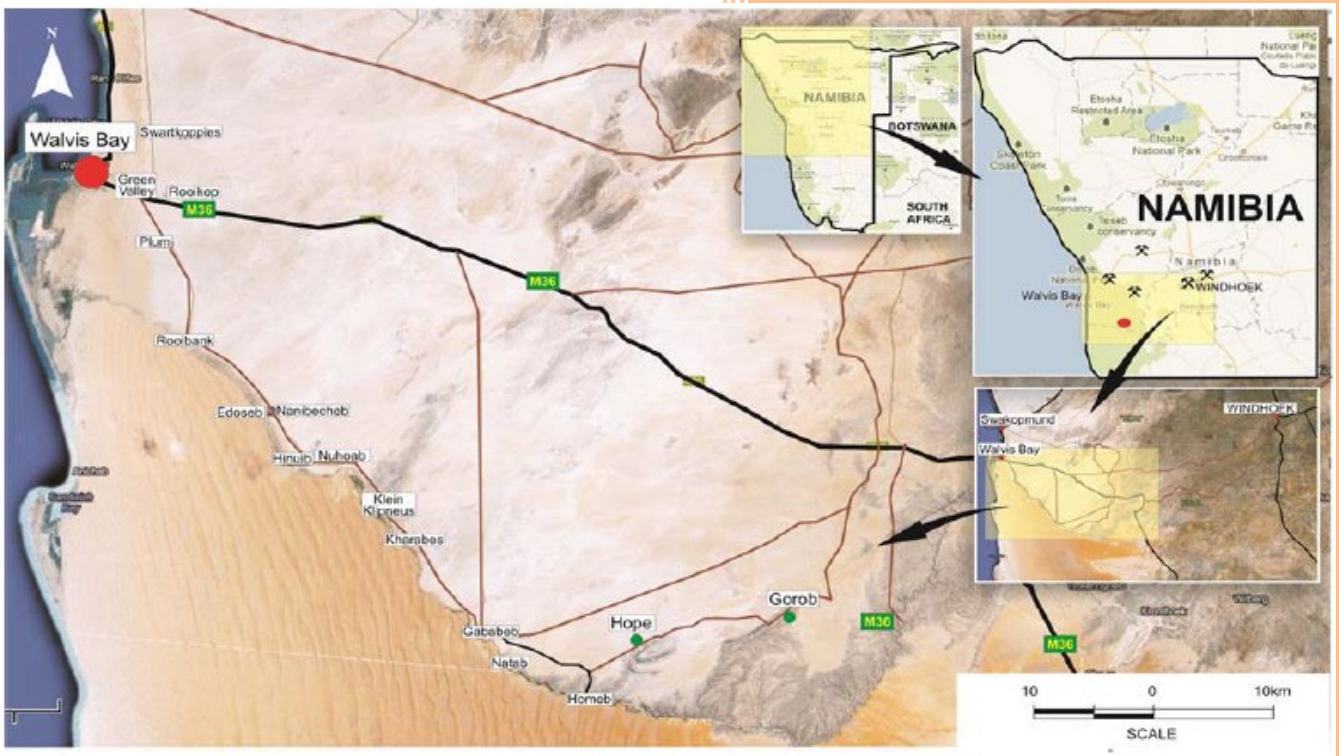
2024

# ENVIRONMENTAL MANAGEMENT PLAN

## Proposed Hope & Gorob Mining Project for ML 246 on EPL 5796 in the Namib Naukluft National Park, Erongo Region




ECT
ENVIRONAM CONSULTANTS TRADING

Hope and Gorob Mining (Pty) Ltd

# PROJECT DETAILS

| **Environmental Management Plan for the Proposed Hope & Gorob Mining Project for ML 246 on EPL 5796 in the Namib Naukluft National Park, Erongo Region** | |
|---|---|
| **PROPONENT** | Hope and Gorob Mining (Pty) Ltd |
| **REPORT DATE** | March 2024 |
| **CONSULTANT** | Environam Consultants Trading<br>P.O. Box 24213<br>Windhoek |
| **AUTHORS** | Colin P Namene<br>colin@environam.com<br><br>Mize Shippiki<br>spike@environam.com |

