



BASE TITANIUM LTD

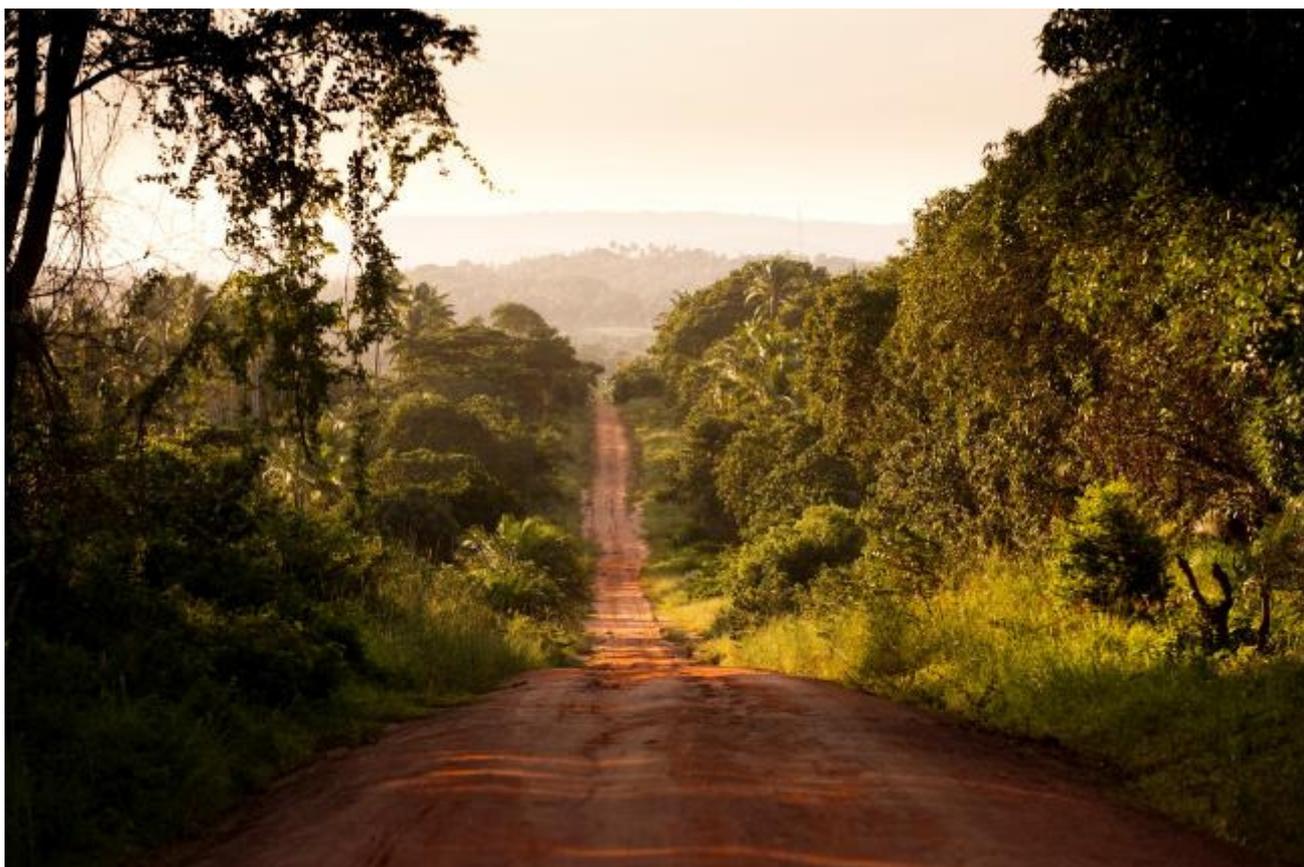
KWALE MINERAL SANDS PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMARY REPORT



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APRIL 2012

This report should be referenced as:
Base Titanium Ltd (2012) Environment and Social Impact Assessment Summary Report



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The Project is located in Msambweni District in Kenya's Coast Province. The Special Mining Lease (SML) site is approximately 50km south of Mombasa, and 10km inland from Msambweni town, on the Milalani Road toward Shimba Hills town. The co-ordinates for the Project location is approximately 4°18' South and 39°27' East.

Base Titanium Limited (Base), a wholly owned Kenyan subsidiary of Base Resources Limited, intends to mine heavy minerals sands from the Kwale deposit located in the Msambweni District, Coast Province, Kenya. The Kwale Mineral Sands Project covers two mining areas, namely the South and Central Dunes. These dunes contain commercially viable quantities of the heavy minerals ilmenite, rutile and zircon.

These minerals are essential in the manufacturing of a wide range of commercial and household products including:

- Pigments and paints
- Titanium metal
- Ceramics
- Toothpaste
- Sunblock

CURRENT STATUS

All material leases, licenses, permits and government agreements necessary to allow development of the Project to proceed are in place, including the key Special Mining Lease (SML), environmental permits and an Investment Agreement with the Government of Kenya which provides a range of government undertakings and fiscal incentives for the Project.

A Resettlement Action Plan (RAP) was prepared for the Project in 2005. This covered the resettlement of the households occupying the SML area which encompasses the Project's footprint. Following disclosure and consultation households were resettled from the SML between 2006 and 2008. 381 households were resettled from within the SML. A post-resettlement monitoring and audit report was prepared in June 2011. RAPs were also prepared for the Access Road and Water Pipeline and Mukurumudzi Dam Site in August 2011. Households were resettled from these areas in 2011 following disclosure and consultation with the affected households. A post-resettlement compliance audit of these programmes was undertaken in February 2012.

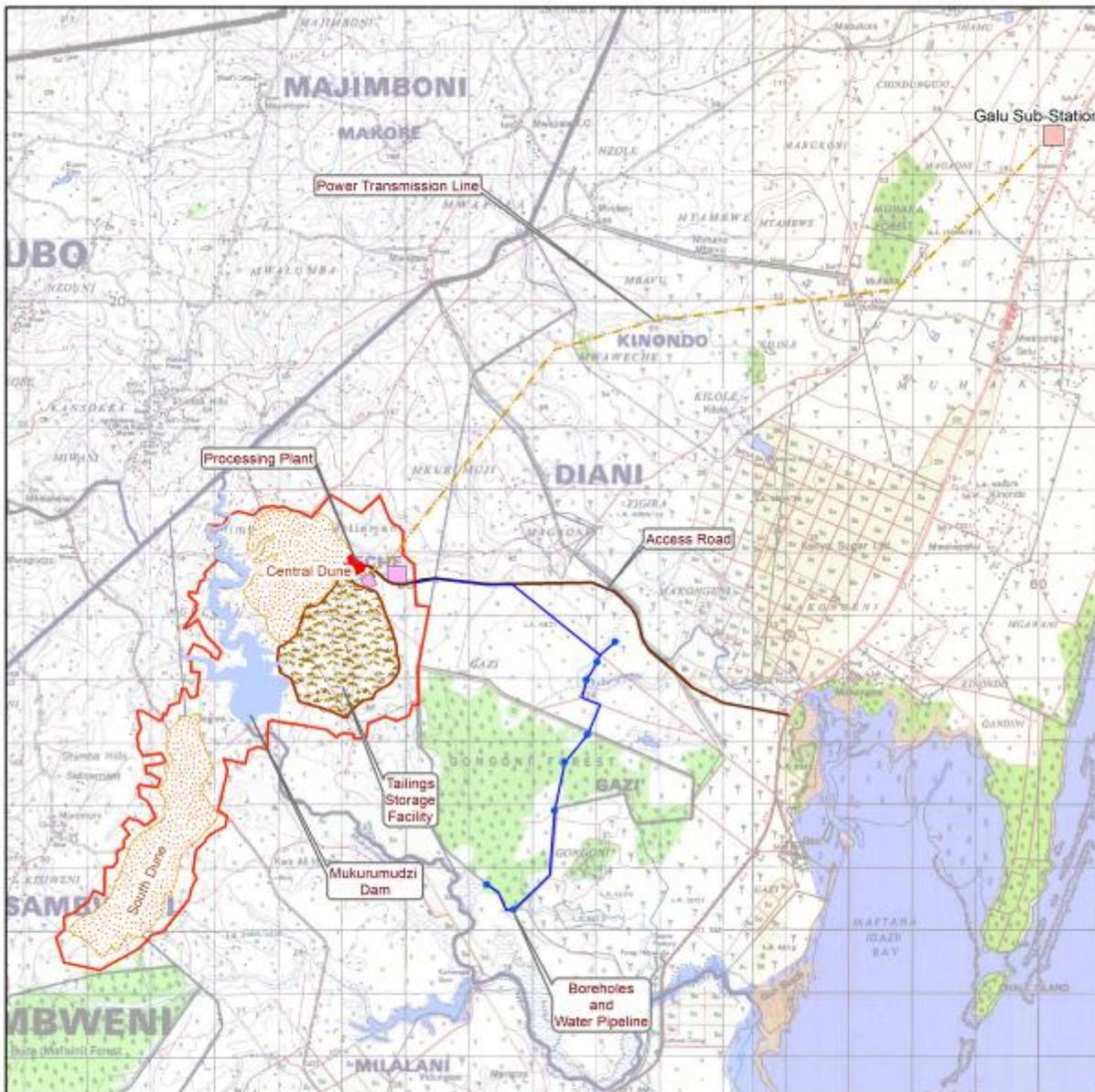
Key highlights of the Kwale Mineral Sands Project

- **Following its acquisition from Vaaldiam Mining Inc. (previously Tiomin Resources Inc.) in July 2010, Base now owns 100% of the Kwale Mineral Sands Project.**
- **The Kwale Mineral Sands Project represents an advanced development opportunity with all material approvals, permits and licenses required for development currently in place and a full definitive feasibility study having been completed.**
- **The Kwale Mineral Sands Project is expected to produce an average of 320ktpa, 80ktpa and 35ktpa of ilmenite, rutile and zircon respectively over the first 7 years of operation from the higher grade Central Dune before declining to an average of 185ktpa, 52ktpa and 24ktpa over the subsequent 6 years from the South Dune.**
- **The estimated capital cost to develop the Project is \$256 million.**

The Project enjoys a high level of Government and community support. Importantly, the Government of Kenya regards Kwale Mineral Sands Project as a Project of national significance and is committed to seeing it to development.

“Today Kwale is a flagship for a new era of mining in Kenya. Commencement of production from Kwale will make mineral resources Kenya's fourth largest export sector.”

Tim Carstens, Managing Director, Base



The main components of the Project comprise: A) The Special Mining Lease (SML) area which encompasses the South and Central Dunes, Tailings Storage Facility (TSF) and Processing Plant; B) the Mukurumudzi Dam; C) a borefield and water pipeline; D) a 7.7km long access road connecting the SML to the A14; and E) a 132kV transmission line connecting the Project site to the Galu sub-station. The products will be transported from the Project site to the Project's Likoni Shiplading Facility located in Mombasa's Kilindini Harbour.

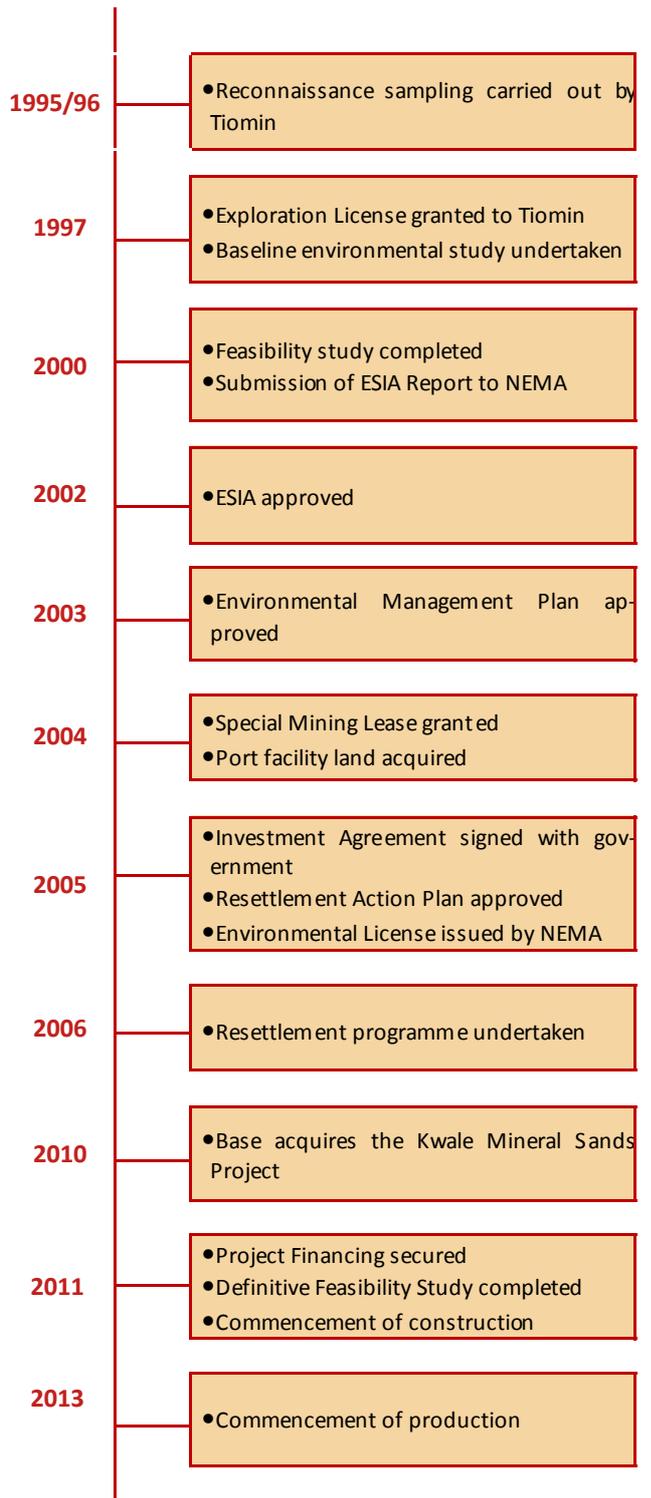
KEY PROJECT ELEMENTS

The Project can be divided into a number of key Project elements, namely:

- **The Mine Site or Special Mining Lease (SML) Area:** This is the area where the mineral deposit has been identified and mining will take place. The SML is the formal title that gives Base the right to mine the deposit.
- **Central Dune:** This heavy mineral sands deposit extends for approximately 2km by 1.5km. An open pit mine will be established on this dune.
- **South Dune:** This heavy mineral sands deposit extends for approximately 4km by 1km. An open pit mine will be established on this dune.
- **Processing Plant:** A facility that uses a range of technologies to separate the heavy minerals into the three export products (ilmenite, rutile and zircon). This plant will be located next to the Central Dune.
- **Tailing Storage Facility (TSF):** Residual material from the separation processes is discarded into the TSF, located to the south of the Central Dune.
- **Likoni Shiplading Facility:** The ilmenite and rutile products are transported to a shiplading facility located at Likoni for export. Zircon will be containerised at the mine site for export from Mombasa Port.
- **Water Supply:** The water supply will include the Mukurumudzi Dam and a series of boreholes located near the mine site.
- **Access Road:** A 7.7km long access road will be built to connect the mine site to the A14 highway.
- **Transmission Line:** A 14km long 132kV transmission line will be constructed connecting the mine site with Galu sub-station.

