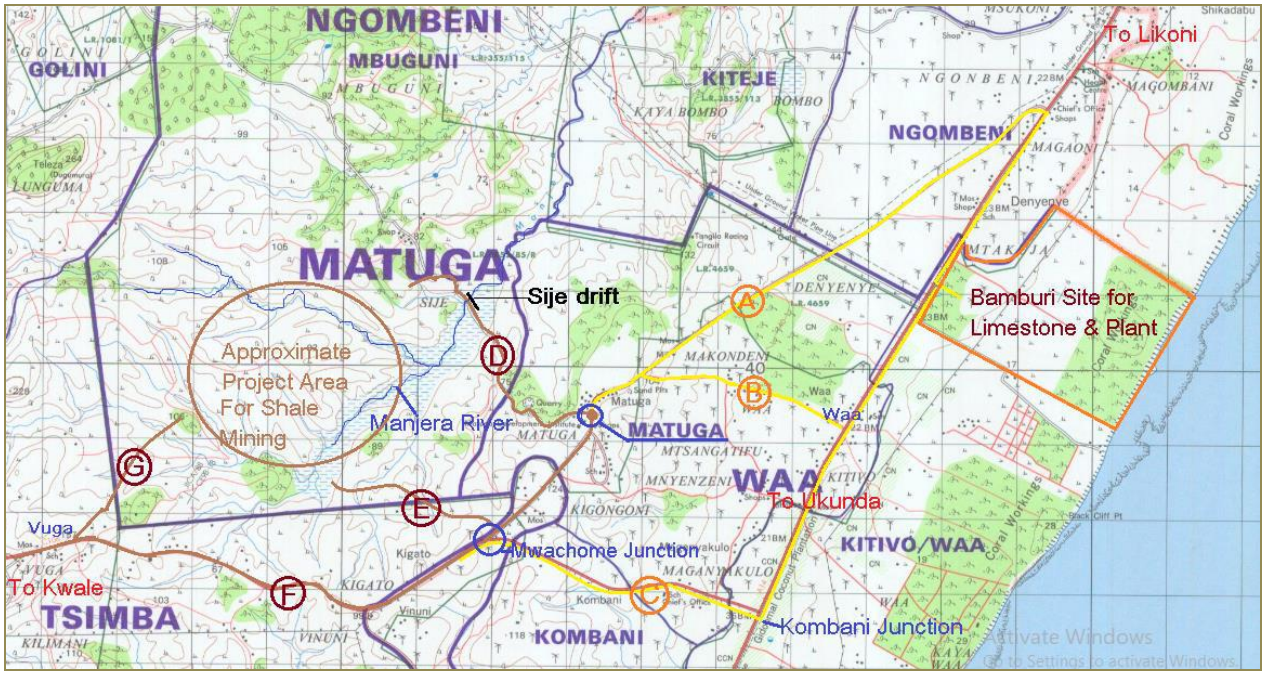


Figure 30: Alternatives to Transport Corridor options.

The yellow roads (A, B and C) will be covered within the Ng'ombeni Limestone and Clinker plant ESIA report while the brown roads (D, E, F and G) are covered in this current report on mining of Shale mineral at Matuga and Kunduts Sub-Locations as indicates on the map above. The following factors characterize the transport corridors:

- All route options pass through relatively busy centres and community areas.
- Majority of the routes are characterized with overloaded motorbikes which over-speed.
- There are power lines on some routes which are very close to the road.
- Some community household structures are right next to the roads.
- Heavily meandering corners and high gradients through seasonal and permanent river valleys, some dilapidated, breaking roads and long overhead (hanging tree branches) characterize the area.

The following are the suggested routing options covered in this report:

Table 36: Suggested routing options

Route Option	Considerations
Option 1 Route A-D	● The first option is the Ngombeni- Matuga-GTI junction- through Ganze –Mtsarani into the Quarry site about 20 Kilometers to the quarry site, accessing it from the North East. It will require road upgrading, and a 200m bridge when crossing river Mwachome.
Option 2 Route B-D	● The second option is Ngombeni-Waa- Matuga-GTI junction- through Ganze-Mtsarani into the Quarry site about 15 Kilometers to the site accessing it from the North East.
Option 3 Route B, F,G	● The third option is Ngombeni-Waa- Matuga—Vuga-Mtsarani- into the Quarry site about 18km Kilometers to the site accessing it from the South.
Option 4 Route C,F,G	● The fourth option is Ngombeni-Waa-Kombani-Vuga-Mtsarani- into the Quarry site about 18.5km Kilometers to the site accessing it from the South, which is tarmacked all the way to Vuga before turning right on a marrum road which is about 3 kilometers from Vuga junction- Mtsarani) into the project area accessing it from the Southern extent. The 3km road is having 12 meanders, 4 andulating hills before running on a ridge to the project site. It will require approximately 5 mini-bridges or weirs of 10-30m length to allow water flow during heavy rains.
Option 5 Route B & E	● The fifth option is Ngombeni-Waa- Matuga-Kigato-Mwauchi-Mwachome via the valley into the Quarry site about 12km Kilometers to the site accessing it from the West.This will mean a new road to be done through Kigato area to Mwauchi-Mwachome, for approximately 3Km. This will be subject to company resources as well as need to erect 2-3 bridges crossing river Mwachome.