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## ABBREVIATIONS AND ACRONYMNS

| ABBREVIATION/ ACRONYM | DESCRIPTION |
|---|---|
| AMD | Acid Mine Drainage |
| AQG | Air Quality Guidelines |
| BAT | Best Available Technology |
| CO | Carbon Monoxide |
| DEA | Directorate of Environmental Affairs |
| EA | Environmental Assessment |
| ESIA | Environmental and Social Impact Assessment |
| EC | European Commission |
| ECO | Environmental Control Officer |
| EMP | Environmental Management Plan |
| EPL | Exclusive Prospecting Licence |
| FEL | Front End Loader |
| GIS | Geographic Information System |
| GN | Government Notice |
| GG | Government Gazette |

| ABBREVIATION/ ACRONYM | DESCRIPTION |
|---|---|
| HIV | Human Immunodeficiency Virus |
| IFC | International Financing Corporation |
| LOM | Life of mine |
| MAWLR | Ministry of Agriculture, Water and Land Reform |
| MEFT | Ministry of Environment, Forestry and Tourism |
| MME | Ministry of Mines and Energy |
| NAAQS | National Ambient Air Quality Standards |
| NHC | National Heritage Council |
| $NO_2$ | Nitrogen Dioxide |
| PPE | Personal Protective Equipment |
| PM | Particulate Matter |
| PPE | Personal Protective Equipment |
| RFC | Reference Concentrations |
| ROM | Run of Mine |
| SHE | Safety, Health and Environment |
| SME | Small and Medium Enterprises |
| $SO_2$ | Sulphur Dioxide |
| TLV | Threshold Limit Value |
| WHO | World Health Organization |
| WRD | Waste Rock Dump |

# 1 PROJECT OVERVIEW

## 1.1 Introduction

A copper-gold mine and processing facility will be built on-site at the Hope prospect, about 120 km from the nearest large town, Walvis Bay, as part of the Hope and Gorob Project. The main objective of the proposed facility is to produce a high-grade copper - gold pre-concentrate that is capable of bearing the cost of transportation to the Namib Lead and Zinc Mine (NLZM) flotation processing plant for final concentration and production of a copper – gold concentrate for export via Walvis Bay and subsequent sale.

A projected rate of approximately 600,000 tpa of open pit mining will be used to begin production at Hope and Gorob for a period of four years, at which point production will switch to underground and open pit production at a rate ranging from 100,000 to 600,000 tpa from open pit sources and 600,000 tpa from underground sources. Unless additional open pit resources are discovered during ongoing annual exploration, this elevated production schedule is projected to last from Year 4 until Year 9, after which the operation will revert to a 600 ktpa rate of production. Hope & Gorob already possess underground resources in excess of 12Mt, including 2.8Mt delineated at >2% Cu Eq. Final concentration of the pre-concentrate will take place at the Namib Lead & Zinc Mine, which will be acquired by Bezant once due diligence has been completed.

The purchase of NLZM by Bezant has two objectives, namely to provide an operating float plant that can process Cu pre-concentrate while simultaneously reducing the lead-time to production by 18 months to 2 years. Secondly, to provide ownership of a marginal lead - zinc resource that Bezant can upgrade through additional exploration and various other initiatives identified by Bezant, and where the mine can be reinstated as soon as the lead and zinc spot prices increase sufficiently to make the mine viable.

This will also have multiple benefits for the environment (limited water required, smaller footprint at Hope and Gorob), for the community (new employment opportunities at Hope and Gorob, reopening of NLZM with associated employment, establishment of a fish farm and agribusiness to support the Topnaar community) and, in addition to the financial benefits accruing to the Government through a range of taxes and royalties.