PROJECT HISTORY

The planning and development of the Project has occurred over a number of years, with initial exploration and prefeasibility work being undertaken in the 1990s. Construction commenced in October 2011 with production expected in late 2013. The Project history timeline is as follows:



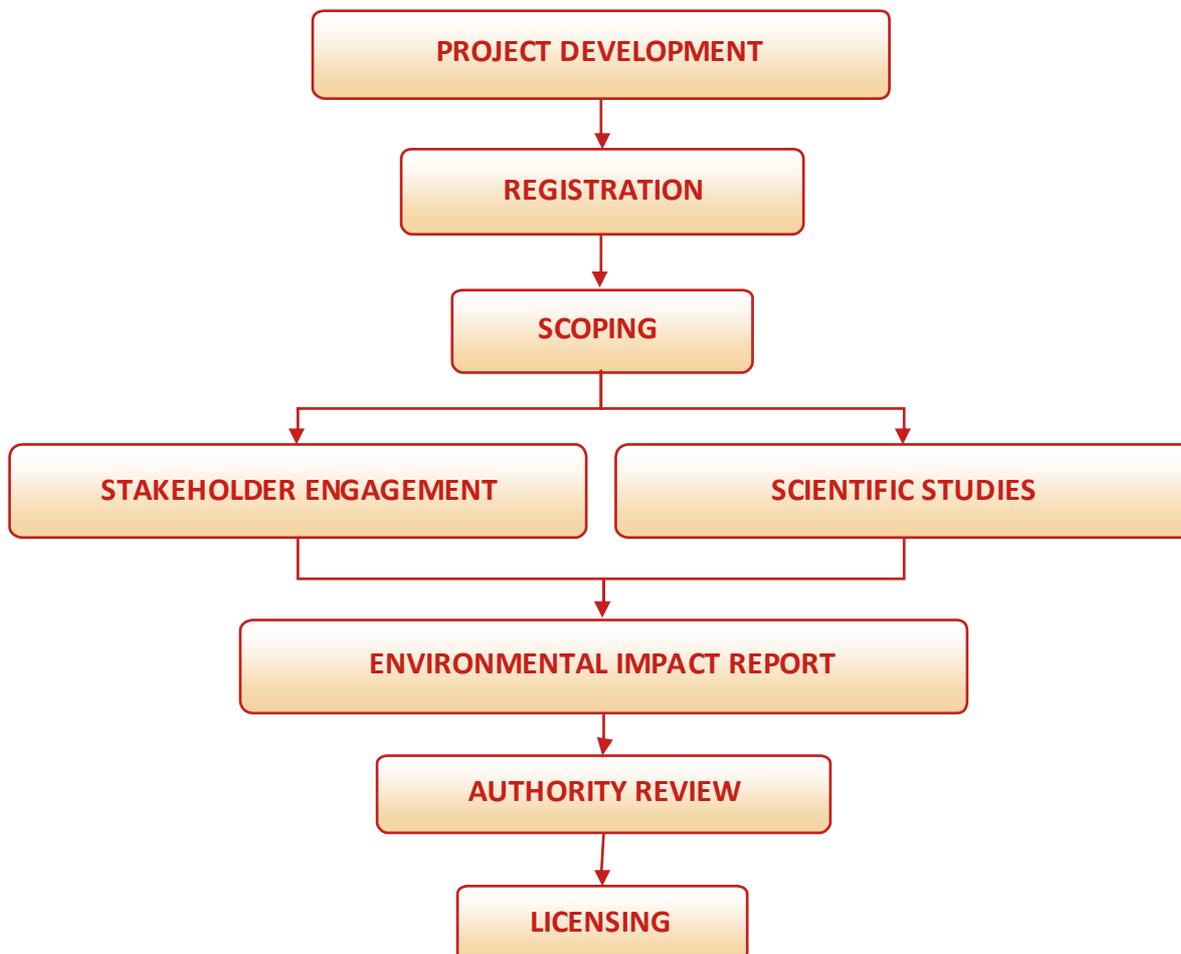
An Environmental and Social Impact Assessment (ESIA) is a tool used to assess the environmental and social impacts associated with a major development of this nature. Control measures for mitigating negative impacts and optimising positive impacts are provided in an ESIA.

An ESIA is required under Kenyan law and is considered International Best Practice (IBP).

The ESIA follows a standard method as shown in the flow diagram below.

EIA AND ESIA

The terms **Environmental Impact Assessment (EIA)** and **Environmental and Social Impact Assessment (ESIA)** are both used to describe the process of identifying, estimating and evaluating the potential impacts of proposed activities. The term **ESIA** has been adopted by the international community to stress the need to accord equal emphasis to both the natural and the human environments when carrying out assessments.



THE KWALE MINERAL SANDS ESIA

Studies commenced in 1998 culminating in the Project ESIA which was completed in 2000.

In July 2002 the National Environmental Management Authority (NEMA) conditionally approved the Project ESIA and an Environmental Impact Assessment (EIA) Licence was issued in June 2005.

ESIA Reports approved by NEMA

- **Volume 1: Terms of Reference**
- **Volume 2: The Public Participation Programme**
- **Volume 3: Environmental Baseline Data Report: Mine Site**
- **Volume 4: Key Issue Reports: Mine Site**
- **Volume 5: Baseline and Key Issue Reports: Shiploading Facility Sites**
- **Volume 6: Environmental Impact Report**
- **Volume 7: Summary Report (English)**
- **Volume 7: Summary Report (Swahili)**
- **Volume 8: Comments Report**
- **Volume 9: Additional Specialist Studies**

The objectives of the ESIA are to:

- Identify all potential significant adverse environmental and social impacts of the Project and recommend cost effective measures for mitigation.
- Identify all potential beneficial social and environmental impacts of the Project and recommend cost effective measures for enhancement.
- Verify compliance with the environmental regulations and relevant standards.
- Develop an Environment and Social Management System to identify and address non-conformities.
- Generate baseline data that will be used to monitor and evaluate the mitigation measures implemented during the Project life.
- Comply with Kenyan legislation including the Environmental Management and Coordination Act (1999) and the Environmental (Impact Assessment and Audit) Regulations (2003).
- Ensure that the Project complies with IBP Standards, policies and procedures.
- Identify and quantify different categories of Project Affected People (PAPs) subject to resettlement or compensation.
- Develop stakeholder engagement strategies to encourage participation in identifying adverse social impacts and associated mitigation.



The ESIA process is critical to ensuring that the Project does not have a detrimental impact on sensitive floral and faunal species, such as the Shimba Hills Reed Frog *Hyperolius rubromaculatus*.

ADDENDUM ESIA

Subsequent to the original Project ESIA several addenda reports have been prepared and approved by NEMA. These addenda cover Project components and supporting infrastructure not detailed in the original study. This has ensured that all Project components have been assessed and the approvals issued by NEMA.

Additional reports approved by NEMA

- **Materials Handling and Shiploading Facility Environmental Assessment (2004)**
- **Access Road Alignment Alternatives Environmental Assessment (2006)**
- **Cemetery Site Environmental Assessment (2006)**
- **Addendum Water Supply Alternatives Environmental Report (2007)**
- **Power Supply Alternatives Environmental Assessment (2008)**
- **Water Supply Infrastructure Environmental Assessment (2010)**
- **Mine Access Road Environmental Assessment (2011)**
- **Borrow Pits Environmental Assessment (2011)**
- **132kV Transmission Environmental Assessment (2012)**

SPECIALIST STUDIES

To support the development of the ESIA and to inform the Project design, a number of specialist studies have been undertaken over the last decade. These studies include the following assessments:

- Social
- Health
- Traffic
- Ecosystem Services
- Visual
- Air Quality
- Soils and Land Use
- Ground and Surface Water
- Vegetation and Floristics
- Terrestrial and Aquatic Fauna
- Radiation
- Dust Modelling
- Noise Modelling
- Greenhouse Gas Modelling



A range of specialist studies were undertaken as part of the ESIA. These photographs show Base staff and specialist consultants undertaking macro-invertebrate identification (below), seine net sampling (top right) and groundwater studies (bottom right) in support of these studies.



INTRODUCTION

Stakeholder engagement enables members of the public to interact with the Project during the ESIA phase and throughout the life of the Project.

Consultation for the Project has entailed two aspects. The first is the timely dissemination of information regarding the Project. This has been a one way process of providing information to the public through *barazas* (public meetings). The second aspect has been the creation of processes to allow the two-way free flow exchange of information that gives stakeholders a chance to air their concerns and have a voice in Project planning.

Both of these aspects will continue to play an important part in community relations during the Project construction phase and into operations as detailed in the Project’s Stakeholder Engagement Plan.



COMMITTEES

In addition to the consultative fora, Base has established a number of committees to act as an interface between the Project and affected communities. These include:

- **Mining Project Liaison Committee:** This committee acts as the primary channel of communication to affected stakeholders in the area.
- **Likoni Liaison Committee:** This committee provides links to communities affected by the Likoni Shiplading Facility and addresses social issues relating to Base’s activities in Likoni.
- **Kwale Liaison Committee:** This committee has been established to engage with communities affected by the transport corridor.
- **Access Road and Water Pipeline Resettlement Committee:** This committee includes representatives of those households being resettled and economically displaced by the access road and water pipeline.
- **Mukurumudzi Dam Resettlement Committee:** This committee includes representatives of those households being resettled and economically displaced by the construction of the Mukurumudzi Dam.
- **Transmission Line Resettlement Committee:** A committee comprising representation of households potentially affected by the transmission line resettlement.



Stakeholder engagement and consultation during Project disclosure for the ESIA process (below and left).



The Project and the associated ESIA have been developed in compliance with Kenyan legislation and IBP guidelines as established by the International Finance Corporation (IFC) Performance Standards on Social and Environmental Sustainability, the Equator Principles, the IFC and World Bank Group Environmental Health and Safety (EHS) Guidelines and the International Labour Organization (ILO) standards.

Key legislation relevant to the Project

- **The Kenyan Constitution, 2010**
- **The Environmental Management and Coordination Act (Cap 8 of 1999)**
- **The Environmental (Impact Assessment and Audit) Regulations, 2003**
- **The Environmental (Impact Assessment and Audit) Amendment Regulations, 2009**
- **The Environmental Management and Coordination (Waste Management) Regulations, 2006**
- **The Environmental Management and Coordination (Water Quality) Regulations, 2006**
- **Environmental Management and Coordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009**
- **Environmental Management and Coordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009**
- **The Water Act (Cap 8 of 2002)**
- **The Water Resources Management Rules, 2007**
- **The Forests Act, 2005**
- **The Forest (Participation in Sustainable Forest Management) Rules, 2009**
- **The Lakes and Rivers (Cap 409)**
- **The Mining Act (Cap 306)**
- **The Agriculture Act (Cap 318)**
- **The Occupational Safety and Health Act, 2007**
- **The Energy Act, 2006**

The Project will adhere to IBP by complying with:

IFC Performance Standards

The IFC Performance Standards provide guidance to “avoid and mitigate adverse impacts and manage risk as a way of doing business in a sustainable way”. They are an international benchmark for identifying and managing environmental and social risk and have been adopted by many organisations as a key component of their environmental and social risk management systems.

Equator Principles

The Equator Principles form a credit risk management framework for determining, assessing and managing environmental and social risk in project finance transactions. Projects which fall under the scope of the Equator Principles are evaluated against comprehensive international performance standards on issues such as labour and working conditions, natural resource management, pollution prevention, impacts on indigenous people, community health and safety and cross-cutting themes such as gender and human rights.

EHS Guidelines

The EHS Guidelines are technical reference documents with general and industry-specific examples of good international industry practice. They contain the performance levels and measures that are normally acceptable to lending institutions and are generally considered to be achievable in new facilities at reasonable costs by existing technology.

ILO Standards

The ILO maintains and develops a system of international labour standards aimed at promoting opportunities for women and men to obtain decent and productive work, in conditions of freedom, equity, security and dignity. The main objectives of the ILO are to promote rights at work, encourage employment opportunities, enhance social protection and strengthen dialogue on work-related issues. In support of these objectives, the ILO has developed a number of policies which identify appropriate ways to meet these objectives.

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ASSESSING ENVIRONMENTAL AND SOCIAL IMPACTS

The Project will result in a number of impacts on the biophysical, natural and social environment. Such impacts can be either negative or positive.

The aim of the ESIA is to assess the range of negative and positive impacts, to determine if the Project, on balance, promotes environmental, social and economic sustainability.

In addition, assessing impacts allows the Project to focus on the most important negative impacts and to develop appropriate mitigation measures to reduce these impacts, while actively promoting positive Project spin-offs through enhancing positive and beneficial aspects.

To assess impacts, a matrix of criteria is used including:

- The nature of the impact
- The spatial extent of the impact
- The duration of the impact
- The magnitude of impact
- The likelihood of the impact occurring

The combination of the above factors determines the overall impact significance as per the Impact Matrix below.

Key questions asked when assessing impacts
Negative and Positive Impacts

- Is the Project impact negative or positive?
- Who will be affected by the Project impacts?

Magnitude

- How serious or beneficial is the Project impact?
- How far will the Project impact extend?
- How long will the Project impact occur?

Likelihood

- What are the chances of the Project impact occurring?

Mitigation

- Can negative impacts be reduced easily using reasonable resources?
- Can positive impacts be enhanced?

	LIKELIHOOD	Unlikely	Likely	Definite
MAGNITUDE	High Benefit	Moderate	Major	Major
	Medium Benefit	Minor	Moderate	Moderate
	Low Benefit	Negligible	Minor	Minor
	Negligible	Negligible	Negligible	Negligible
	Low Impact	Negligible	Minor	Minor
	Medium Impact	Minor	Moderate	Moderate
	High Impact	Moderate	High	High

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THE BIOPHYSICAL ENVIRONMENT
CLIMATE

The local climate is characterised by bimodal rainfall patterns with a long rainy season occurring from March to July, and a short rainy season between October to December. The remainder of the year forms part of the two dry weather cycles.

Average annual rainfall for the Project site is 1 400mm, however droughts and flooding are fairly common in the area. The risk of long dry spells are high with prolonged droughts recurring about every 5 years.

Temperatures are warm at the Project site with an average of around 25°C. Mean temperatures are highest in the months of November to April. The climate in the area is defined as semi- to sub-humid.

AMBIENT AIR QUALITY

The Project site is entirely rural. Human activities, especially vegetation burning and clearing of vegetation for agriculture, generates dust and smoke. The local air quality is therefore considered to be natural but not pristine.

GEOLOGY AND SOILS

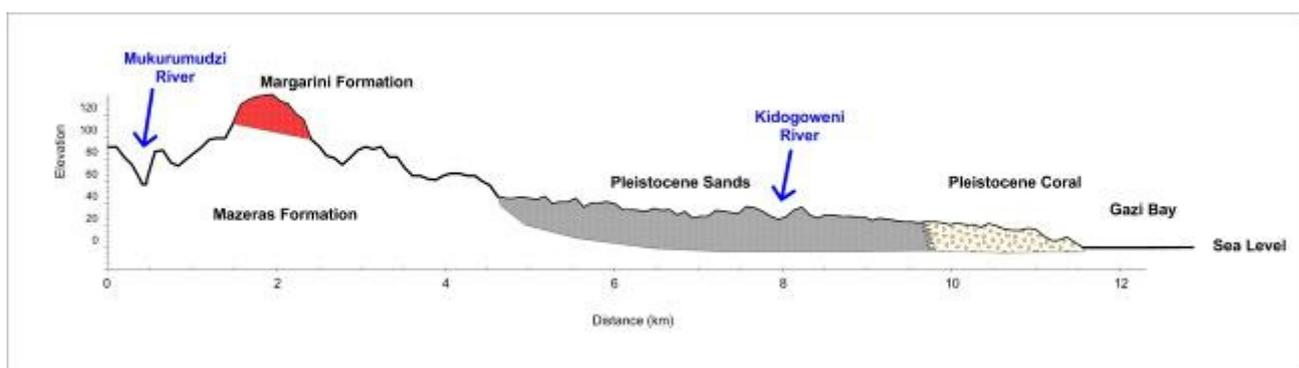
The Kwale deposit is made up of ancient dunes called the Magarini Sands which were deposited after the intense erosion of the underlying sandstone. These dunes are poorly stratified and include a sequence of brown, red and pink soils before reaching the basement layer of sandstone.

The two areas of the Kwale deposit that will be mined are the South Dune and the Central Dune. The Central Dune is approximately 1.5km long by 1km wide and is located on the north-eastern extent of the mine area. The South Dune is approximately 4km long by 1km wide and is located on the south-western extent of the mine area.

The Central and South Dunes contain a generally high grade of heavy minerals with a heavy mineral content of 5.7% and 3% respectively. The minerals are generally located 20-30m below the surface, resting on the sandstone substrate. These shallow depths permit the minerals to be mined using open pits.

The Central Dune pit will be mined over the first seven years of the Project after which mining will be shifted to the South Dune pit which will be mined over the remaining six years of the Project lifespan.