With the above alternatives, the proponent has a freedom of deliberating on the most appropriate choice, but with considerations on the highlighted factors from this report as a base to establish his rationale.

9.3 Alternatives of Project Location

The project area was stratified into three sub-blocks which are herein referenced as block A, B and C. The three bear various unique characteristics as referenced below

Option A: Is approximately 700 Acres but only 508 Acres will be available for mining. The remaining land will be used for stockpiling and drainage management to avoid siltation fo river MWachome and hence the Indian Ocean.

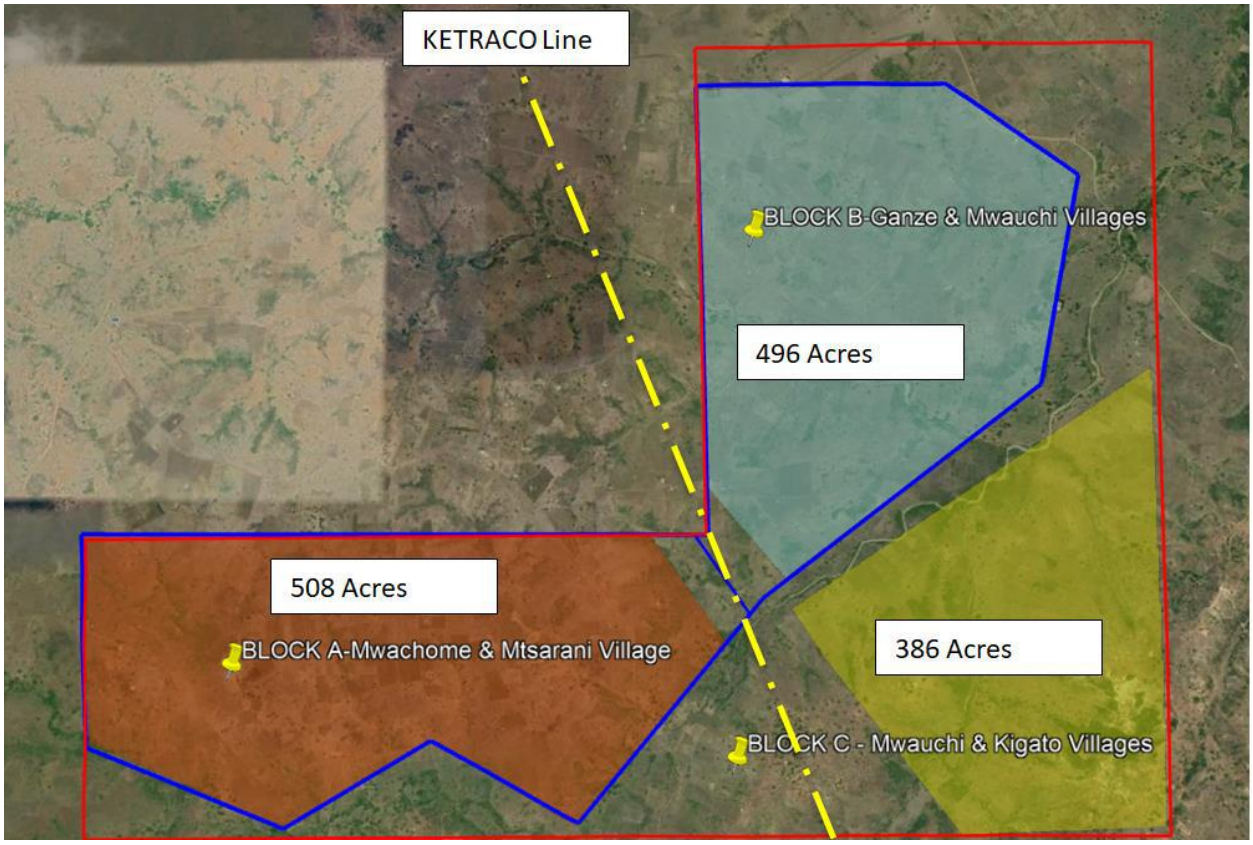


Figure XX: Project Site Alternatives

Option B is an option, assumed to be in the same formation but northward, it has not been drilled yet to confirm. Road accessibility will require more bridges which will increase the project cost.

Option C: Has more of sand than shale

Note: Option Block A is our priority, where we have drilled and confirmed to have shale. Has quality shale and is accessible from Vuga market. The yellow line indicates the 132 KV KETRACO power line which will require adequate way-leave considering the nature of ground it is constructed on.

9.4 Shale crush site Location Options

Crushing is part of the initial processing of mined resource mineral and can be done on site before transporting or at the processing plant as the initial processing stage. Crushung bears a

number of environmental attributes ranging from dust activation, noise generation due to the crushing and movement of machinery or visual scenery attributes among others. Considering the two options, **the project designed to carry out the crushing off the site** where these impacts may be consolidated and controlled more efficiently together with other associated project impacts. In the long run, this will benefit the project socially considering avarted social aspects of the projects, environmentally and in the long run economically.