The proponent appointed Environam Consultants Trading (ECT) to undertake an Environmental and Social Impact Assessment and to apply for an Environmental Clearance Certificate (ECC) form the Office of the Environmental Commissioner on its behalf.

The process will be undertaken in terms of the gazetted Namibian Government Notice No. 30 Environmental Impact Assessment Regulations (herein referred to as EIA Regulations) of the Environmental Management Act (No 7 of 2007) (herein referred to as the EMA). The ESIA process will investigate if there are any potential significant bio-physical and socio-economic impacts associated with the proposed development and related infrastructure and services.

The ESIA process would also provide an opportunity for the public and key stakeholders to provide comments and participate in the process. It will also serve the purpose of informing the proponent’s decision-making, and that of MEFT.

This document details the Environmental Management Plan (EMP) or the management actions needed to avoid or lessen identified impacts to acceptable standards as informed by the ESIA.

## 1.2 Project Location

The Hope and Gorob mineral deposits and EPL 5796 are located in the Namib Desert of Namibia, relatively close to the Gobabeb Namib Research Institute (i.e., Gobabeb), approximately 120 km south-east of Walvis Bay, in the Erongo Region. It is situated within the Namib Naukluft National Park, north of the Kuiseb River at coordinates 23.559705°S, 15.341892°E. The southern boundary of the Hope Project is near the Namib Sand Sea, a vast expanse of aeolian sand that forms part of the ancient Namib Desert. Refer to Figure 1 below for the locality map of the Hope and Gorob deposits.