Schematic cross section showing the geology of the Kwale area. The Kwale Mineral Sands deposit is made up of the Magarini Formation. Groundwater for the mine site will be abstracted from a dam constructed on the Mukurumudzi River and boreholes installed into the Gongoni Aquifer within the Pleistocene Sands.



SURFACE WATER

Surface water drains in a trend from the western hinterland towards the coast, via a number of rivers and their associated tributaries. The Project area falls mostly within the Mukurumudzi catchment, but also extends into the smaller and seasonal Kidongoweni and Mtawa catchments.

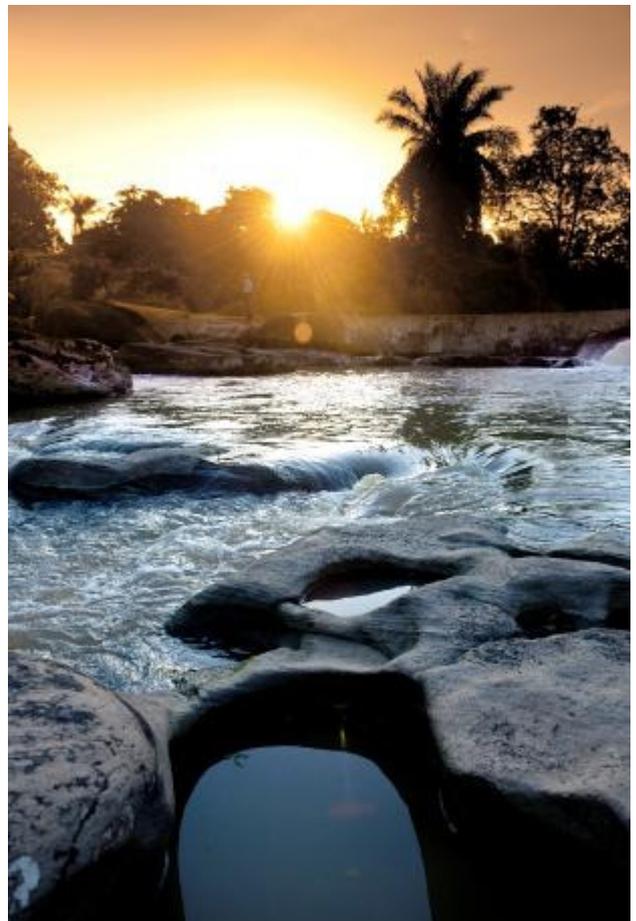
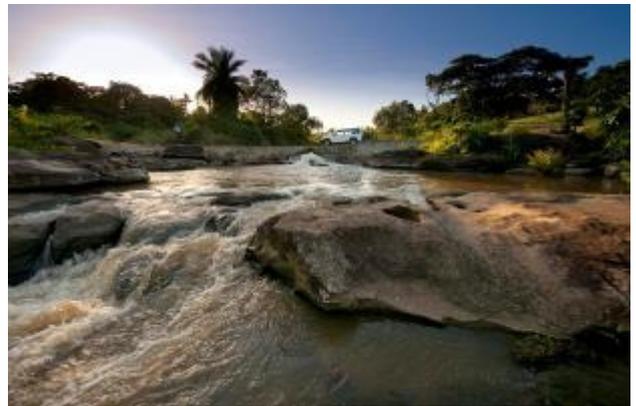
The Mukurumudzi River is perennial rising in the Shimba Hills and flowing from the north-west to the south-east, bisecting the Central and South Dunes and draining into the Indian Ocean north of Msambweni.

Stream flow in the area is largely governed by the seasonal rainfall, but stream flow is also maintained by the discharge of numerous perennial springs. Stream flow is significantly reduced or entirely absent during dry seasons.

GROUNDWATER

East of the Project site is underlain by the Msambweni aquifer. Water from this aquifer provides the base flow to rivers in the area through the discharge of local springs. Water in this aquifer does not contain many minerals. A shallow aquifer, heavily exploited for domestic and other uses, it is often brackish and contains coliform bacteria.

Borehole 6 with generator supplying water for use in road construction. It will serve the mine site during operations (below). The Mukurumudzi River (right top, middle and bottom).



FLORA

Botanical surveys have been conducted over the greater Project area (SML and surrounding areas) as well as within the adjacent Gongoni and Buda Forest Reserves. These surveys consisted of exploratory searches with all species found within a specific area identified and recorded. The original survey work conducted in 1999 has been supplemented by additional survey effort in 2011 and 2012. Selected specimens were taken and lodged within the Kenyan National Herbarium.

Species of conservation interest have been identified according to the IUCN Red List of Threatened Species. Within the greater Project area, 1 008 flora species have been recorded, of which 87 are exotic or naturalised species and 76 are Threatened species. The Gongoni and Buda Forest Reserves both contain a significant proportion of the Threatened flora found within the region. Approximately 80% are found within Gongoni, 51% within Buda and 91% are found within either Gongoni and/or Buda (only 7 species identified in the greater Project area are not present within the forest reserves). Of the 76 Threatened species identified, four are Critically Endangered, 22 are Endangered and the remaining 50 are Vulnerable. A further 15 species have been identified that are Near Threatened.

Cantharellus platyphyllus (below) and *Ceropegia* spp. (bottom right). Spatial extent of the Coastal Forests of East Africa Biodiversity Hotspot (sourced from Conservation International) (top right).

Biodiversity Hotspot Context

The Project is located within the Coastal Forests of Eastern Africa biodiversity hotspot. This hotspot was originally part of the Eastern Arc Mountains and Coastal Forests of Tanzania and Kenya hotspot which was divided into two hotspots in 2005 following a review of the original biodiversity hotspots.



AVIFAUNA

A total of 207 bird species have been recorded within the greater Project area. This is considered to be a reasonable level of biodiversity. Four IUCN Red-listed Near Threatened species were identified in the area, but were not restricted to the minesite.

Forested areas are considered to be of importance as most of the bird species of conservation interest are partially or entirely reliant on forests. This includes forested areas along the Mukurumudzi River and its tributaries and the neighbouring Gongoni and Buda Forest Reserves.

MAMMALS

Forty-three mammalian species were recorded in the greater Project area, which compares moderately with the total number of expected species (70). The diversity and density of wild mammals was significantly lower than could be expected and this is attributed to habitat destruction and hunting.

Mammalian species of conservation interest are likely to be restricted to the Gongoni and Buda Forest Reserves, but may also be found in the forest remnants along the Mukurumudzi River and its tributaries.

Bearded Pygmy Chameleon *Rieppeleon breviceaudatus* (below) and the Sabaki Tilapia *Oreochromis spilurus spilurus* (bottom right) collected during faunal studies undertaken for the Project.



HERPETOFAUNA

Twenty-eight amphibian species and 41 reptile species were recorded in the greater Project area. The higher diversity of amphibian and reptiles species was found to be largely restricted to wetlands, the Gongoni and Buda Forest Reserves, as well as the Mukurumudzi River and its tributaries. Two IUCN Red Listed Endangered amphibian species were identified in the area. Although no current IUCN Redlist report exists for reptiles, 10 species within the area are likely to be classified as either Threatened or Near Threatened.

The amphibian species of conservation interest found in forest or wetland areas are likely to benefit from increased habitat created by the establishment of the Mukurumudzi Dam.

ICHTHYFAUNA

Five species of fish were identified at three sample sites along the Mukurumudzi River. The samples from the upper Mukurumudzi River showed the highest species richness.

MACRO-INVERTEBRATES

Forty-four species of aquatic macro-invertebrates were identified along the Mukurumudzi, Kidongweni and Mtawa catchments. Macro-invertebrate diversity was noted to be highest in the Mukurumudzi River, with the seasonal Kidongweni and Mtawa having a moderate and low diversity respectively. The diversity of macro-invertebrates has been used as an indicator of water quality.



ADMINISTRATIVE AND GOVERNANCE

The Project is situated in Msambweni District, which lies in Kwale County in Coast Province. At the local administrative level, locations are headed by Chiefs, and are divided into sub-locations overseen by a village elder or chairperson.

The Chief, through his village chairpersons and elders, is responsible for general administration, the distribution of land, maintenance of law and order (settlement of disputes) and the development of his/her settlement area/village. Decisions in the settlements are made by the village chairperson and the elders of the resident families. Youth and women organisations are occasionally consulted in decision making. In general village decisions are presented by the elders to the community during a village assembly.

SETTLEMENT CHARACTERISTICS

The settlement pattern in the study area consists mainly of scattered rural households or households that live elsewhere with some being economically dependent on their plot in the study area for their livelihoods. These households still retain a hold on their plots by checking on them or having younger family members or employees remaining active on the plot.

Typical traditional rural homesteads (bottom and right).



POPULATION DEMOGRAPHICS

The 2009 National Population Census established the population of the Kwale County to be 649 931 with a population density ranging from 89 to 123 inhabitants per km² and an average household size of 4.85 persons. Msambweni District has a population of 288 393 inhabitants with a population density ranging from 9 to 2 271 inhabitants per km² and an average household size of 4.85 persons.

CULTURAL HERITAGE

Most of the culturally important, sacred and historical national heritage sites in the area are located along the coast with many on private land. They consist of mosque ruins, palaces, houses and walls with gates and tombs, and “Kayas” or sacred forests. There are no sacred sites located within the footprint of the mining area or supporting infrastructure.

RELIGION

At the coast Islam is the dominant religion with mosques in most villages. There are several traditional Christian churches based on the teachings of local preachers. Indigenous religion, mostly based on the idea of a supreme god, continues to play a major part in the lives of many people with sacrifices and rituals taking place.



LIVELIHOOD STRATEGIES

Msambweni District is relatively densely populated. About 20% of the district is used for agricultural purposes. The sugarcane development along the Ramisi River, to the south of the SML area, which was largely dormant for several decades, is now being revived. Mixed subsistence farming occupies a further 15% of the land with cassava and maize being the main crops. Other crops include beans, cow peas, finger millet, pepper, pigeon peas, rice, sim sim and sweet potatoes.

Programmes will be established to mitigate social impacts primarily associated with improving agricultural yields. This will ensure that households affected by resettlement will be able to re-establish crops for either subsistence or commercial purposes. Alternative livelihood programmes will also allow diversification into non-agricultural skills.

Locally produced fruit and vegetables are readily available in markets in the area (below). Local children attending classes at Kiruku Secondary School (top right).



EDUCATION

Primary schools in Kenya are funded by the government and are free. Parents are however, expected to pay a percentage of the fees for secondary school, which can cost between KSh30 000 to KSh60 000 per annum, depending on the grade. There are few government secondary schools. The majority of villages in the Project-affected areas also have madrasas (Islamic schools) which are attended by both boys and girls in addition to primary school.

Education levels are low amongst the affected populations in the Mivumoni location with 31% of the adult population aged 19 to 59 years, and 71% of the elderly population aged 60 years and older having not completed any level of formal education. Among the affected households surveyed in Kinondo location, 58% of the adult population aged 19 to 59 years, and 91% of the elderly population aged 60 years and older, have not completed any level of formal education.

HEALTH PROFILE AND INFRASTRUCTURE

There are approximately 50 health facilities in the Kwale area. Among the 27 health facilities that offer all services, including curative, maternal child health, family planning, etc., there are three hospitals, one each at Msambweni, Kinango and Kwale, a total of five Health Centres at Kikoneni, Samburu, Shimba Hills, Tiwi and Vanga, 18 dispensaries and one public health centre at Ukunda. Two private hospitals in Diani Beach offer a comprehensive range of services. Kwale District Eye Centre Charity operates an eye clinic in Waa approximately midway between the mine site and Likoni Shiplading Facility.

The County also has 17 community-based “Bamako” pharmacies managed by Village Health Committees with the assistance of community health workers trained by the Ministry of Health. The health facilities in the district do not meet the requirements of the population because of the low number of medical personnel and the sparsely distributed facilities.

HOMESTEAD CHARACTERISTICS

A variety of house types exist in the district including:

- The traditional Mijikenda house
- The Swahili house
- The modern or “up-country” house

In the greater Project area, most households are built according to the traditional style and materials. The number of structures increases to match the growing population. In general, each dwelling consists of several units with an average of three rooms each. Most dwellings have an indoor kitchen but very few have sanitation facilities.

The construction of improved sanitation facilities in traditional houses will reduce health problems leading to improved livelihoods.

The Kenya Red Cross Society operates in the area and offers a number of services including first aid training (top right). Teens Watch anti-drug walk in Ukunda to raise funds to build a drug rehabilitation centre in Msambweni District (bottom right).

Diseases and health issues in the District

- **Communicable diseases linked to housing design:**
 - Tuberculosis (TB)
 - Acute respiratory infection
 - Leprosy
- **Vector-related diseases:**
 - Malaria
 - Filariasis
- **Soil-, water- and waste-related diseases:**
 - Diarrhoeal diseases
 - Cholera
 - Typhoid fever
 - Fungal skin diseases
 - Intestinal parasites
 - Schistosomiasis (Bilharzia)
- **Sexually Transmitted Infections (STIs)**
 - HIV
 - Sexually Transmitted Infections (STIs)
 - Hepatitis B
- **Food-, and nutrition-related diseases:**
 - Malnutrition
 - Anaemia
- **Non-communicable diseases:**
 - Diabetes
 - Hernia



WATER SUPPLY

The availability and usage of water varies in different parts of the area because of diverse environmental conditions. Springs and rivers are important sources of water in the coastal area.

Kwale has 22 rural and 4 urban water supply schemes mostly regulated by the Coastal Water Services Board and managed by the Kwale Water and Sanitation/Sewerage Company. Of these 26 piped schemes, 20 are operational, leaving six non-operational due to the lack of funds to run or repair them.

In the County, about 25% of the population has access to piped water while 30% relies on approximately 570 community boreholes and wells equipped with hand pumps. About half of the households in the County use water from unclean sources and are exposed to the risk of contracting water-borne diseases. The average water consumption is about 4 000 litres per month per household with an estimated cost of KSh330 per month.

School girls collecting water from a Afridev hand pump installed on a community borehole (below). The supply of electricity has recently been extended to Msambweni and Shimoni areas through the Rural Electrification Programme, for example through the extension of the power to the Galu-sub-station (right).



ELECTRICITY SUPPLY

Electricity is not extensively distributed in the County. It was only available at main market centres like Kinango, Ukunda and Diani Beach. Recent improvements have extended supply to Msambweni and Shimoni areas through the Rural Electrification Programme. Many parts of the County and the hinterland areas remain with no electricity supply. Electricity is mainly used for lighting and cooking where available. Street lighting has recently been installed in Ukunda.

REFUSE AND SEWAGE

The human settlements along the tourist beaches have a refuse collection and disposal service, while for most of the remaining population these services are not provided. Usually, people have a pit near their houses where they burn their refuse. In the greater Project area, very few people have toilets in their homes. Most households have pit latrines, while others have no type of sewage disposal system. Proper sewage services may greatly increase the health and living standards of the area.



TELECOMMUNICATIONS

Mobile telephone services are available across most parts of Kwale, Msambweni, Kinango, Ukunda, Shimba Hills and Lunga Lunga. The standard trunk dialling facilities are available at Kwale, Msambweni and Ukunda, while Kinango, Shimba Hills, Lunga Lunga, Lukore and Shimoni are served with manual exchange operations although these services are unreliable.