9.5 Use of Explosives versus Stripping and Ripping

In particular, surface mining will be used to retrieve the Shale mineral from the ground. There are five recognized types of surface mining, each with specific variations depending on the minerals being extracted. These include strip mining, open-pit mining, mountain top removal, dredging and highwall mining. Use of explosives help in loosening the mineral by breaking it from hard ground.

- Shale mineral bears loose crumbling properties and so, blasting using explosives will not be considered.
- The project will employ Stripping and Ripping under controlled environments to avart high dust activation and surface runoff.

9.6 The Proposed Development Option

Under the Proposed Development Option, the developer of the proposed project would be issued with an EIA License. In issuing the license, NEMA would approve the proponent's proposed development of the Project, provided all environmental measures are complied with during the project area occupation, Setting up, Mineral extraction and site handling, transportation and Decommissioning phases. This alternative consists of the applicant's final proposal with the inclusion of the NEMA regulations and procedures as stipulated in the environmental impacts to the maximum extent practicable. A key component will include the approved Resettlement Action Plan which will have to be accepted by the entire community through public disclosure processes.

10. ENVIRONMENTAL SOCIAL MANAGEMENT PLAN AND MONITORING

10.1 Environmental and social management

Following the desk studies, field investigations and public consultations undertaken in this study, an Environmental and Social Management Plan (ESMP) has subsequently been developed. The ESMP provides a general outlay of the environmental and social aspects, potential impacts, mitigation measures, performance indicators, monitoring means and frequency, responsibility for monitoring and associated [estimate] costs.

The responsibility for the incorporation of mitigation measures for the project implementation lies with the Health Safety and environment department, who must ensure that the Contractor implements all specified mitigation measures. In order for the Contractor to carry out environmental management activities during exploration, the proponent should draw up an environmental management plan of his own to show how he will address the mitigation measures during the exploration period. The Health safety and environment department is responsible for assessing the Contractor's environmental management plan.

10.2 Monitoring Environmental and Social Performance

Monitoring is a long-term process, which should begin the start of exploration of the project and should continue throughout the life of the project. Its purpose is to establish benchmarks so that the nature and magnitude of anticipated environmental and social impacts can be continually assessed. Monitoring involves the continuous or periodic review of exploration, operation and maintenance activities to determine the effectiveness of recommended mitigation measures. Consequently, trends in environmental degradation or improvement can be established, and previously unforeseen impacts can be identified or pre-empted.

Simple monitoring systems should be set up during the entire project cycle by the Health safety and environment department and more during operation by the Proponent, so that potentially environmentally problematic areas can be detected well in advance and the appropriate remedial action taken. This could simply be a checklist of items that need to be inspected as a matter of routine, or periodically, depending on the nature of the aspect. The types of parameters that can be monitored may include mitigation measures or Extraction and camp operation processes, driving or development of actual impacts. In some cases, monitoring is fairly straightforward and can be done as part of routine or periodic maintenance. However, other parameters, particularly those related to socio-economic and ecological issues can only be effectively assessed over a more prolonged period of say 3 to 5 years.

The tables below overleaf summarize the Environmental and Social Management Plan (ESMP) for the proposed project. It describes parameters that can be monitored, and suggests how monitoring should be done, how frequently, and who should be responsible for monitoring and action.

10.3 Project Mineral Extraction (Mining) Phase

The necessary objectives, activities, mitigation measures and allocation of costs and responsibilities pertaining to prevention, minimization and monitoring of significant negative impacts and optimization of positive impacts associated with the project equipment installation and operational phases. Major risks and mitigation include:

4. Risk of breaking quarry cliffs and banks where deep excavations exist. Such elevations should be secured and not kept open for long after extraction.

5. Stray wildlife such as elephants which infrequently may breach boundaries to roam the area. Any incident should be reported in good time. The proponent should liaise with the Kenya Wildlife Service to manage unusual occasions.

6. The existing high-power transmission line which traverses the project area. This requires a 360meter wayleave and could affect a significant portion of the target area. Exploitation of such areas or vicinities should be with consultation with KETRACO who manage the power lines and affected corridors.

7. River discharge points at the Mombasa's Port Reitz. The discharge point may experience heavy siltation depending on mining and quarry management, integrated with season. There should be periodic monitoring of water ways through the operation phase. Monitoring should be done with coordination of the Kenya Maritime Authority at the ocean, Water Resources Authority at the riverine areas and NEMA.

8. Junctions linking the highway to the interior where the resources are found. These junctions are hazards to fast moving vehicles plying the area. There should be clear vision of both sides of the highway when driving out of the access roads. Signage should be well placed. The County government should coordinate with the contractor to manage road safety at major junctions and interior sections of the project area.

9. Wind storms from fast blowing winds. Erect buffers inform of tarpaulin or tree planting, wetting the ground and reduced speed of lorries.

The table below has provided a more detailed outline of proposed mitigation measures.