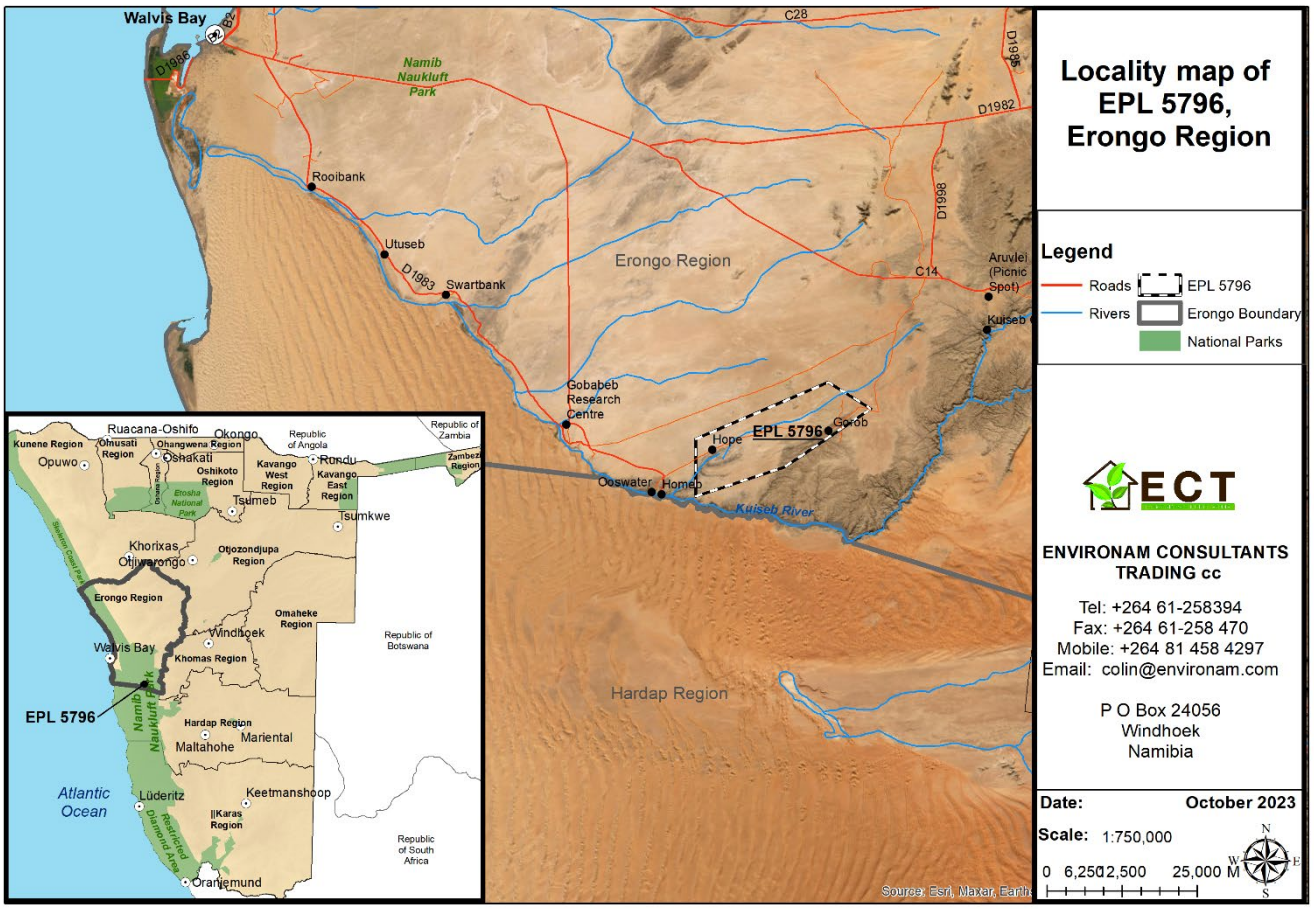


Figure 1: Locality Map of Hope & Gorob Deposits

## 1.3 Project Components

The project activities covered by this EMP consist of construction and operation of the following main components. These are presented in below (**Figure 2**):

- Mining operations – comprising of open pit and underground mining by drill and blasting, ore stockpiles, waste rock dump area, transportation infrastructure.

- Processing operations – comprising of the crusher, milling, ore conditioning facilities of the processing plant and associated infrastructure, workshops and storage facilities.
- Transportation of pre-concentrate ore from the Hope and Gorob Mining Operation to the NLZM processing facility.
- Product transport – copper concentrate from NLZM to Walvis Bay harbour for export.

The project has a projected life of mine of minimum 20 years during which mining will take a two phased approach:

A projected rate of approximately 600,000 tpa of open pit mining will be used to begin production at Hope and Gorob for a period of four years, at which point production will switch to underground and open pit production at a rate ranging from 100,000 to 600,000 tpa from open pit sources and 600,000 tpa from underground sources. Unless additional open pit resources are discovered during ongoing annual exploration, this elevated production schedule is projected to last from Year 4 until Year 9, after which the operation will revert to a 600 ktpa rate of production. Hope & Gorob already possess underground resources in excess of 12Mt, including 2.8Mt delineated at >2% Cu Eq.

Final concentration of the pre-concentrate will take place at the Namib Lead & Zinc Mine, which will be acquired by Bezant once due diligence has been completed.

The purchase of NLZM by Bezant has two objectives, namely to provide an operating float plant that can process Cu pre-concentrate while simultaneously reducing the lead-time to production by 18 months to 2 years. Secondly, to provide ownership of a marginal lead - zinc resource that Bezant can upgrade through additional exploration and various other initiatives identified by Bezant, and where the mine can be reinstated as soon as the lead and zinc spot prices increase sufficiently to make the mine viable.

This will also have multiple benefits for the environment (limited water required, smaller footprint at Hope and Gorob), for the community (new employment opportunities at Hope and Gorob, reopening of NLZM with associated employment, establishment of a fish farm and agribusiness to support the Topnaar community) and, in addition to the financial benefits accruing to the Government through a range of taxes and royalties (Bezant, 2023). See Figure 2 and 3 for proposed Hope and Gorob mine layouts.