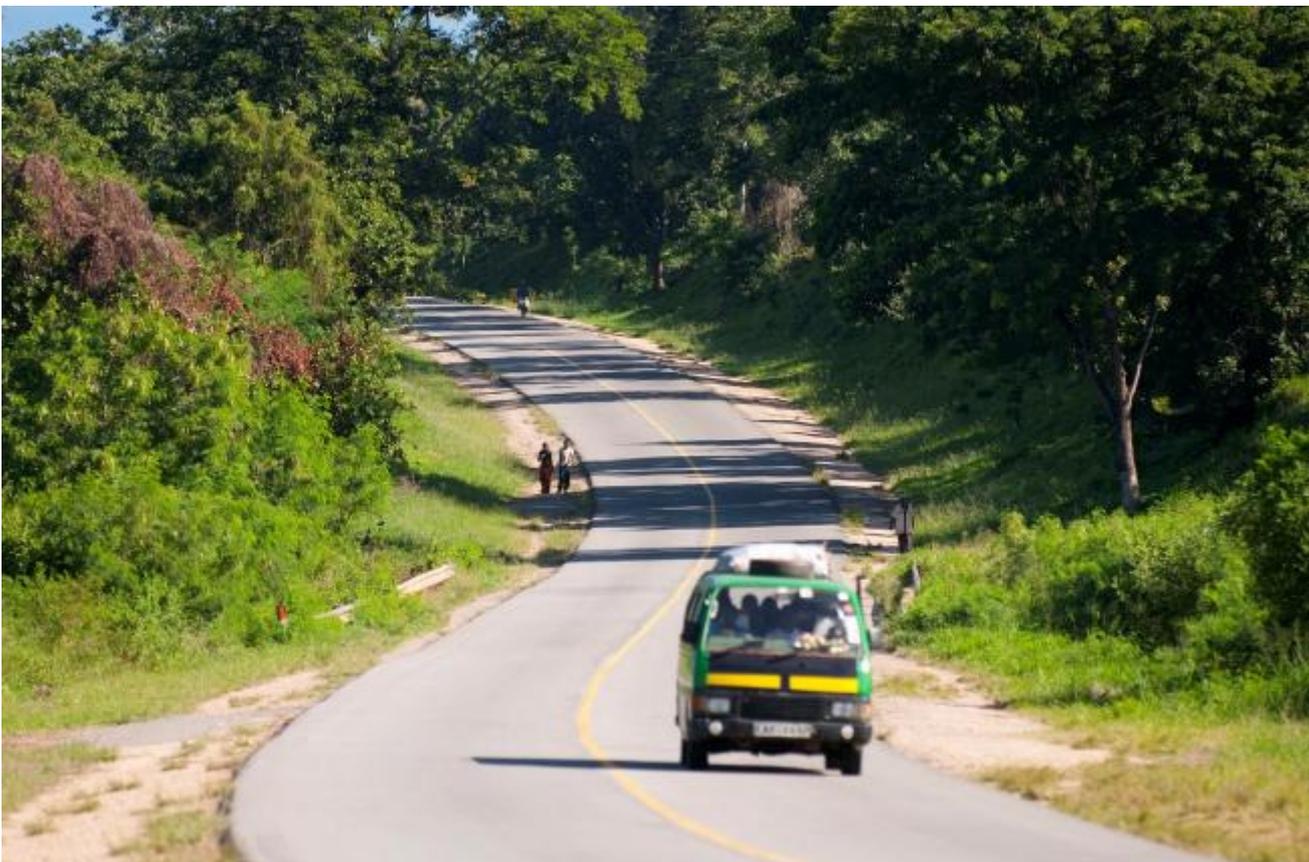
The automation of telephone services in many parts of the district is constrained by the lack of electricity and is affected by vandalism. Many of the rural market centres have no access to telecommunications facilities.

There are two Post Offices, one in Kwale town and one in Ukunda, and 14 Postal Agencies located at Diani Beach, Kinango, Matuga, Waa, Tiwi, Msambweni, Vanga, Kikoneni, Lunga Lunga, Shimba Hills, Ngombeni, Samburu, Taru and Mackinnon Road.

The A14 is a asphalt road running through the coastal area connecting Mombasa to Lunga Lunga and beyond to Tanzania (below). Electricity supply lines (right).

ROAD INFRASTRUCTURE

The Kwale County has a road network of approximately 1 130km of which only 16% is of asphalt standard. The coastal strip and the northern part of the County are connected with asphalt roads running from Mombasa—Lunga Lunga and Mombasa—Nairobi. The Mombasa—Lunga Lunga road is the only heavily utilised road in the district. The access road from the coast to Kwale town is asphalt. The other access roads are earth compacted with open storm-water drains; their condition remains poor, especially during the rainy season.



The Mining Area includes the mine, processing plant and tailings management facilities assessed in the original ESIA approved by NEMA.

The Mining Area is considered limited to activities located within the Special Mining License (SML) area.

The mining facilities within the SML area consist of the following functional units:

- Mining unit
- Processing unit comprising
 - Wet Concentration Plant (WCP)
 - Mineral Separation Plant (MSP)
- Tailings Storage Facility
- Product Storage
- Office, workshop and accommodation units

Each component is explained further in the following sections.



Wet concentrator pilot plant (right). The establishment of the construction camp (below).



SITE PREPARATION WORKS

Prior to commencing mining, trees and vegetation will be cleared to provide a six month cleared area ahead of the mining operations. Tree-felling and stockpiling will be carried out using a dozer and excavator. Stockpiled timber and vegetation will be loaded and hauled to designated safe locations off the active mine areas using a loader with fork and grapple attachment and dump trucks. Following removal of vegetation, topsoil will be stripped and stockpiled using a loader and truck fleet.

It is important that after stripping of the topsoil that no debris remains that can foul the water and feed pump suctions/impellers, block screens or hinder recoveries in the concentrator. Hence strict attention will be paid to grubbing and cleaning-up root matter, particularly in densely vegetated areas.



THE MINING UNIT

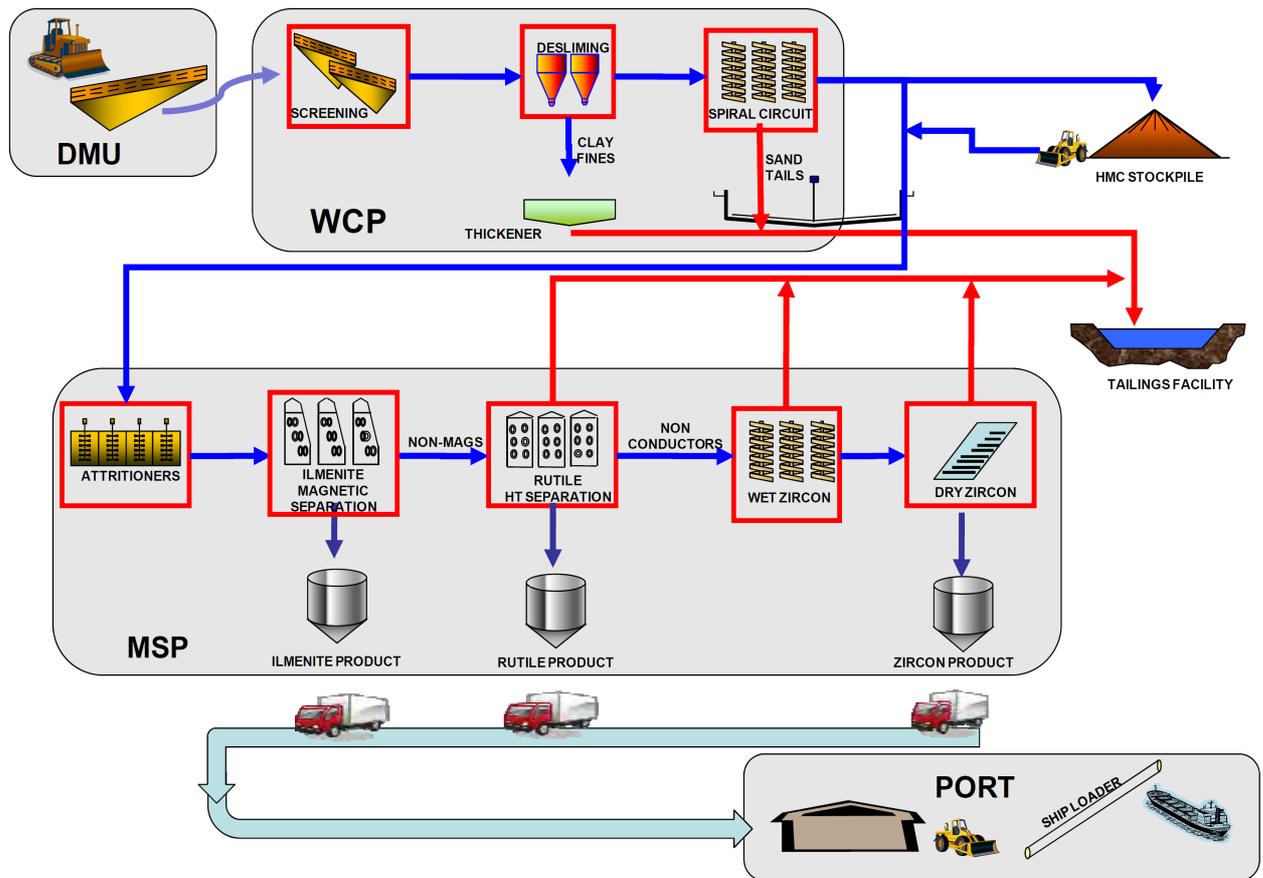
The ore will be mined using a Dozer Trap Mining Unit (DMU) method. The base of the DMU is placed on a flat surface while the dozer trap section is positioned against a mining face cut into the side of the dune. Large tracked dozers push the mineral-rich sands from the mining pit directly to the DMU hopper.

The feed is drawn by gravity into the throat of the DMU and onto a belt feeder. The belt feeder conveys the feed into a liquefier chute, then onto a 30mm screen to remove any oversize ore. The undersize ore passes into a bin and is slurried for pumping to the plant. The oversize ore will be stored in the oversize stockpile and removed periodically by mobile equipment to the appropriate storage area. Where necessary, an excavator will be used to maintain a clearway at the DMU throat.

The ore will be excavated based on a grid pattern comprising mining blocks. Each mining block is based on a nominal 200m x 100m rectangular area, modified to best fit around the perimeter of the defined pit, with the DMU located at the base of a mining block. As mining progresses, the DMU will be relocated using an excavator and loader. Any surplus ore left at the start of the move will be moved forward to the next pit.

A Dozer Mining Unit (DMU) in operation (below). Cataloging of mineral sands samples for analysis (left).





Simplified process flow diagram.

PROCESSING — WET CONCENTRATOR PLANT

The Wet Concentrator Plant (WCP) separates the heavy minerals from the coarse sands.

It consists of a number of screens through which slurred ore is passed. Material greater than 4mm in size is removed and discarded to tailings. The ore then reports to a cyclone desliming unit, to separate clay particles less than 45µm in size. A flocculant is added to the clay to permit settling in a thickener and is then discarded as tailings.

The remaining material is fed into a four-stage spiral concentrator circuit which separates the heavy minerals from the sand by centrifugal forces. The heavy minerals are then fed into the MSP for further processing, while the remaining sand is dewatered and impounded in the TSF.

PROCESSING — MINERAL SEPARATION PLANT

The Mineral Separating Plant (MSP) separates the target heavy minerals by gravity, magnetic and electrostatic methods, using 5 circuits:

Feed Preparation Circuit

This circuit receives heavy minerals from the WCP through an attritioner to break up aggregates, and then a classifier to remove any remaining clay and fines. The remaining heavy minerals are then directed toward the Ilmenite Circuit.

Ilmenite Circuit

Heavy minerals from the Feed Preparation Circuit are fed into a diesel fuelled Heavy Mineral Concentrator (HMC) fluid bed dryer to dry the slurry. Thereafter, it is transferred to a Low Intensity Magnetic Separation (LIMS) / Rare Earth Drum (RED). These processes separate the ilmenite based on its magnetic properties. The remaining non-magnetic fraction is fed into the Rutile and Zircon Circuits.

Rutile Dry Circuit

Non-magnetic material is fed into a Rutile Fluid Bed Reheater, which heats the materials to 110°C prior to treatment by a series of High Tension (HT) Separators. These separators divide the materials based on electric conductivity.

The conductive portion of the material is the raw rutile which is further processed via Rare Earth Roll Magnetic Separators to remove any remnant ilmenite from the final rutile product. The non-conductive material is fed into the Wet and Dry Zircon Circuits.

Wet Zircon Circuit

The non-conductive material from the Rutile Circuit is fed into a three-stage spirals circuit. These spirals generate a wet zircon concentrate which is fed into the Dry Zircon Circuit.

Dry Zircon Circuit

The wet zircon concentrate is fed into a Fluid Bed Dryer to heat the feed material to approximately 100°C. Once this temperature is reached the concentrate is treated via a series of HT Separators and Induced Roll Magnetic Separator (IRMS) to produce a final zircon product.

Office, Workshop and Accommodation Units

Support facilities will be established and include offices for general administration, health and safety, environment, social and training, maintenance workshops for light and heavy vehicles and machinery, laboratory facilities, ablutions, security and warehousing.

During construction a camp comprising accommodation, ablutions, a health and first aid facility, mess, dining and recreational facilities will be established at the mine site.



Kwale Mineral Sands Project Processing Plant (left) site preparation (October 2012) and (below) nearing completion (September 2013). The Processing Plant comprises from left: Product storage and bulk loading facility (1), mineral separation plant (2), wet concentrator plant (3) and thickeners (4).



TAILING STORAGE FACILITY

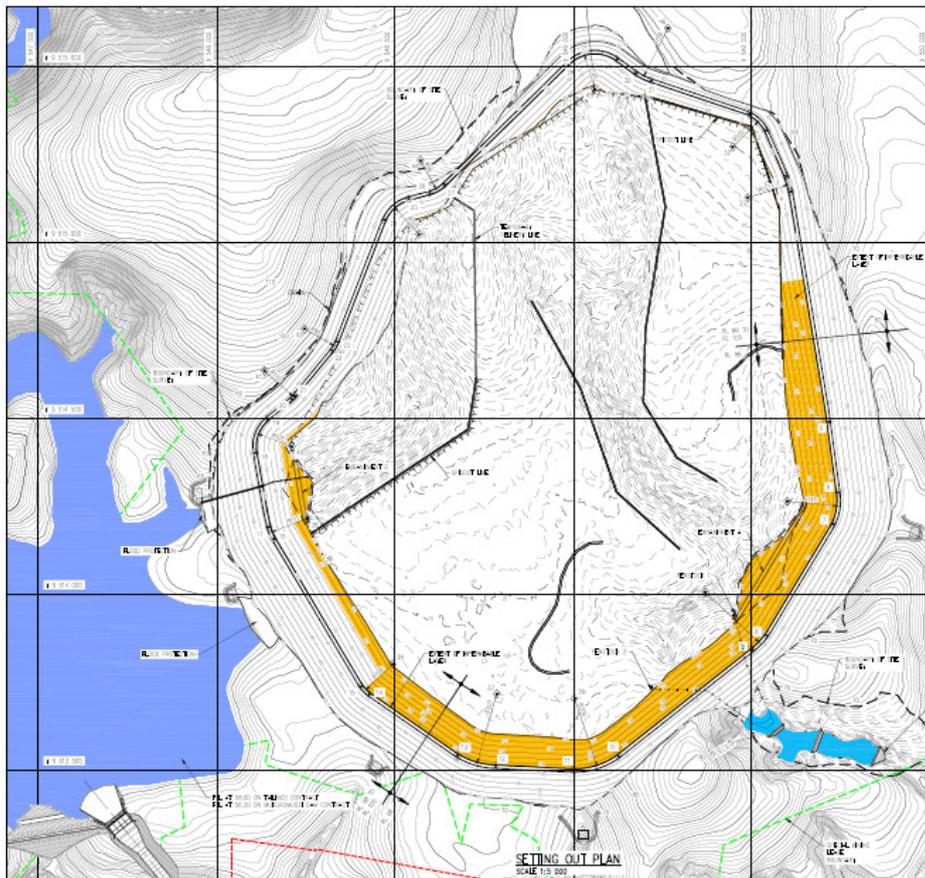
The processing of heavy mineral sands produces two distinct tailing streams — fine tailings (slimes) containing a high proportion of clay-sized material and coarse sand tailings.

A Tailings Storage Facility (TSF) will be developed as part of the Project. The TSF will cover an area of approximately 280ha and constructed to a maximum height of 46m. The TSF will be located to the south of the processing plant.

The coarse sand tailings will initially be used to construct the main impoundment wall of the TSF after which they will be directed to the mine void where they will be used to build walls and/or provide backfill. The fine tailings will undergo thickening before being impounded in the TSF and left to consolidate over time.



Design of the Tailings Storage Facility (TSF) (below) and typical mineral sands tailings (right).



ASSESSMENT OF IMPACTS RELATED TO MINING, PROCESSING AND ASSOCIATED ACTIVITIES IN THE SPECIAL MINING LEASE (SML) AREA

The ESIA for the SML area identified the activities which will be undertaken, and considered all the potential social and environmental impacts of each activity. The consequence and likelihood of each potential environmental and social impact was assessed and categorised. The assessment included direct and indirect impacts, cumulative impacts and whether the impacts will be of short or long term duration.