Table 37: Environmental management plan for the Mine Setup Phase

Potential Impact	Proposed Mitigation	Monitoring Means and frequency	Responsibility for Monitoring	Performance Indicator	Cost (Ksh)
Terrestrial Habitat Alteration	• Ecological & biodiversity studies of target areas with an objective of establishing statistics. • Re-vegetation of disturbed areas with native plant species; • Undertake selective clearance by removing tall woody species leaving saplings, for quick regeneration of vegetation along the way-leave	Annual Studies Routine inspection	Supervising Engineer and Contractor	Re-vegetation of disturbed areas Fauna Specie Counts	Re vegetation approx. 100 per sq m. 25,000
Aquatic habitat alteration	• Minimizing clearing and disruption to riparian vegetation.	Inspection, routine	Design Engineer and Contractor	-Siltation of soil in rivers from exploration activities. -Physical water quality	Routine Inspection Internal cost
Soil erosion	• Top Soils excavated during ripping of shale material should be used for back-filling and should not be left exposed to wind or water for long periods. Avoid exploring during rainy season. • The contractor should avoid steep terrain during the transportation of material by using alternative routes or use light vehicles where appropriate • Riverine vegetation should be minimally disturbed during the Exploration phase to	Inspection Routine Maintenance Monitoring Interventions	Contractor Supervising Engineer Project Environmentalist	Status of ground cover in constructed Areas Turbidity in Water Bodies	Re-vegetation approx. 100/- per sq m. 3000 Weekly

Potential Impact	Proposed Mitigation	Monitoring Means and frequency	Responsibility for Monitoring	Performance Indicator	Cost (Ksh)
	reduce soil erosion and safeguard riverbank protection • Re-plant degraded areas with local species common in the area to complement natural vegetation regeneration to improve ground cover. • Monitor for potential fugitive mechanical or hydrology aided migration of soils as a result of operation of the project or maintenance of roads. • The most appropriate monitoring points should be between the Sije Drift crossing Manjera River and upstream riverine environment connecting to the project area.				
Air Pollution (dust, fuel emissions)	• Control speed of exploration vehicles • Prohibit idling of vehicles Water should be sprayed during the Exploration phase on excavated areas • Regular maintenance of plant and equipment. • Provision of dust masks for use when working in dusty conditions	Daily inspection	Design Engineer, Supervising Engineer and Contractor	visible particulate matter in the air Increase in upper respiratory tract ailments Number and status of PPE Vehicle service tags	Respiratory protection devices @ 600-200 Vehicle service @ 3,000-10,000
Water Pollution	• Maintenance of exploration vehicles should be carried out in the designated area.	Routine inspection, Maintenance records	Supervising Engineer and Contractor	Water quality Turbidity levels	Routine inspection - Internal cost
Management of Solid waste	• A NEMA certified Contractor must dispose solid wastes away from the site	Routine Maintenance	Contractor, Supervising	Nil visible solid waste heaps on	Routine maintenance -

Potential Impact	Proposed Mitigation	Monitoring Means and frequency	Responsibility for Monitoring	Performance Indicator	Cost (Ksh)
	to an approved disposal site.		Engineer	Site Records of generated waste	Internal cost
Management of Hazardous substances	• Use of designated areas for repair and maintenance of machinery e.g. garages to avoid fuels and lubricant spills at the -site. • Segregating waste and assigning appropriately licensed waste handlers • Employing a spillage mitigation plan • Sensitization and strategic storage	Routine Maintenance Monitoring of storage and use of hazardous substances, and disposal,	Contractor, Supervising Engineer	Records of storage, use and disposal	Not estimated depends on vehicle service and repair requirements
Risk of fire	• Carry out routine thinning, slashing, and other maintenance activities, within and adjacent to Rights-of-way in order to minimize the risk of fire. • Install appropriate classes of fire extinguishers at strategic positions of the facility • Each assigned heavy vehicle to have at least 5kgs of fire extinguisher • A trained fire marshal to be employed on site at all times • Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access.	Routine maintenance and periodic Inspections	Contractor, Supervising Engineer	Monitoring Records Number of functioning fire extinguishers Presence of a fire marshal at all times	Routine maintenance - Internal cost
Spread of Diseases	• Education, guidance and counseling on HIV/AIDS and other STDs – exploration staff • Avail condoms to Exploration staff • Use of COVID-19 guidelines, use Masks	Routine examination Records	Contractor Supervising Engineer OHS Manager	Medical Records	screening approx. 1000 Education – approx. 2,000 per person per

Potential Impact	Proposed Mitigation	Monitoring Means and frequency	Responsibility for Monitoring	Performance Indicator	Cost (Ksh)
					session Condoms @10/-
Land acquisition and Resettlement	Ensure that the displaced persons are: • Informed about their options and rights pertaining to resettlement; • Consulted on, offered choices among, and provided with alternatives; • Provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project. • Offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; • Provided with development assistance in addition to compensation measures; • Set up a Grievance resolution Mechanism	Consultations Records Inspection Meetings Presence of an active GRM Presence of a formal communication channel	Proponent	Relocation Compensation for loss Compliance with ESS 6 of the Worldbank Environment and Social safeguards Policy	Approx. 66 M
Visual impact	• Extensive public consultation during the planning of project • Tree planting and erection of buffers • Operations limited to low dust seasons • Limited speed of vehicles • Deploy use of PPEs	Public Consultation	Environmental and Social Manager	Complaints	Kshs.400,000