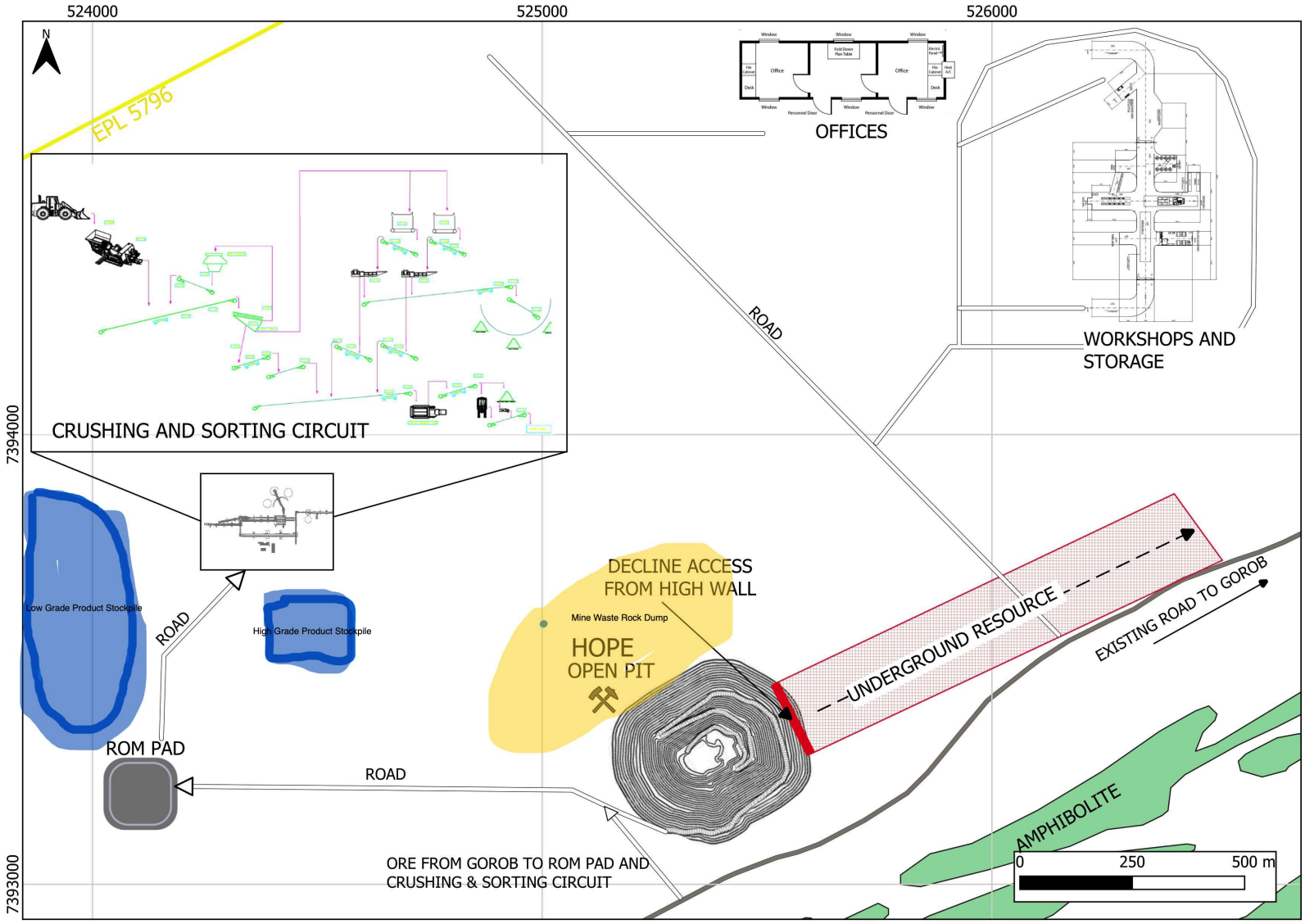


Figure 2: Layout of the Hope Mine

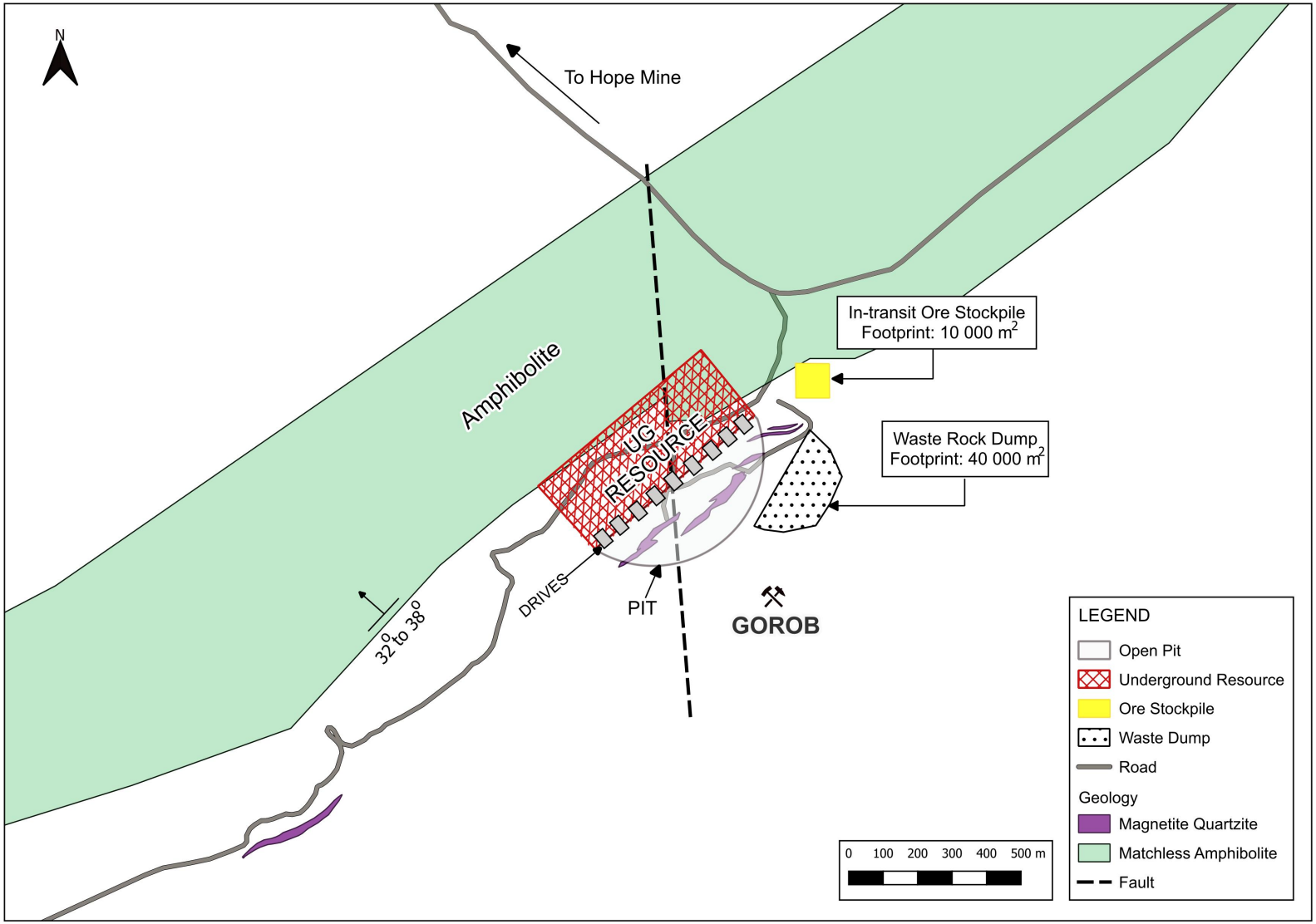


Figure 3: Layout of the Gorob Mine

## 1.4 Public and Stakeholder Consultation

### 1.4.1 Objectives

Community consultation and stakeholder engagement was undertaken as part of the Environmental Assessment (EA) process and are detailed in Annexure D of the ESIA report of the Hope and Gorob mining project.