Impacts before Mitigation

The establishment of the Project will likely result in mostly minor or moderate impacts.

The majority of the potential negative impacts to the social environment are moderate or high impacts. The moderate impacts relate to increased local tensions due to employment opportunities and increased social pathologies due to the influx of people into the area seeking employment. The impacts with a high significance rating relate to the relocation of people and the impact this will have on their livelihoods, communal infrastructure and social networks.

Environmental impacts of high significance relate to the loss of natural resources. The surrounding community use the natural resources for food, construction and ethnobotanical purposes. The loss of access to natural resources within the mining area will likely result in an impact of high significance. The Project will potentially result in the loss of plant species and ecological diversity.

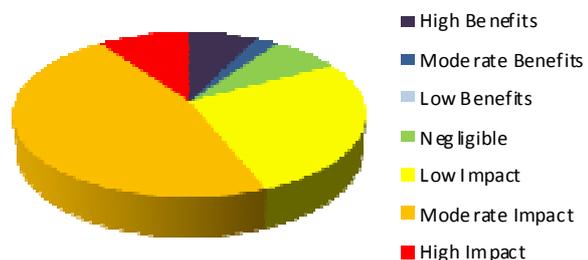
The establishment of the Project will also have positive and beneficial impacts, one of the most important being the creation of employment opportunities. The community will benefit from the improved infrastructure associated with the mine site and the economic development of the surrounding area. The contribution of the Project to the national and local economy is of benefit on a national and local level. The soil in the area of the TSF has low agricultural potential and the tailings may increase the agricultural potential thus resulting in increase land-use potential.

Mitigation and optimisation measures

- **Develop and implement a RAP in accordance with IBP.**
- **Undertake socio-economic monitoring of affected households.**
- **Minimise the extent of vegetation clearing, undertake the collection of seeds, particularly of sensitive species.**
- **Preserve and stockpile topsoil.**
- **Minimise erosion through design criteria and strategic management of cleared areas.**
- **Design the TSF to meet international technical and safety standards.**
- **Develop labour recruitment policies and procedures to maximise the benefit to local communities and minimise influx.**
- **Develop and implement a community development programme.**
- **Develop and implement a programme for biodiversity conservation.**
- **Develop a rehabilitation management strategy that ensures the area is returned to a condition post mining that can support biodiversity and provide natural resources to the surrounding communities.**
- **Decommission mine infrastructure in accordance with IBP.**

The development of the Project will result in both negative and positive impacts to the biophysical, natural and social environment. The majority of negative impacts will have low or moderate consequence before mitigation.

Distribution of impacts before mitigation



Impacts after Mitigation

The majority of impacts will have a low or negligible effect after implementation of the recommended mitigation measures during the design, construction, operational and decommissioning phases of the Project.

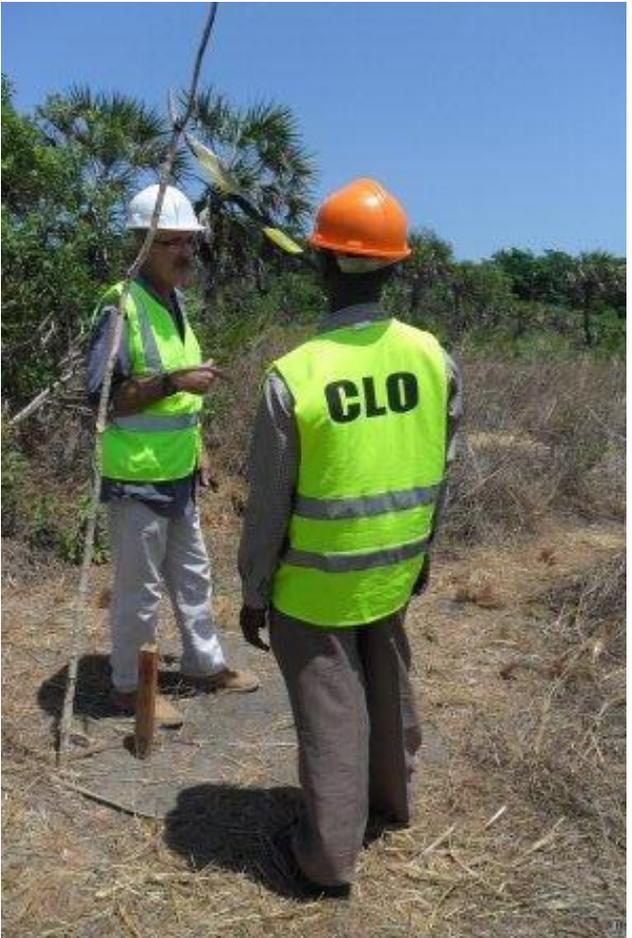
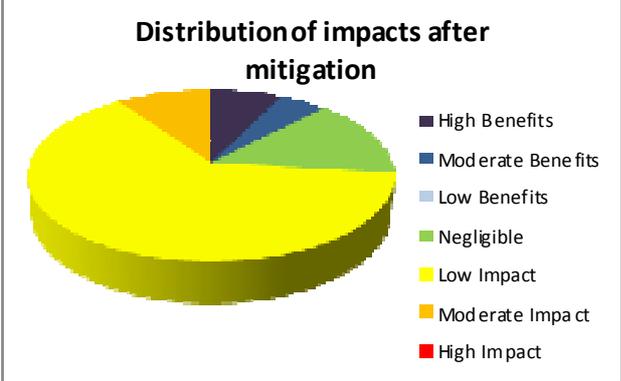
The incorporation of various environmental considerations into the design, such as designing the TSF to meet international technical and safety standards and incorporating IBP recommendations into stack designs to minimise emissions, contribute to ensuring that the significance of negative impacts is reduced.

It is inevitable that people will need to be relocated in order for the area to be mined. The impact on the affected persons can be minimised through the implementation of a RAP developed in accordance with IBP guidelines. Base has developed and implemented a consultative RAP that ensured affected households were given a fair and equitable compensation package that has enabled them to re-establish and improve their livelihoods and that Base meets its Project responsibilities to the affected communities. Community infrastructure, including schools, medical facilities and water infrastructure have been provided by the Project as part of the resettlement programme. The Project’s Labour, Recruitment and Influx Management Plan that aims to maximise benefits to locals and minimise influx and is being implemented.

Control measures to minimise the impact of construction activities have been established and are being implemented. This includes the regular watering of cleared areas and implementation of speed restrictions on Project sites to minimise generation of construction related dust. The implementation of health and safety standards will minimise the impact of occupational and community health and safety related incidents.

Over 65% of the negative impacts from the establishment of the mining site will be of low significance following implementation of the recommended mitigation measures (top right). Health and safety standards minimise the impact of occupational and community health and safety incidents (middle and bottom right).

Over 65% of the negative impacts from the establishment of the mining site will be of low significance following implementation of the recommended mitigation measures (top right). Health and safety standards minimise the impact of occupational and community health and safety incidents (middle and bottom right).



INTRODUCTION

The make-up water demand for the Project is approximately 5Mm³ pa, or 14 000m³ pd, for the first four years and around 8Mm³ pa, or 22 000m³ pd, thereafter.

Due to the bimodal rainfall and periodic dry cycles that occur on the Kenyan coast, the Project will establish a sustainable water supply.

A number of water supply options were assessed by Addenda ESIA prepared in 2007 and 2010. It was determined that the most sustainable options would be the establishment of a dam on the Mukurumudzi River, with a back-up supply from a wellfield.

Key features of the Mukurumudzi Dam

- **Water level: 58m asl**
- **Storage capacity: 8.8Mm³**
- **Surface area: 1.3km²**
- **Spillway capacity: 181m³ s⁻¹**
- **Head of water going over spillway at flood: 1.67m**
- **Net freeboard: 1.5m**
- **Spillway construction: Concrete channel**
- **Spillway size at mouth: 40m x 3.2m**
- **Spillway size at exit: 20m x 0.8m**
- **Spillway length: 281m**
- **Draw-off culvert size: 10.8m² (including both service and scouring culverts)**
- **Draw-off culvert length: 155m**
- **Draw-off tower height: 26m**
- **Draw-off tower plan dimensions: 3.4m x 3.0m**
- **Designed to international technical safety standards including International Commission on Large Dams (ICOLD) design standards**

THE MUKURUMUDZI DAM

The dam will be built on the Mukurumudzi River close to the current Kivumiro Weir site, located between the South and Central Dunes. The dam will have a wall height of 22m and a length of 347m. The dam has been designed to international technical and safety standards. Provision has been made for a spillway to accommodate a 1:500 year flood event.

The dam will cover an area of approximately 1.3km² and have an estimated live storage of 8.8Mm³. The maximum water level has been set at 58m above sea level.

The dam will comprise an earthfill embankment and a clay core. The design includes a cut-off trench to key the dam wall into underlying rock and minimise seepage beneath the dam wall. The cut-off trench will be backfilled with clay and compacted. Concrete injection grouting into the base will fill any voids in the soil and rock structure underneath the dam wall. The embankment of the dam will consist of compacted fill with a clay core in the centre. Behind the clay core will be a filter consisting of graded rock inside a geotextile material membrane. The vertical filter will drain into a horizontal filter at the base of the dam, emerging at the toe drain which runs along the base of the dam wall. A wearing rip-rap face on the upstream slope of the dam will prevent wave erosion.

Water recovery from the dam will be via a dry draw-off tower constructed within the dam. It will have intakes at two levels — one close to the bottom of the dam and one at the mid height of the reservoir. The draw off tower will be connected to the pump station by a draw-off culvert underneath the dam wall and will be accessed via the service culvert. The draw off pipes in the service culvert consists of two pipes each of 250mm diameter. A pumping station will be constructed just below the dam wall and just prior to the spillway rejoining the river. This station will consist of two sets of duty/standby pumps.

BOREHOLE BACK-UP SUPPLY

Up to eight boreholes will be constructed in the deeper confined part of the Msambweni aquifer to provide a back-up supply of water in the event of a prolonged drought. Each borehole will have the capacity to supply on average 900m³ of water per day for a backup water supply of 5 400m³ pd. It is anticipated that only six boreholes will operate at a time, with two on standby. This equates to a backup of 2Mm³ pa.

Four of the boreholes are placed along the edge of the Gongoni Forest Reserve, one in the forest and three are north of the forest. The boreholes located within Gongoni Forest Reserve will be managed in accordance with a Special Use Licence issued by the Kenya Forest Service (KFS) to Base.

At each borehole there will be a pump with the capacity to deliver water directly to the mine water storage facilities at the mine site without any intermediate tanks or pumps. In addition a monitoring piezometer will be drilled alongside each production borehole.

WATER PIPELINE

The water will be pumped to the mine site via a pipeline. A 10m easement will be established along the pipe corridor to include the 11kV power line and the access track to the boreholes. The access track will be 3.0m wide on a 200mm layer of compacted subgrade material. Between the boreholes located in proximity to the forest the 11kV line will be routed underground via a direct buried cable to minimise the disturbance to the forest.

The location of Borehole 2 sited on the edge of the Gongoni Forest Reserve (right). The boreholes associated with the forest will be managed in accordance with a Special Use License issued by Kenya Forest Service (KFS) to Base.

The Kilindini Formation and Msambweni Aquifer

Immediately east of the mining area is the Kilindini Sand Formation. This formation comprises a mixture of very fine to coarse sands, calcareous sands and silts, loams, clays and intercalated detrital limestone.

The Kilindini Formation is considered the most promising water-bearing formation within the Kenya south coast. The relatively deep central part of this aquifer has potential for sustainable large-scale abstraction.

The Kilindini Formation hosts the Msambweni Aquifer with groundwater at a depth of 0-100m below the surface.

The Msambweni Aquifer runs parallel to the coast, about 3km inland and approximately 4km from the mine site. The aquifer is sandwiched between the coral reefs at the coast and the fine tertiary sediments inland. The recharge of the aquifer is estimated to be in the region of 34 500m³ pd.



ASSESSMENT OF IMPACTS RELATED TO THE PROJECT'S WATER SUPPLY

The impact assessment for the Mukurumudzi Dam and borefield identified the activities which will be undertaken and considered all the potential social and environmental impacts of each activity.

Impacts before Mitigation

The most significant negative social impact for the construction of the Mukurumudzi Dam is the required relocation of people. Approximately 97 households, essentially located in two villages, will be relocated from the inundated and isolated areas. Relocation results in a number of social impacts, including a disruption of social support networks, loss of livelihoods, cultural loss, loss of communal infrastructure, etc. The construction of the dam may lead to an influx of people into the area seeking employment. This together with the expected increase in contractor staff may lead to an increase in disease and social pathologies in the area which will have a high impact.

There are also a number of positive social impacts associated with the construction of the dam. The Mukurumudzi Dam will provide a stable water resource for domestic and agricultural use, thereby affording tangible social benefits which would extend past the life of the mine.

Significant drawdown from the Msambweni Aquifer through abstraction of water from the borefield will likely have negative impacts on two of the most important ecological systems within the area namely the Gongoni Forest Reserve and the Gazi Bay mangrove community. Drilling data shows an aquitard present beneath the Gongoni shallow aquifers and a programme of groundwater exploration and modelling work is currently being implemented to gain a better understanding of this relationship. Drawdown of the phreatic aquifer would also have a negative impact on wetlands and ephemeral pans in the area that rely on groundwater for base flow. These impacts would all be of high significance.

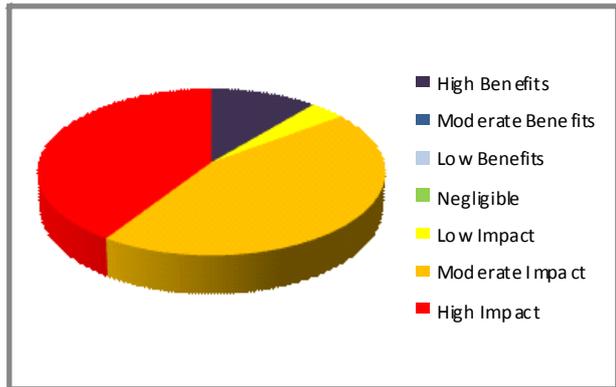


The establishment of the water supply for the Project will result in a number of negative impacts of high significance. There will also be a number of positive impacts of high significance (right).

The construction of the dam could impact on the channel structure of the Mukurumudzi River and lead to a loss of diversity in stream and riparian biota. The damming of the water and a reduction in downstream flow will also lead to changes in ecosystem functions. An assessment of the Environmental Water Requirements (EWR) of the Mukurumudzi River was undertaken in 2011. This assessment concluded that the river downstream of the dam location was generally in a degraded state due to human activities such as understory clearing, uncontrolled livestock access to the river, flow regulation and illegal sand extraction. The degraded nature of the river resulted in limited existing ecological values and hence the impact of these impacts are limited.

Mitigation and optimisation measures

- **Develop and implement a Water Management strategy.**
- **Develop and implement a RAP in accordance with IBP.**
- **Develop and implement a ground and surface water monitoring programme.**
- **Undertake socio-economic monitoring of affected households.**
- **Design the dam to meet international technical and safety standards.**
- **Abstract water within the limits set by the Water Resources Management Authority (WRMA).**
- **Develop labour recruitment policies and procedures to maximise the benefit to local communities and minimise influx.**
- **Undertake ecological monitoring at the water supply sites to establish the effect of water abstraction on the systems.**



Impacts after Mitigation

A number of mitigation and management control measures have been proposed and developed with consideration of legislative requirements, international standards and commitments already made by the Project through the environmental approval process to date. The implementation of these mitigation and management control measures reduces the environmental and social impacts associated with the Project’s water supply to medium or low.

People have been resettled in accordance with the procedures and policies established in the consultative RAPs prepared for this infrastructure. The RAPs stipulate that people will be compensated in a fair and equitable manner for assets and will be assisted in their move to the host resettlement site. Assistance takes the form of logistical support and financial incentives. The RAPs include provision for affected households to benefit from targeted community investment programmes. This mitigation will reduce the social impacts while not completely removing them.

The Project’s Social Monitoring Programme will measure the incidence of disease and put in place the requisite remedial measures to reduce the impact to one of moderate significance.