Operations/Development Phase

Potential Impact/Aspect	Proposed Mitigation	Monitoring Means	Responsibility for Monitoring	Performance indicator	Cost (KSh)
Terrestrial habitat alteration	• Maintenance of ecological records • The selective removal of tall-growing tree species and the encouragement of low growing grasses and shrubs in project site. • Removal of alien invasive plant species, • Cultivating native plant species; • Avoiding clearing in riparian areas; • Vegetation management should not eradicate all vegetation • Protection of important wildlife	Quarterly internal audits Annual statutory auditing	Environmental Manager	Vegetation cover	Audit cost approx. 100,000
Noise, Dust and Vibrations	• Use of correct PPEs such as ear muffs, dust coats, gloves, masks for the operators • Periodic Workers Medical examination • Avoid working in hanging areas with high potential for soil collapsing • Public awareness • Erection of security tapes	Health and Safety Audits	Environmental Manager	Work Safety Health Records Complaints from the workers and public	Safety Audit cost approx. 150,000
Soil Erosion	• Back-filling of excavated soils • Use of liners to cover the shale materials soils to avoid wind blowing away • Ensure proper drainage around the working environment	Environmental Audits	Environmental Manager	Soil Conservation	Audit cost approx. 350,000
Siltation on the road	• Avoid spillages on the road during transportation of shale • Cover with liner to avoid wind effect	Road Maintenance Visual indicators	Site Engineer	Road Maintenance	Internal road maintenance costs

Potential Impact/Aspect	Proposed Mitigation	Monitoring Means	Responsibility for Monitoring	Performance indicator	Cost (KSh)
	while in motion • Establish mini weirs on trenches draining the mining sites and de-silt appropriately	De-silting Records		De-silted trenches	
Spread of COVID-19 Disease	• Use of PPE, Sanitizers, Water and Soap all time as per MOH guidelines • Avoid congestion • Ensure all staff o visitors are tested against COVID or have undergone medical check ups • Avoid Public gathering and adhered to social distancing	COVID-19 Emergency Preparedness	Site Manager, SHE Officer	Records	Health Emergency Budget costs
Groundwater levels interference in boreholes and water wells	• Avoid groundwater contamination • Back-filling on all excavations	Ground water level monitoring Yields of ground water	Site Manager	Records	Maintenance costs
Solid waste from vehicles and machines	• Proper waste management • Use of sanitary dust bins color coded • Proper storage and Waste Disposal	Routine waste collection	Site Manager	Records	None
Risk of Fire	• Install appropriate classes of fire extinguishers at strategic positions of the facility • Each assigned heavy vehicle to have at least 5kgs of fire extinguisher • A trained fire marshal to be employed on site at all times • Controlled burning of vegetation, fire suppression equipment requirements, and typically must be monitored	Routine maintenance	Maintenance Engineer	Records	Routine maintenance Internal cost Fire drills carried out

Decommissioning Phase

Potential Impact/Aspect	Proposed Mitigation	Monitoring Means	Responsibility for Monitoring	Performance indicator	Cost (KSh)
Noise					
Vehicular	• Control of speed	Random checks	Health safety and Environment Department	Number of Public complaints	Nil
Compressor	• Provision of hearing • protection devices	Regular inspection	Health safety and Environment Department	Number of Public complaints	Nil
Physical Hazards					
Physical Hazards	• adopting ergonomic work flow designs that tend to fit the physical tasks to the workers and not vice-versa while maintaining a balance with expected productivity	Regular inspection and redesign of work flow	Health safety and Environment Department	Number of ergonomic-related complaints	Nil
AIR POLLUTION					
Shale Dust	Provide appropriate hand, respiratory and body protective devices Avoid working while winds are very low or blow low towards residential households	Periodic inventory of personal protective equipment	Health safety and Environment Department	Number and status of existing PPE	@600 – 200 each for hand, respiratory & body protection devices for each worker
Vehicular	Proper service of project vehicles	Service schedules e.g. every 5,000 km for off-road vehicles and every 3,000 km for truck	Health safety and Environment Department	Service tags	@ 5,000 and 10,000 for off-road vehicles and trucks respectively

10.4 Decommissioning Phase

The decommissioning phase also known as the "deconstruction," is part of the (eventual/ultimate) reversal phase, which has the additional and often dominant risk factors associated with the materials processed/produced during the life of the project (e.g., toxic and/or explosive chemicals, etc), as well as the potentially decreased structural integrity due to renovations and/or wear and tear.

Similar impacts encountered during the mine set-up phase will be experienced in much the same way when the reverse process is set in motion. The table below gives an analysis of the decommissioning impacts expected in the proposed prospecting and Exploration project:

Table 38: Impact Analysis – Decommissioning Phase

Aspect	Health and Safety Impact	Significance Level
Noise	Reduced hearing due to high noise from decommissioning activities – deconstruction such as vehicular noise and site remediation noises	Low
Air Pollutants	Acute/chronic respiratory disease caused by CO_2, CO, NO_x, and VOCs released by combustion engines during transportation and by obnoxious respirable particles released by speeding trucks during transportation of debris	Low
	Acute/chronic respiratory disease caused by pollutants (cement, caustics, isocyanates – lung sensitizers) released during deconstruction of storage facilities and disassembly of superstructures	Low
Water Pollutants	Public health problems as a result of consuming heavy metal contaminated drinking well water from oils, greases, hydrocarbons deposited on roads sides and leached into drinking water wells by rain water	Low
	Public health problems due to decommissioning activities that pollute potential drinking water wells	Low
Traffic Accidents	Traffic related mortality and morbidity from transportation activities	Low
Physical Hazards	Injuries resulting from physical hazards such as slips, trips, and falls from a tall cabin, Injuries due to accidental bumping into unguarded rigid parts of truck or cargo; Injuries while performing field repair-work, tire change, unfastening tight bands and ropes, etc.)	Low
	Injuries resulting from physical hazards encountered by truck drivers such as chemical corrosion by dangerous chemicals such as transformer oil	Low
	Injuries resulting from physical hazards encountered by truck drivers such as explosion of over-inflated tires or car battery	Low
Ergonomic Hazards	Injuries due to poor ergonomic considerations such as pains in the low back and in the joints caused by prolonged driving; Over-exertion while moving or otherwise handling bulky and heavy loads/equipment; visual discomfort and eye problems caused by inadequate illumination and eyestrain; development of lumbago due to poor vehicle suspension/ uncomfortable seat, etc.	Low

10.5 Capacity building and training

The effective implementation of the Environmental Management Plan of the project will require capacity and awareness building. While the Proponent must ensure that capacity and awareness building, mitigation measures and monitoring concerns are implemented, actual training activities should be the responsibility of the health safety and environment department, who may have to commission external consultants to carry out the training component. This can be achieved by targeting specific groups for the necessary training.

Table 39: Target Groups

Target Group	Description
Group A	Mine Workers: This group consists of Engineers (Resident, Provincial, Project,) Contractors, Supervisors, Site Agents, Site Managers and the Environmental department. These are the top management staff concerned with the project exploration and maintenance.
Group B	Mine Workers: Foremen, headmen, skilled and unskilled laborers.
Group C	Maintenance team: For this group of people, working on the mine equipment as their core activity.
Group D	Project Affected People (PAP): area residents, farmers, people who have businesses that can potentially be affected by the mining activities, or they live close by the line route.

10.6 Training Objectives

Training will be based on modules aimed at:

- Developing awareness of the need to consider environmental issues during Mineral extraction and Transportation, operation and maintenance of the project.
- Creating awareness and understanding of the environmental legal framework pertaining to exploration activities.
- Developing skills for identification and assessment of environmental, social, safety and health impacts of project.
- Incorporation of mitigation measures at all stages of development.
- Reviewing ESIA and Audit reports and incorporating measures into decision making.

Arrangements for training in environmental awareness should be initiated as soon as operations commence. The Client will either have to commission a consultant to carry out this training on site, at the Head Office, or personnel could undertake the environmental training and then in turn he/she trains other personnel.

The table below presents the recommended topic modules and costs for each of the four target groups necessary to implement the Environmental Management Plan.

Table 40: Topic Modules and Costs

Topic modules	Target Group	Estimated Cost per person, per unit (KShs)
• Understanding of legislation in Kenya, as relevant to the project • Understanding of the project cycle and how the EIA/incorporation of mitigation measures fits into the cycle • Develop awareness of the environmental implications of exploration and maintenance activities and procedures for assessing them • Develop awareness and understanding of the human resource and institutional arrangements for pre-empting and managing environmental impacts • Importance of incorporating mitigation measures during planning and design and implementing an environmental monitoring programme • Impart skills on environmental monitoring and auditing during exploration and maintenance • Need for gender balance during recruitment of laborer's • Cultural aspects of target groups	Group A Mine Workers	7,500
• General understanding of legislation in Kenya as relevant to the project • Sensitization on health (STDs including HIV/AIDS), littering, solid and liquid waste management • Types of environmental, social, occupational safety and health impacts that could be generated by these target groups • Cultural aspects of target groups	Group B / C Technical Workers / Maintenance Team	5,500
• Brief overview of the project cycle • Understanding of EMCA 1999 and the EIA process • Legal implications of encroachment onto the TL reserve • Process for compensation and relocation/resettlement if necessary, (eligibility for compensation, compensation valuation and payment procedures; grievance redress mechanisms)	Group D PAP	2,500

11. CONCLUSIONS AND SUMMARY OF RECOMMENDATIONS

11.1 Introduction

As a result of the ESIA scoping and assessment of field data, potentially significant environmental and social impacts have been identified including the need for land acquisition within proposed location for the mining. During the shale resource extraction, it is our recommendation that a proper land compensation framework be done for those willing to lease or sell their land to the proponent, Bamburi cement. All guidelines provided in the ESMP should be adhered to protect the environment and the people.

11.2 General mitigation and intervention measures

11.2.1 General Conclusions

- The proposed project is expected to have impacts on various aspects of the environment as well as the socio-cultural/economic status of the project affected parties. These anticipated impacts are discussed in Chapter 6.
- Mitigation of potential impacts (environmental and social) as described in Chapter 7 and 8, and implementation of the ESMP presented in Chapter 10 of this report, will help to prevent or avert negative impacts, and enhance the positive outcomes of the project. This will help to achieve project sustainability.
- The responsibility for the incorporation of mitigation measures for the project implementation lies with the Supervising Geological Engineer, who must ensure that the Contractor implements all specified mitigation measures.
- The Involuntary Resettlement guidelines of the government of Kenya will be followed and used complementarily where applicable to avoid conflict.
- Community participation in planning and implementing resettlement will be encouraged;
- A Compensation and Resettlement Action Plan (RAP) will be developed addressing land, housing, crops and other compensation to be provided to the adversely affected population.
- A monitoring and evaluation mechanism for resettlement activities will be carried out.
- Diligence on the part of the contractor and proper supervision by the Supervising Engineer during Prospecting phase and the initial operation period is crucial for mitigating impacts.