In order to build strong, constructive, and responsive relationships, stakeholder engagement (i.e., public consultation) is an essential component of the EA process. The management of social and environmental impacts of a project depends on this. For this reason, a continuous process of public participation must be maintained to ensure community and stakeholder involvement. The objectives of this consultation are:

- In order to facilitate two-way engagement with stakeholders, accurate and timely information on the project must be provided;
- Identification and resolution of stakeholder concerns;
- Identify areas within the community where the project proponent can make a positive contribution that will benefit the community.

### 1.4.2 Stakeholders

As part of the Public Consultation process, stakeholders likely to be negatively or positively impacted by the project were identified. The following stakeholders in Table 1 are relevant to the project:

**Table 1:** Stakeholders related to this project

| LEVEL | DESCRIPTION |
|---|---|
| NATIONAL | • Ministry of Environment, Forestry and Tourism<br>• Ministry of Health and Social Services Ministry of Mines and Energy<br>• Ministry of Agriculture, Water and Land Reform<br>• Ministry of Urban and Rural Development<br>• Ministry of Works and Transport<br>• Roads Authority<br>• NamWater<br>• NamPower |

| LEVEL | DESCRIPTION |
|---|---|
| REGIONAL | • Erongo Regional Council<br>• ERONGORED |
| LOCAL | • Walvis Bay Rural Constituency Office<br>• Walvis Bay Municipality<br>• Topnaar Traditional Authority<br>• Gobabeb Namib Research Institute |

### 1.4.3 On-going Engagement

Identified stakeholders will continue to be actively engaged in the consultation and engagement process as necessary. Included in this involvement is:

- Developing a Stakeholder Engagement Plan, which allows all stakeholders to participate effectively;
- An Environmental and Social Grievance Mechanism for receiving and facilitating affected parties' concerns and grievances about the proponent's environmental and social performance, and
- Annual reports to affected communities regarding:
  - ✓ Project implementation progress,
  - ✓ Action plans on issues that could possibly impact the communities or pose a risk
  - ✓ Concerns identified by communities during the consultation process or grievance mechanism.

## 1.5 Environmental Policy

A sound environmental and social performance plan is to be developed for Hope and Gorob Mining based on the criteria provided in this EMP. The proponent will be required to comply with all applicable laws and regulations regarding environmental and social assessment and management.

# 2 ENVIRONMENTAL MANAGEMENT PLAN

This EMP was developed for Hope and Gorob Mining (Pty) Ltd to manage the potential impacts associated with the construction, operation, and closure (mine closure) of the mine. Mitigation measures are based on the assessments and findings of the ESIA, and the ESIA report should be read in context with the mitigation measures. EMPs are working documents, so changes may be made regarding future extensions and Best Available Technologies.

## 2.1 Environmental management objectives

By converting mitigation measures into actions and monitoring, auditing, reviewing and corrective action, the EMP ensures conformity with the overall goals and objectives. The following objectives are outlined:

- Maintain compliance with the conditions of the Environmental Clearance Certificate issued by the Office of the Environmental Commissioner;
- Advise on practical measures for preventing, minimising, mitigating, or rehabilitating adverse impacts;
- Protect biophysical and social aspects of the environment;
- Ensure worker and public safety; protect human health;
- Develop a plan for monitoring and managing project implementation in an environmentally sustainable manner.

## 2.2 Roles and responsibilities

In order to ensure sound environmental management during each phase, multiple stakeholders must be engaged in the implementation of this EMP.

### 2.2.1 General Manager and Construction / Project Manager

The General manager and construction/project manager during the construction and operation phase will be responsible for the following:

- Ensure that responsibilities are executed in compliance with relevant legislation and the EMP.
- Ensuring that the necessary environmental authorizations and permits have been obtained.
- Maintain general communications with stakeholders and authorities to inform them of planned activities where relevant.
- Report significant environmental incidents or emergencies to the relevant local authority.