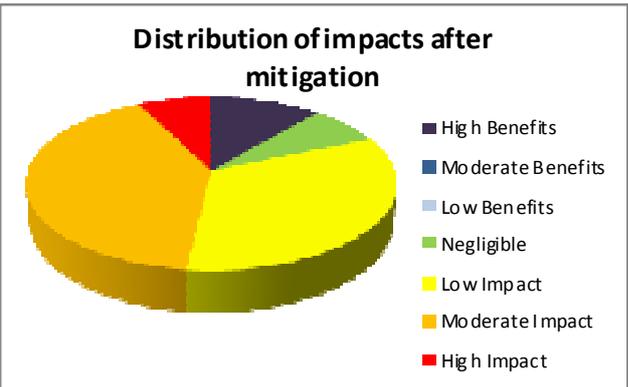
Abstraction from the Msambweni Aquifer must be within the defined abstraction pattern and volume of the water permits. Adherence to these will reduce the impact to the Gongoni Forest Reserve and Gazi Bay mangrove communities.

Impacts to the channel flow and ecology can not be mitigated as the river channel will be flooded leading to permanent change. However, the effective operation and release of the required environmental flow releases from Mukurumudzi Dam, as per the EWR, will reduce the impact to the river downstream of the dam.

Monitoring of the Mukurumudzi River will provide information for management of the system (top right). Over 50% of the negative impacts associated with the Project’s water supply will be of low significance while just under 30% will be of moderate significance following implementation of mitigation measures (right).

The implementation of health and safety standards will minimise the impact of occupational and community health and safety related incidents.

Ongoing water use monitoring and modelling and associated ecological monitoring of the water supply systems and the surrounding areas will ensure the impacts are managed through appropriate control measures and management strategies.



INTRODUCTION

Bulk ilmenite and rutile from the mine site will be transported by road to Likoni and exported from there by bulk carrier to their final destination. A shiploading facility will be constructed to provide capabilities for the storage and handling of these products.

The facility will consist of:

- A steel framed shed for the storage of the bulk minerals
- A wharf for berthing of ships
- A shiploading boom and conveyor belt for loading of the ships
- Offices, ablution facilities and a maintenance workshop

SITE LOCATION

The facility will be constructed adjacent to the Kenya Ferry Services terminal on the south side of Kilindini Harbour channel within Likoni town in the Kilindini district of the Coast Province. On the north side of Kilindini Harbour is Mombasa town.

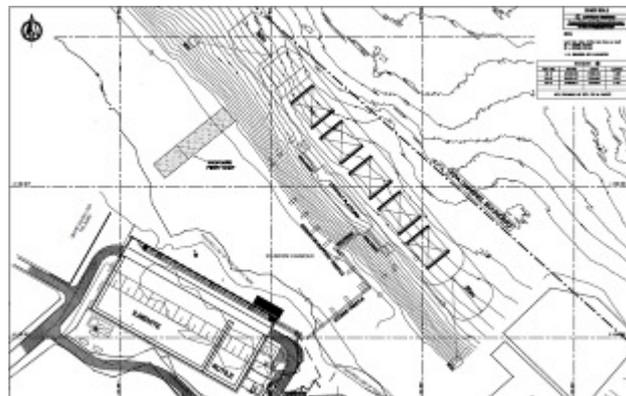
Mombasa Port is a busy commercial port and is the largest and busiest port on the East African coast. Mombasa Port facilities include:

- 16 deep water berths
- 2 bulk oil jetties (tanker berths)
- 1 cased oil jetty
- 5 container berths
- 2 bulk cement berths
- 2 lighterage and dhow wharves
- 1 explosives jetty (handling lighters)
- 2 dhow jetties at the “old port”

The planned design for the Project’s Likoni Shiploading Facility (top right). The site is located on the south shore of Kilindi Harbour next to the Kenya Ferry Services terminal (right middle and bottom).

GEOLOGY

The shallow site geology comprises coral reefs of the Pleistocene age. The lithology of these reefs comprises fossil coral limestone. A shallow layer of sub-soil and top soil overlay the geology of the site.



CURRENTS

Current circulations within Likoni channel are influenced by strong winds, with water being blown to the north of the bay towards Mombasa and away from Likoni. Current speeds are greater at these times, reaching speeds of 200cm s^{-1} . In summer the north east monsoon winds change direction with 50% blowing easterly, and the rest blowing either south westerly or south. During this period, fresh water discharges are less and current speeds slower, resulting in any discharge effects being more localised around discharge points.

In general currents flow along the middle channel and hug the northern banks (the Mombasa side) of the Kilindini Harbour and enter Port Reitz along the northern bank, on the opposite side of the channel to Likoni. During neap tides the currents closely hug the southern side of the channel.

FAUNA AND FLORA

The shoreline in the immediate vicinity of the Likoni Shiploading Facility encompasses five different zones with distinct characteristics defined:

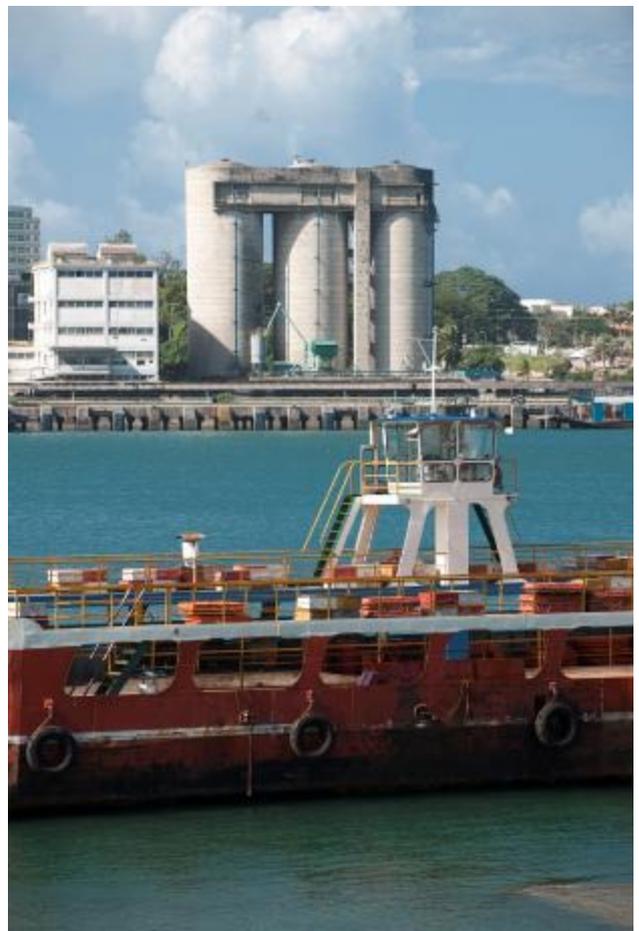
- Zone 1. Creek water area: The planktonic organisms inhabiting this area are mainly phytoplankton and zooplankton.
- Zone 2. Beach area: The beach area is predominantly sandy. Dominant organisms in this area are Ghost Crab *Ocypode* spp. (Ocypodidae).
- Zone 3. Inter-tidal zone: This zone is dominated by *Ulva* species of seaweeds mainly *U. reticulata* and *U. fasciata* growing on a rocky substratum. The animals inhabiting the intertidal area are crabs and gastropod shells.
- Zone 4. Rocky cliff: These occur on the upper parts of the beach, and are made up of dead corals. On this coral rag various species of shrubs and trees grow. The lower part of the rocky cliff is dominated by coral crabs *Eriphia smithi* (Menippidae) and Grapsidae crabs, which are embedded in the rock crevices. The lower parts of the cliffs have *Ulva* spp. growing on them.
- Zone 5. Mainland: On the cliff edge and mainland several species of trees and shrubs are found. They are denser at the cliff edge.

SOCIO-ECONOMICS

Likoni has a population of 176 426 and is largely residential and considered a lower income and lower middle class neighbourhood. The largest sectors of employment are informal street vending, stone quarrying, and casual employment at the port.

Mombasa is East Africa's most important port with Kilindini Harbour central to the region's economy. Mombasa is also the centre of coastal tourism in Kenya, with popular beaches to the north and south. Access from Moi International Airport in Mombasa to the south coast beaches is by the Likoni Ferry. Other large industries include an oil refinery west of Mombasa and the Bamburi Cement factory north of the city.

A bulk cement berth on the Mombasa side of Kilindini Harbour.



ASSESSMENT OF IMPACTS RELATED TO THE PROJECT'S LIKONI SHIPLOADING FACILITY

The impact assessment for the Likoni Shiploading Facility identified the activities associated with the construction, operation and decommissioning of the facility and considered all the potential social and environmental impacts of each activity.

Impacts before Mitigation

The establishment of the facility at Likoni will introduce a number of negative impacts relating to the increased number of vehicles in the area. These will pose a moderate risk to pedestrians and other vehicles through the increased potential for collisions. An increase in vehicular traffic will also lead to an increase in dust and emissions to the air in the form of vehicle exhaust fumes.

There will be increased levels of noise due to the construction activities. The noise levels experienced will be typical of that generated by earth moving equipment during construction but will be intermittent. The noise generated during the construction phase will increase the ambient noise level of the area and could impact on surrounding residents and businesses. Of particular significance is the Likoni School for the Blind located to the west of the site which will most likely be impacted by the increased noise.

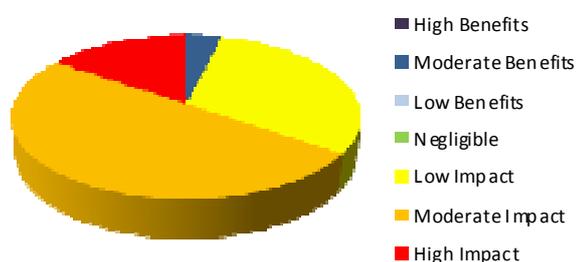
The main impact to the terrestrial environment will be from the clearance of vegetation including grass and some trees to allow for site preparation and establishment of the facility. The vegetation in the area is typical of a disturbed site. Plant species diversity is very low with mainly weedy and exotic species being recorded. There are no species of special concern.

Animals and birds will be disturbed by the construction activities and will relocate to find other habitats once the construction work commences. There is a relatively impoverished faunal diversity at the site due to the degraded nature of the plant communities but some animals and a few birds are known to frequent the area.

Impacts of potential moderate to high significance on the marine environment relate to potential oil spills associated with the shipping industry.



Distribution of impacts before mitigation



The Likoni Shiploading Facility prior to construction (top right). The majority of the negative impacts from the construction and operation of the Likoni Shiploading Facility will be of moderate to low significance. Increased employment opportunities will provide a moderate positive impact (right).

Mitigation and optimisation measures

- **Design the Likoni Shiploading Facility to meet international technical and safety standards.**
- **Implementation of an emergency response plan in case of a spill.**
- **Routine environmental inspections during construction.**
- **Implementation of a vehicle inspection programme.**
- **Use noise dampening procedures during construction and operation.**
- **Use well maintained equipment and vehicles.**
- **Implement a traffic management strategy for the operational phase.**

Impacts after Mitigation

A number of mitigation and management control measures have been proposed and developed with consideration of legislative requirements, IBP and commitments already made by the Project through the ESIA approval process to date. The implementation of these recommendations and control measures reduces the impacts associated with the Likoni Shiploading Facility to moderate or low.

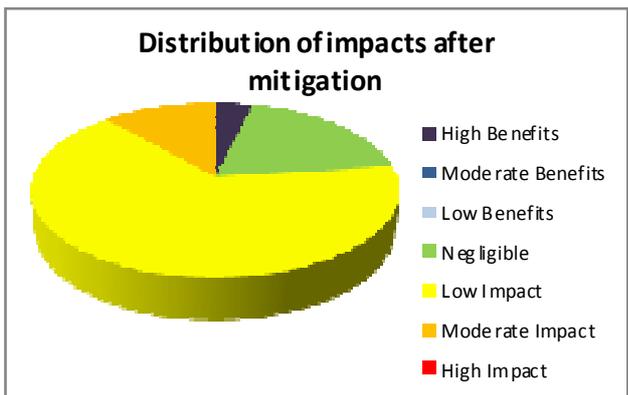
Provided the risks associated with vehicle accidents are effectively managed by implementing operating procedures and educational programmes, as well as installing various traffic calming and management structures (speed bumps, pedestrian crossing with signage, etc.), impacts on the social environment from increased traffic will be acceptable given existing high traffic volumes.

Following the implementation of mitigation measures, the majority of the negative impacts are reduced to either moderate or low significance. In addition, a number of impacts are now negligible and will essentially have no impact.

The generation of noise by construction equipment can be reduced but not prevented. The use of modern, silenced and well-maintained plant at all times, conforming to standards set out in legislation will reduce noise levels. Noise abatement measures should be established between the Likoni School for the Blind and the Likoni Shiploading Facility, such as a strategically placed wall and ensuring limited apertures are located on the western end of the storage shed. These steps will ensure that the impact is reduced to one of moderate significance.

Dust levels can also be reduced through the use of standard dampening procedures during the construction phase.

Ballast water is usually loaded into ships when they have to sail empty in order to aid stability of the ship in rough seas. Such water is usually discharged outside the port of anchor as the ship loads cargo. The ballast water may be contaminated with substances such as fuel hydrocarbons or potentially invasive species. It is a breach of regulations to discharge oil or any oily mixture including sludge into the harbour waters and will result in heavy penalties. Shipping regulations require exchange of ballast water in open ocean in accordance with international maritime regulations. Facilities exist at Mombasa Port for the treatment of such wastes. The discharge of oil contaminated water into the Kilindini Harbour should therefore not take place except through accidental discharge. Base staff will undergo training and be equipped to deal with any spill event.





INTRODUCTION

In order for the Project to access the mine site for construction and operational activities and to transport the products and supplies between the mine site and the Likoni Shiploading Facility and Mombasa Port, an access road will be built connecting the existing A14 coastal highway to the minesite.

A number of access road options were assessed by Addenda ESIA prepared in 2006 and 2011. The most suitable option was selected taking into consideration distance between the mine site and the A14 and ecological and social considerations with the intent of minimising the impacts associated with the construction and operation of the access road.

ACCESS ROAD DESIGN

The access road will be a 7.7km long single carriageway. The road will be surfaced with a 50mm layer of asphalt concrete. The carriageway will be 6m wide with a 1m shoulder giving the road a total width of 8m. The road reserve will be 40m wide along the majority of its length.

The road will consist of a 150mm cement/lime improved gravel base overlying a 175mm natural gravel sub-base. The wearing course will consist of a 50mm layer of asphalt concrete.

Base-course material for the access road will be sourced from borrow pits adjacent to the A14 road.

Construction of the Project Access Road, March 2012. Fill material being transported from a borrow pit (top), concrete works for the construction of a pipe culvert (second from top), placing of sub-base layers (third from top) and trimming of side slopes in road cut (bottom).

ASSESSMENT OF IMPACTS RELATED TO THE PROJECT'S ACCESS ROAD

The impact assessment for the access road identified the activities which will be undertaken and considered all the potential social and environmental impacts of each activity.

Impacts before Mitigation

The primary livelihood strategy of the communities living in the area is subsistence agriculture. The road will require a 40m road reserve within which all structures, crops and trees will be removed. This will lead to a loss of productive land within the footprint of the road reserve and have an impact on livelihoods. This will lead to increased pressure on surrounding land use as a result of a loss of natural resources, e.g. firewood.

The construction of the road reserve will require the relocation of people. Seven households and one unused mosque have structures affected by the construction of the access road while 79 households are economically affected.

There will also be an increase in ambient noise and dust levels from both construction activities and vehicles transporting goods to the mine site and minerals to the Likoni Shiploading Facility and Mombasa Port.

Positive impacts include improved road infrastructure.