11.3 General Recommendations

Avoidance of negative environmental impacts should be the Proponent's priority. Impacts can be avoided completely by a "no-project" alternative, but it should be recognized that all existing mining activities elsewhere have impacts on their surrounding environment; these impacts can increase over time with economic growth and development, however their effect on the environment may be reduced by maintenance, rehabilitation, design and construction actions.

11.3.1 Mitigation

Mitigation is the lessening of negative environmental impacts through:

- Changes in the design, construction practices, maintenance, and operation of a project; and

- Additional actions taken to protect the biophysical and social environment, as well as individuals who have been impacted adversely by a project.

The extent and timing of mitigative actions should be based on the significance of the predicted impacts. Some aspects of impact mitigation can be incorporated into project design and can largely resolve the threat of impacts before construction commences.

However, many measures require an ongoing implementation plan to ensure that proposed actions are carried out at the correct times, that environmental measures such as planting vegetation and slope protection are maintained, and that prompt remedial actions are taken when the initial measures are not fully successful.

Some measures may not be the exclusive domain of the Proponent; Government departments, local authorities, neighbouring communities, businesses, non-governmental organizations, and the legal system may all be involved in their design and implementation of these mitigation measures. Clear definition of responsibilities, funding, and reporting requirements can help to ensure the success of such measures.

11.3.2 Compliance Monitoring

During construction, all mitigation measures designed to reduce the impact of the construction activities should be monitored and enforced by the environmental monitoring authorities. This requires:

- Defining the proposed mitigation and compensatory measures;
- Specifying who is responsible for the monitoring activity;
- Including implementation of mitigation measures in contract specifications;
- Making environmental competence one of the selection criteria for contractors; and briefing, educating, and training contractors in environmental protection methods.

Compliance monitoring should not be confined to the right-of-way, but should cover all sites affected by the project, including disposal sites, materials treatment areas, access roads, and work camps.

11.3.3 Effects Monitoring (Evaluation)

After mitigation measures are implemented, effects monitoring or evaluation can test the validity of hypotheses formulated in the environmental impact study; they can also determine if the mitigation measures have achieved their expected results. Evaluation is necessary not only for individual projects, but also to advance methodology, assist in designing future studies, and through lessons learned -contribute to the relevance and cost-effectiveness of environmental protection measures. Responsibility for corrective action to be taken in the event of mitigation failure should be defined clearly within the Proponent's organization.

11.3.4 Monitoring Guidelines

Continuous observations and assessment is essential for identification of impacts unforeseen during the ESIA of the project. To ensure success of the project adequate consultation should be undertaken in the project area with the community members.

Monitoring parameters/indicators should be identified and programmes developed for their observation and action. When developing a monitoring programme the following should be considered:

- Frequency of monitoring
- Required personnel -Monitoring should be conducted by trained personnel
- Methods of record keeping
- Availability of calibrated and maintained equipment
- Existence of baseline information
- Data analysis and review

The environmental indicators to be monitored during the project phases namely the construction; operation and decommissioning include those listed in the table below. The monitoring parameters can be revised as the project development proceeds to enable incorporate and foreseen indicators.

Table 41: Monitoring Parameters

Indicator	Parameter to Monitor	Source of data
Occupational Health and Safety	-Threshold limits Values	• Recorded audit reports
	-Biological Exposure Indices (disease incidences)	• Clinics (Public Health)
	-Minimum safe working distance	• Work site audit reports
	-Number of occupational diseases and accidents	• Worksite Audit Reports, health clinics
	-Complaints from the public	• Institutions, Chiefs, main project office
	-General Rules	• Code of Practice on OSH Auditing, DOSH, Min. Labour & Human Res. Dvt. 2005 Edition
Socio-Economic Environment	-Impact on local markets	• Subsequent Audits
	-Development Projects	• CSR Reports
	-Trend of infectious diseases for example: HIV/AIDS, STI's	• Reports from Clinics and Administration
	-Correlation between project team and local community	• Subsequent Audits
Air Quality	-Industrial and Vehicular Noise	• Environmental Audits
	-Suspended Particulate Matter	• Environmental Audits
	-Visual Indications	• Frequency and source observation
	-Complaints from the public	• Administration and received reports
Fire	-Source, Frequency and scope -Fire fighting Equipment	• Reports from work or community • Inspection reports
Aquatic habitat Alteration	-Existence of vegetation	• Reports from Authority, Community, Clinics, other institutions • Observed damaged infrastructure • Industrial Audits
	Water quality and quantity	
	Water Borne Diseases	
	Complaint from community members	
	Marine water Turbidity	
Vegetation Cover	-Invasive vegetation	• National Museums of Kenya • Community Leaders information
	-Loss of Important Species	