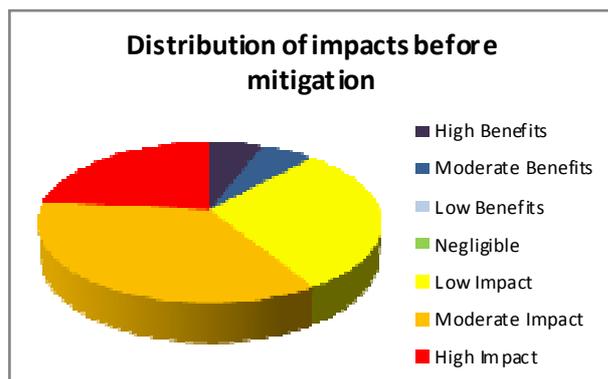
During the construction phase vegetation will need to be cleared for the selected road reserve. The proposed access route passes through a mosaic of different vegetation types which have varying ecological values attached to them. Of highest value is the secondary wooded grassland while areas under cultivation have the lowest ecological value. Their loss could also impact on faunal communities which make use of the vegetation which could lead to a reduction in faunal biodiversity.

The access road could disrupt the movements of fauna and lead to increased mortality from collisions with vehicles and predation due to increased exposure.

Mitigation and optimisation measures

- **Develop and implement a RAP in accordance with IBP.**
- **Undertake socio-economic monitoring of affected households.**
- **Develop labour recruitment policies and procedures to maximise the benefit to local communities and minimise influx.**
- **Minimise erosion through design criteria.**
- **Preserve and stockpile topsoil.**
- **Minimisation of vegetation clearance through compliance with clearance boundaries.**
- **Implement noise reduction measures.**
- **Implement dust control measures during construction activities.**
- **Investigate the use of well maintained equipment with noise reduction measures fitted.**
- **Implement of a traffic management strategy for the operational phase.**
- **Implement health and safety standards that minimise the impact of occupational and community health and safety related incidents.**
- **Implement speed control measures and educational programmes on traffic safety awareness.**

The impacts of most significance relate to noise and dust generated by construction activities and the relocation of households from the road reserve.



Impacts after Mitigation

A number of mitigation and management control measures have been proposed and developed. The implementation of these mitigation and management control measures reduces the majority of the environmental and social impacts associated with the construction and operation of the access road to impacts of moderate or low significance.

People have been resettled in accordance with the procedures and policies established in the consultative RAP prepared for the access road. Households which had structures directly affected by the access road were given cash replacement value of their affected structures. This enabled the affected households to reconstruct their structures on the unaffected areas of their plot. The households which were partially affected did not require resettlement but were compensated for all assets affected by the construction of the access road.

As the access road will have a asphalt concrete surface dust emissions will be minimal post construction. However, little can be done to mitigate the increased dust levels that will be associated with the construction of the access road. Standard dampening down procedures will be employed to control dust during construction.



Attempts can be made to reduce the noise generated by construction and transport equipment, for example by ensuring that they are serviced and have noise reduction measures fitted. The use of a noise reduction barrier such as a dense vegetation bank or earth berm may be able to mitigate some of the impact from increased ambient noise levels. However their construction may be considered visually obtrusive by residents.

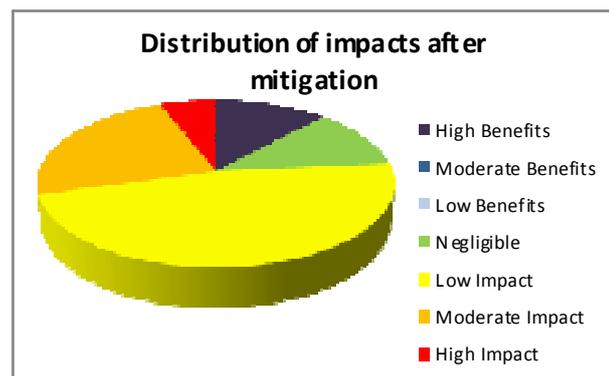
The implementation of health and safety standards will minimise the impact of occupational and community health and safety related incidents.

No threatened floral species of conservation interest have been found in the footprint of the access road and the impacts to flora and fauna are considered to be low or negligible.

Impacts to faunal species from collisions with vehicles are difficult to mitigate. The incidence of collisions could be reduced by limiting the speed of vehicles using the road.

Management measures will be put into place during the construction phase to ensure that waste is disposed of correctly. This will include staff training.

Following the implementation of the recommended mitigation measures, almost 50% of the impacts are of low significance while 12% of the impacts are negligible (below). Implementation of the recommended mitigation measures have the affect of minimising the impacts associated with the activity, this includes clearing of topsoil for stockpiling during the access road construction (top left) and a consultative RAP process (bottom left).



13
THE TRANSMISSION LINE
INTRODUCTION

The Project requires a reliable power supply for the operation of the mine and associated infrastructure. The overall power demand for the Project is estimated to peak at approximately 12mW.

Due to the unavailability of a power supply at the mine site, Base in conjunction with Kenya Power will construct a single 132kV transmission line connecting the mine site to the Galu sub-station. Kenya Power will take ownership of the transmission line on completion of construction and will be responsible for the operation of the transmission line.

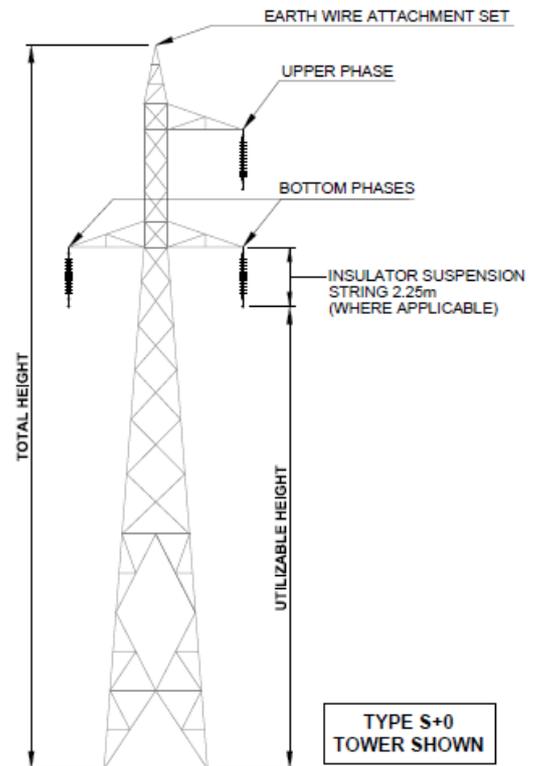
LOCATION OF THE TRANSMISSION LINE

The affected settlements along the route of the transmission line include Ukunda Settlement Scheme, Mwamua, Kiuzini, Mivumoni, Mtsangati, Mtambwe, Kilole, Mbatvu and Mwaweche.

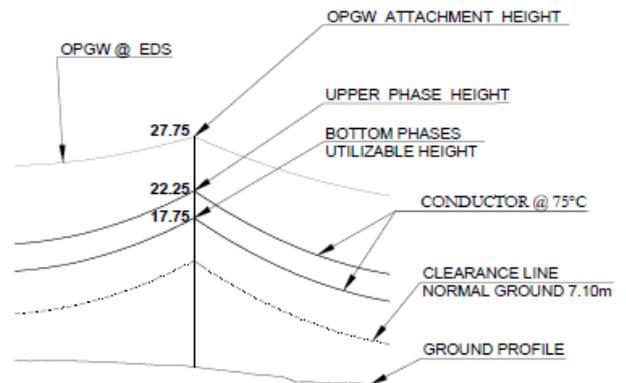
TRANSMISSION LINE DESIGN

The transmission line will have a length of 13.9km and will require a 30m wide wayleave corridor affecting about 41.7ha of land.

The transmission line will have a nominal operating transmission voltage of 132kV and a highest transmission voltage of 145kV. The nominal distribution voltage at the mine site will be 11kV and the frequency 50Hz. The transmission line will have a capacity of at least 100MW. The mine site only requires a supply of 12MW, however, the line could potentially be used by Kenya Power at a later date and the 100MW capacity matches the incoming line from Rabai to the Galu sub-station. The transmission line has a design life of 50 years.



The Galu sub-station (below). The engineering design of one of the transmission line towers (right).



ASSESSMENT OF IMPACTS RELATED TO THE 132KV TRANSMISSION LINE

The impact assessment for the 132kV transmission line identified the activities which will be undertaken under the scope of work and considered all the potential social and environmental impacts of each activity.

Impacts before Mitigation

Social impacts of high significance relate primarily to the acquisition of wayleave rights and the displacement of people living on the land. A 30m wayleave along the length of the transmission line is required and will result in the displacement of households within. The RAP identifies 41 households with living structures within the wayleave, and 13 households with secondary or auxiliary structures. These structures will need to be relocated to areas outside the wayleave.

The transmission line will also impact on activities taking place within the wayleave as activities other than farming and grazing are restricted within the wayleave. This impact is also considered to be of high significance as it could lead to livelihood losses.

A beneficial impact from the construction of the transmission line relates to the increased disposable income locally due to the employment of local people during construction of the line.

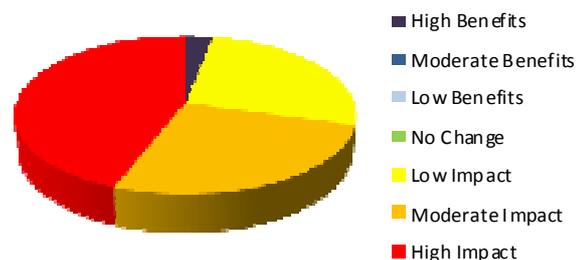
The majority of the environmental impacts arise from the construction of the transmission line and relate to the clearing of the wayleave and the excavation and construction of the tower foundations.

Clear-felling of the vegetation along the 13.9km length of the transmission line will displace 41.7ha of vegetation and could potentially lead to opportunistic establishment of weeds. Transport of workers, equipment and materials to the construction site may also disturb the vegetation. Clearing of vegetation is not expected to have significant negative impact on wildlife owing to the short width of the wayleave and low wildlife density in the line route.

The clearing of vegetation can lead to other negative environmental impacts such as soil erosion, and silting of nearby surface water bodies. These impacts are not considered to be significant.

During the operational phase, electrocution and collision affecting raptors and other birds are possible outcomes along the proposed transmission line. Collision and electrocution incidences are species specific. Raptors for instance are known to have territories which may restrict their ranging behaviour therefore reducing chances of power line mortalities compared to waterfowl such as cranes. Eagles are at low risk due to their solitary behaviour compared to flocking birds like the storks, cranes and vultures.

Distribution of impacts before mitigation



Impacts considered of high significance are mostly social impacts (top right). Base staff working with the community to clear vegetation. Similar activities will be carried out during the construction of the transmission line (right).

Mitigation and optimisation measures

- **Development and implement a RAP in accordance with IBP.**
- **Undertake socio-economic monitoring of affected households.**
- **Develop labour recruitment policies and procedures to maximise the benefit to local communities and minimise influx.**
- **Position towers to minimise impact on sensitive areas.**
- **Where necessary use bird deflectors and raptor platforms.**
- **Implement health and safety standards that minimise the impact of occupational and community health and safety related incidents.**
- **Minimise vegetation clearance through compliance with clearance boundaries.**

Impacts after Mitigation

A number of mitigation and management control measures have been proposed and developed with consideration of legislative requirements, international standards and commitments already made by the Project through the environmental approval process to date. The implementation of these mitigation and management control measures reduces the majority of the environmental and social impacts from this transmission line to moderate or low.

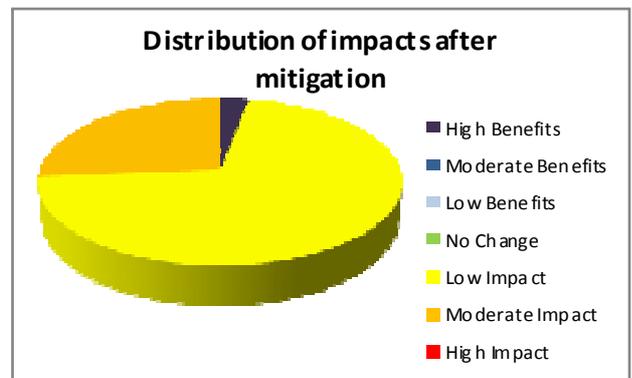
Social impacts after mitigation tend to be of low or moderate significance. Kenya Power will acquire the wayleave using its established procedures under the Energy Act, Resettlement Policy Framework (RPF) and the RAP which has been developed by Base. Kenya Power will compensate all affected persons adequately.

Over 70% of the impacts from the transmission line will be of low significance after implementation of the mitigation measures, while approximately 27% will be of moderate significance (top right). A tower of the incoming 132kV transmission line from Rabai to Galu sub-station (right).

To enhance the positive aspects related to potential employment opportunities, Base has developed a Labour, Recruitment and Influx Management Programme. Under this Programme, staff will be preferentially recruited from the local community and provided with skills training. An operational and community health and safety training programme will also be implemented to reduce negative social impacts.

The impacts to the terrestrial habitat from the clearance of vegetation will be mitigated through the use of environmental management procedures. Within these procedures will be protocols outlining the methodology for the clearance of the vegetation. The Project’s Environmental Management Plan — Construction together with the Environmental Monitoring Programme will ensure that impacts to the environment from accidental spillages or incorrect disposal of waste is reduced or eliminated.

The use of raptor platforms for roosting and nesting and cable visual identifiers will reduce the incidence of avifauna collisions.



14 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

INTRODUCTION

To give effect to Base’s environmental and social policies an Environmental and Social Management System (ESMS) has been developed for the Project. It provides the context and framework for systematic management of environmental and social impacts in a manner that supports continual improvement in performance.

The ESMS is based on the r ‘Plan-Do-Check-Act’ business performance improvement cycle. It utilises impact and risk assessment as a key tool within the initial phases of the Project and throughout the life of the Project to identify the impact of the Project on the biophysical, natural and social environment. The ESMS provides the mechanism used by the Project for managing and controlling these impacts.

The Project’s ESMS applies to all activities that Base and all other parties under the operational control of Base undertake in the construction, operation and/or decommissioning of the Project.

The ‘Plan-Do-Check-Act’ business performance improvement cycle.



THE 'BASE WAY'

Base's approach to the environmental and social management of the Project is guided by a core set of principles collectively referred to as the 'Base Way'.

Corporate Policies

A series of corporate policies provide the framework within which the Project operates.

These policies include:

- Environmental Policy
- Communities Policy
- Employment Policy
- Health and Safety Policy
- Security Management Policy
- Procurement and Supply Policy

What are we?



What is Base Resources and what are we trying to build? What do others see in us? How do we define ourselves?



.....a creative resource company that enriches our people, our communities in which we operate and our shareholders.

ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

A number of plans and programmes are being developed to inform and guide the environmental and social management of the Project from design, through construction and operations and into closure and decommissioning.

Who are we?



We live by a set of core beliefs or principles that together form the "Base Way". This permeates every aspect of our business.

- The Potential of People.**
 - Taking personal responsibility for safety.
 - Promoting a "can-do" approach.
 - Self-improving and encouraging others to do likewise.
- The Power of the Team.**
 - Making commitments and delivering.
 - Empowering others.
 - Working for the good of the whole.
- The Value of Resources.**
 - Being "cost and return" conscious.
 - Finding ways to continually improve.
 - Balancing short-term with long-term objectives.
- Absolute Integrity.**
 - No bribes - ever.
 - Telling it how it is.
 - Confronting inappropriate behaviour in others.



The core of these plans and programmes is a statement of environmental and social management objectives and associated management measures relevant to the scope of the individual plans and programmes. They are live documents that respond to changes in circumstances identified through the implementation of the ESMS.

A series of Environmental and Social Management Plans (ESMPs) are being developed to further support the Environmental and Social Management Plans prepared and approved by NEMA as part of the Project's ESIA and addenda reports.

Where are we going?



Our audacious goal is to be the pre-eminent African-focused mining company by 2021.

*We will be the first thought of company when considering truly successful resource development in Africa.
Governments and communities will invite us in and employees will seek us out.
Others will seek to emulate us.*



Each plan is developed and informed by the following:

- Base's corporate policies
- Base's environmental and communities performance standards
- Kenyan legislative requirements
- IBP standards, policies, procedures and guidelines

The "Base Way".

Environmental and Social Management Plans and Programmes

- **Environmental Management Plan — Construction**
- **Social Management Plan — Construction**
- **Stakeholder Engagement Management Plan**
- **Community Health and Safety Management Plan**
- **Mine Site Environmental and Social Management Plan**
- **Water Resources Management Plan**
- **Transport Environmental and Social Management Plan**
- **Likoni Shiploading Facility Operation Environmental and Social Management Plan**
- **Conceptual Closure Plan**
- **Resettlement Action Plans**
- **Community Development Management Plan**
- **Labour, Recruitment and Influx Management Plan**
- **Social Monitoring Programme**
- **Environmental Monitoring Programme**
- **Biodiversity Conservation Programme**

The ESMS includes a number of community and environmental initiatives which have been developed by Base to ensure that Project benefits are realised in accordance with the Project's commitments as laid out in the Special Mining Lease agreement, Base's policies and IBP.

Environmental Management Plan — Construction and Social Management Plan — Construction

These apply to all activities undertaken by Base and its Contractors during the construction phase of the Project. All Contractors working on the construction of the Project will be contractually bound to complying with these management plans.

Stakeholder Engagement Management Plan

This outlines the objectives and strategies for on-going stakeholder engagement throughout the life of the Project.

Community Health and Safety Management Plan

This ESMP addresses the development of management strategies and interventions for community health and safety impact management during construction, operation and closure.

Mine Site Environmental and Social Management Plan

This ESMP applies to all activities undertaken by Base and its Contractors during the operation of the Project within the SML, including mining, processing and TSF management.

Water Resources Management Plan

The Water Resources Management Plan will ensure that all Project water resources are coherently and responsibly managed during the operational phase of the Project.

Transport Environmental and Social Management Plan

This ESMP applies to the product transport activities undertaken during the operation of the Project.

Likoni Shiploading Facility Operation Environmental and Social Management Plan

This ESMP applies to the activities undertaken during the operation of the Project within the Likoni Shiploading Facility, both land and marine based.

Conceptual Closure Plan

The Conceptual Closure Plan describes the vision for post-mining land form and land uses of the mine site and Likoni Shiploading Facility and describes strategies and actions proposed to achieve the desired post-mining outcomes. Alignment of government, community and NGO stakeholders expectations on post-closure land uses are expected to be key to the success of planning for and implementation of site closure and decommissioning.

RESETTLEMENT ACTION PLANS

The development of Resettlement Action Plans (RAPs) is required as a consequence of the displacement that will result from land acquisition and easement rights. Base is committed to ensuring that its actions, carried out through the RAPs, do not result in the affected households being worse off as a result of resettlement. This is in accordance with IBP and is subscribed to by Base as a responsible developer.

Four RAPs have been prepared for management of resettlement of people living on land directly impacted by the Project. The four RAPs cover the following development areas:

- SML area
- Mukurumudzi Dam
- Access Road and Water Pipeline
- 132kV Transmission Line

Key issues specifically addressed within each RAP include:

- Alignment with previous RAPs
- Establishment of the institutional and legal framework and mechanisms for implementing involuntary resettlement
- Detailed socio-economic profile of Project Affected Persons (PAPs)
- Participation of affected households in resettlement planning
- Development of eligibility, evaluation and compensation criteria
- Implementation of the Project's grievance mechanism
- Implementation schedule, costs, monitoring and evaluation procedures



Resettlement Guiding Principles

The core principle of resettlement is that no one defined as Project-affected, should be worse off after resettlement.

In addition, Base has adopted the following sub-principles with respect to the resettlement process:

- **Resettlement must be avoided or minimised**
- **Genuine consultation and participation must take place**
- **A fair and equitable set of compensation options must be negotiated**
- **Resettlement must take place in accordance with legal requirements and IBP**
- **Vulnerable social groups must be specifically provided for**
- **Resettlement must be seen as an "upfront" Project cost**
- **Resettlement should be undertaken as a development that ensures that directly affected communities benefit**
- **An independent monitoring procedure must be established**
- **A grievance procedure must be implemented**

Participation of the affected individuals and community in the RAP process is integral to ensuring its success.



COMMUNITY DEVELOPMENT MANAGEMENT PLAN

Base's current community development initiatives have been based primarily on assisting local communities in supporting the following initiatives:

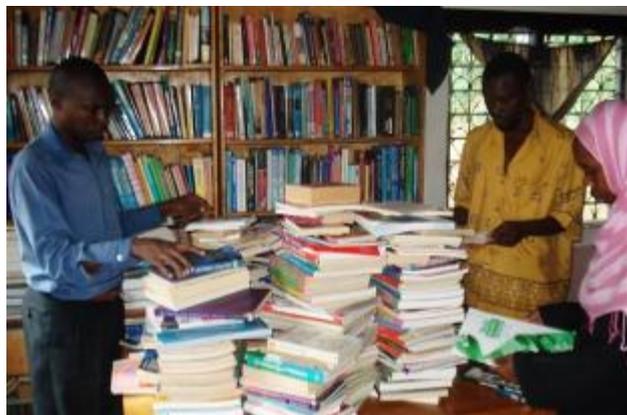
- Education
- Health
- Water supply and sanitation
- Roads
- Sport, arts and cultural events
- Transportation

These will remain amongst the leading priorities for inclusion in future, as well as:

- Agricultural extension programmes to enhance farm productivity and promote food security
- Enhance micro-credit opportunities to promote non-agricultural livelihoods
- Vocational training for induction into Base's employment or other organisations as the case may be
- Provision of other social infrastructure components such as:
 - Market structures to improve commercial potential of the agricultural sector
 - Religious structures
 - Social halls
- Support sustainable economic development activities

The Community Development Management Plan has been prepared as part of the Project's ESMS and will undergo a consultative review with local communities and stakeholders through the districts designated committees. This will allow them to prioritise the criteria and schedule development projects in accordance with community desires which will encourage ownership and sustainability.

Livestock owners gain access to areas of the mine site not affected by Project activities to graze their cattle (top right). Donated books delivered to Ukunda Library (middle right). Drilling and equipping a community water supply in Kiruku (bottom right).



LABOUR, RECRUITMENT AND INFLUX MANAGEMENT PLAN

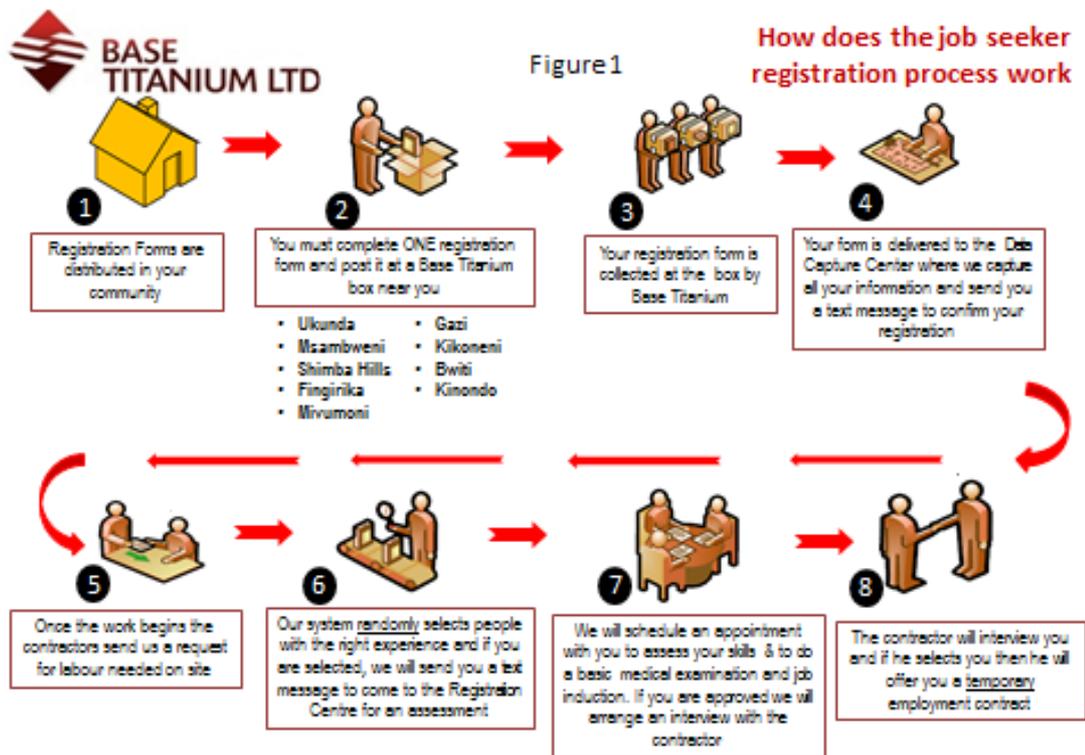
The implementation of the Project will have a number of potential impacts as a result of labour and recruitment activities. To ensure that negative impacts are mitigated and positive impacts enhanced and to assist in creating an environment that is healthy, safe, efficient, productive, harmonious and free of disruption and industrial disputes, Base has developed a Labour, Recruitment and Influx Management Plan.

This plan sets out a number of labour practices, procedures and processes which will be adhered for the Project, including compliance by all Contractors and Sub-contractors.

In addition to these practices and procedures, Base has developed a number of initiatives towards recruitment of local labour for the Project including the development of a Labour and Business Management Database. This database is designed to link Contractor requirements with resources available in the local community.

Base has developed a formalised recruitment process, as detailed below, which has been explained to communities.

- Labour practices, procedures and processes**
- Compliance with Base labour principles and practices.
 - The use of collective bargaining systems to negotiate employee contracts, when necessary.
 - Project specific induction programmes.
 - In-house human resource management system and procedures appropriate and adequate to Base standards.
 - Preferential employment of local labour and use of existing employees.
 - Implementation of on-the-job training.
 - The provision of accommodation in the construction camp.
 - The provision of transport for local labour.
 - Establishment of an on-site medical facility.
 - Provision of a Strike Procedure to employees.
 - Compliance with all the provisions of legislation and labour agreements in place.
 - Formalised demobilisation procedures.
 - Promotion of labour harmony.



SOCIAL MONITORING PROGRAMME

The social monitoring programme has been developed to ensure that Base complies with relevant legislation and IBP thus meeting its Project obligations. It has been established to ensure that social monitoring proceeds in a logical process and is based upon the data that has been generated for the Project.

The overall objectives of the Social Monitoring Programme and its implementation are to:

- Ensure regulatory requirements are met.
- Check that impacts do not exceed Project standards and other environmental and social standards described in the various ESIA and addenda reports.
- Verify predictions made in the Social Impact Assessment by obtaining real time measurements and observations.
- Verify that mitigation measures are effective and implemented in the manner described in the ESMPs and RAPs.
- Provide early warning of potential environmental and social impacts.
- Inform future operations and to contribute to continuous improvement in the management of environmental and social issues related to the Project.

How do we use the monitoring data?

- To provide early warning for site management, to adjust mitigation measures on a day-to-day basis to suit evolving conditions.
- To enable the Project to demonstrate that mitigation measures and procedures laid down in ESMPs are being followed and operations are being conducted within compliance limits.
- To provide formal assurance to Base and third parties, such as the Kenyan regulatory authorities, that the Project is compliant with regulations and agreed limits and that relevant mitigation / enhancement measures are being implemented.

What social aspects do we monitor?

- Socio-economic performance of impacted households.
- In-migration and population changes.
- Educational and health facility usage.
- Engagement of vulnerable groups in income generation / small businesses.
- Community grievances and complaints.
- Employment and human resources.
- Community health and safety e.g. presence of communicable diseases, traffic accidents.
- Supply chain e.g. origin of contractors and suppliers.
- Ecosystem services e.g. changes in natural resource availability.
- Community development schemes e.g. support to local entrepreneurs.

Children attending Kiruku Secondary School.



The following environmental monitoring programmes have been established:

- **Water Resources Monitoring Programme incorporating:**
 - **Surface Water Flow and Quality Monitoring**
 - **Groundwater Levels and Quality Monitoring**
 - **Marine Water Quality Monitoring**
 - **Wastewater and Stormwater Quality Monitoring**
- **Natural Ecology Monitoring Programme incorporating:**
 - **Vegetation Monitoring**
 - **Amphibian and Reptile Monitoring**
 - **Aquatic Macroinvertebrate Monitoring**
- **Environmental Radiation Monitoring Programme**
- **Meteorological and Air Quality Monitoring Programme**
- **Noise Monitoring Programme**
- **Waste Monitoring Programme**

Establishing environmental baseline data in the form of avifauna (below top), flow rating curves (below bottom) and installing a meteorological station at the Mine Site (bottom right).



ENVIRONMENTAL MONITORING PROGRAMME

The Environmental Monitoring Programme has been developed to ensure that Base complies with relevant legislation and IBP and meets its Project obligations.

A comprehensive Environmental Monitoring Programme covering a number of applicable environmental criteria has been developed by Base. The Environmental Monitoring Programme has been informed by Kenyan legislation and IBP guidelines on environmental monitoring requirements and recommendations for Projects.

The objectives of the Environmental Monitoring Programme are to:

- Establish baseline environmental conditions.
- Identify any impacts to the environment thus allowing early implementation of mitigation and remedial measures.

Where required, Base and its specialist environmental consultants will develop supporting documentation to demonstrate:

- Sample or data collection methods.
- Sample handling, storage and preservation.
- Sample or data documentation.
- Quality control.
- Data reliability (calibration of instruments, test equipment, and software and hardware sampling).
- Data storage and backup, and data protection.
- Interpretation and reporting of results.
- Verification of monitoring information by qualified and experienced external experts.



BIODIVERSITY CONSERVATION PROGRAMME

Base is committed to achieving a net positive biodiversity impact and locating Project facilities such that important habitats are protected and impacts to species of conservation interest are minimised.

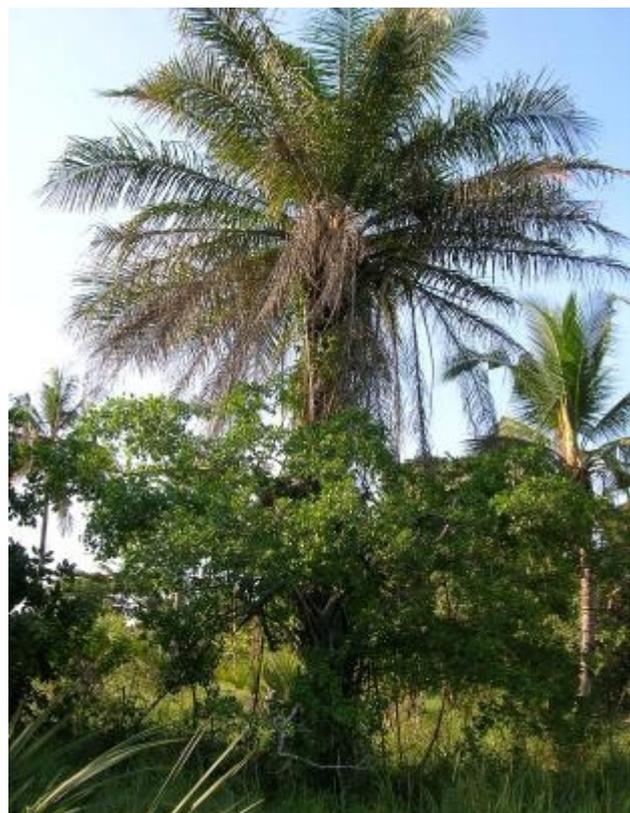
The Project is expected to have a number of potential impacts on biodiversity but will also create a number of opportunities for improving conservation outcomes in and around the Project. The Biodiversity Conservation Programme has been established to exploit these opportunities and includes a number of diverse initiatives and activities.

For example, baseline surveys and monitoring is being undertaken to identify species of conservation interest in the greater Project area and other areas around the region. Based on the results from these surveys, Base intends to develop a rare and threatened flora propagation research programme targeting species of conservation interest to establish techniques that may be suitable for use in revegetating Project impacted areas.

Base is also actively supporting the ongoing management of the coastal forest patches and exploring opportunities to support conservation initiatives in the region.

Objectives of the Biodiversity Conservation Programme

- **Contribute to the biodiversity knowledge base of the Kenyan south coast region.**
- **Conserve and protect existing areas of forest and high value habitat.**
- **Create new biodiversity conservation habitats in rehabilitated areas.**



Vegetation and florist sampling in the Special Mining Lease (SML) (below) to identification species of conservation concern or interest such as *Synsepalum subverticellata* (top right) and *Ficus faulknerae* on *Elaeis* (bottom right).