	-Health of nearby Kayas (Teleza & Bombo)	• Company Audits
	-Encroachment into Forests	
Resident Birds	-Presence of resident birds	• Site audits • Reports from Birdlife International (Diani)
	-Mortality rate	
	-Existence of nesting sites	
Waste Management	-Existence of solid waste	• Community through Administrative offices • Subsequent Audits
	-Complaint from community members	
	-Frequency of waste Collection	
Soil Erosion	-Gulley formation	• Field Audits • Administrative offices • Field office
	-Increased sediments in water courses	
	-Complaint from community members	
Infrastructure	-Roads, Power lines, houses and institutions	• Facility owners, administrative offices
Statutory Compliance	-Associated Industrial Based Breaches (Supplied within this report, and others)	• Administrative offices • Lead stakeholders

The list of the environmental parameters and their measurable indicators will guide the proponent access the effective level of the EMP and need to modify it for appropriate action.

11.3.5 Reporting

Constant reporting by the site mine engineer to the proponent is necessary to ensure the project is executed as per the plans. The safety officer/environment officer should always be available at the site to report any concerns for urgent mitigation. The officer should also ensure enforcement of Environment, Health and Safety requirements as per the relevant legislations. The mine engineer should always consult the project manager/engineer to maintain a clear understanding of all the project aspects and their mitigation measures. All compliances exploration methods to be adopted must be done in compliance to guidelines with ministry of mining.

12. ENVIRONMENTAL MANAGEMENT/MONITORING PLAN

12.1 Introduction

This section presents the ESMP that will need to be implemented by client to prevent or reduce significant negative impacts to acceptable levels. Environmental and Social Management Plan (ESMP) for development projects provides a logical framework within which identified negative environmental impacts can be mitigated and monitored. In addition, the ESMP assigns responsibilities of actions to various actors and provides a time-frame within which mitigation measures and monitoring can be done.

ESMP is a vital output of an Environmental and Social Impact Assessment as it provides a checklist for project monitoring and evaluation. The ESMP outlined in the sections below has addressed the identified potential negative impacts and mitigation measures of the proposed prospecting and Exploration, based on the Chapters of Environmental Impacts and Mitigation Measures of the expected Negative Impacts.

12.2 Environmental Management & Monitoring Plan

Table 42: During Mineral Extraction and Process Management

Monitoring Issue	Parameter	Monitoring Method	Indicator	Frequency of Measurement	Responsibility
Air Emissions/ Ambient Air quality	Dust	-Visual Inspection Feedback from the community -Particulate Count	Airborne particles/accumulations	Continuous	Main contractor, NEMA, Local Authority, Community
	Engine exhaust smoke	Ditto	Colour of exhaust smoke/accumulation	Ditto	Main Contractor, NEMA, Local Authority Community
Noise	Noise Level	-Auditory impacts Feedback from the community -Noise measurements	-Complaints	Ditto	Main Contractor, NEMA, Local Authority Community
Waste Management	Amount of Solid waste produced (sediments and wastes from secondary projects)	Measurement of silt level at the base of dam Visual impacts in drain ways	-Silt level in the dam base and at the weir -Sediment and bio-wastes accumulated	Ditto	Main contractor, NEMA, Local Authority Community
Health and Safety	Occupational Health and Safety monitoring	Reporting of accident and incidents, safety breaches and damage to the facility	Statistical records and safety reports	Ditto	Main contractor NEMA Community
Environmental Quality	Aesthetics, registered complaints, Soil measurements,	Comparative pictorials, visual impacts, recording, photography, lab analysis, Community liaison	Number of complaints and nature of complaints, parametric and qualitative, pictorials, registers	Bi, annual	Mine Operator, Community County Govt NEMA, Mines & Geology
Community Welfare	Community Health	Community Liaison and meetings	Feedback and records	Annual	Mine Operator, Community County Govt NEMA, Gender and Social Department

Table 43: After decommissioning

Monitoring Issue	Parameter	Monitoring Method	Indicator	Frequency of Measurement	Responsibility
Waste Management	Solid waste	Tracking the volume of solid waste generated and establishing the treatment, recovery, transport and disposal methods	Waste streams per mine and volumes generated	Continuous	Mine Operator, Community County Govt NEMA, Mines & Geology
Health and Safety	Community Health and Safety monitoring	Reporting of accident and incidents, safety breaches and damage to infrastructure and related diseases.	Statistical records and safety reports	Continuous	Mine Operator, Health department, NEMA, Community, Mines & Geology
Water Quality	Water quality /quantity parameter	Flow rate from main streams, Qualitative parameters, quantitative parameters	Flow in cubic meters per sec.	Annual Audits	WRMA, Community, NEMA Mine Operator, Mines & Geology
Environmental Quality	Aesthetics, registered complaints, Soil measurements,	Comparative pictorials, visual impacts, recording, photography, lab analysis, Community liaison	Number of complaints and nature of complaints, parametric and qualitative, pictorials, registers	Bi, annual	Mine Operator, Community County Govt NEMA, Mines & Geology
Community Welfare	Community Health	Community Liaison and meetings	Feedback and records	Annual	Mine Operator, Community County Govt NEMA, Gender and Social Department

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