- Oversee and initiate strategies to improve the measures of and implementation of the EMP and environmental policy of the mine.

### 2.2.2 Environmental Team

The Environmental Team will consist of a Safety, Health and Environmental Manager (SHE), SHE Officers and a Community Liaison Officer. The team will be responsible for the following:

- Review of EMP during detailed design to ensure that the design specifications recommended in the EMP are incorporated.
- Undertake induction training for all personnel to ensure that the environmental values, potential impacts, management measures and emergency responses are understood and implemented.
- Undertake weekly inspections to ensure on-site implementation and to check the effectiveness of the prescribed mitigation measures.
- Undertake or coordinate monitoring activities such as water or air quality data collection.
- Investigate environmental incidents and report to the mine manager, the corrective actions taken and the results of ongoing monitoring activities.
- Bi-annual internal audits of EMP implementation.
- Annual internal review and update of the EMP.
- Liaison with stakeholders and authorities.

External consultants will also form part of the environmental team.

### 2.2.3 Site Supervisors

The site supervisors will be responsible for the following:

- Ensure that the mitigation measures detailed in the EMP are implemented correctly and are effective and appropriate for the site and activities.
- Review and sign off on area specific plans and drawings prior to construction or implementation.
- Conduct daily inspections of activities and mitigation measures with corrective actions taken and recorded where applicable.
- Report all environmental incidents to the Construction/Project Manager and Environmental Team.
- Hold weekly meetings with personnel to discuss the current project activities and the health, safety and environmental issues associated with these activities.

### 2.2.4 Project Personnel

All personnel will have a general duty of taking any reasonable and practical measures to ensure that no harm is caused to the environment. This will include the following:

- Induction presentations will be given to all project personnel on the importance and implications of the EMP. Presentations should be given in the employee's preferred language, whenever possible. Training should include at a minimum:
  - Explanation of the importance of complying with the EMP.
  - Discussion of the potential environmental impacts of construction activities.
  - The benefits of improved personal performance.
  - Employees' roles and responsibilities, including emergency preparedness.
  - Explanation of the mitigation measures that must be implemented when carrying out their activities.
  - Explanation of the specifics of this EMP and its specification (no-go areas, etc.)
  - Explanation of the management structure of individuals responsible for matters pertaining to the EMP.
  - Health and Safety Training
- Pre-start checks will be performed by personnel in charge of vehicles, machinery, and equipment to ensure they are in good working condition, i.e., there are no signs of oil or other leaks, and emergency equipment, such as spill kits and fire extinguishers, is available. Daily pre-start checks will be recorded on a checklist in the vehicle.

## 2.3 Environmental Legislation and Standards

### 2.3.1 Legislation

Summarized below (**Table 2**) are the activities associated with the construction and operation of the mine that have specific requirements in terms of national legislation (such as permits).

**Table 2:** Activities Requiring Permits in Terms of National Legislation

| THEME | LEGISLATION | REQUIREMENT |
|---|---|---|
| WATER | Water Resources Management Act 11 of 2013 | The following licences are required in terms of the Water Resources Management Act:<br>• Licence to abstract and use water;<br>• Groundwater disposal licence;<br>• Borehole licence. |
| LABOUR | Labour Act 11 Of 2007 | • Regulations relating to the health and safety of employees at work are contained in GN 156/1997 (GG 1617). Must be complied with on this project. |
| NATURE CONSERVATION | Forestry Act No 27 Of 2004 | • Provision for the protection of various plant species.<br>• Some species that occur in the area are protected under the Forestry Act and a permit is therefore required to remove the species.<br>• The forms can be obtained from the permit office at the Ministry of Environment, Forestry and Tourism, Windhoek. A period of three months should be allowed for obtaining this permit. Species and numbers/quantities involved will need to be specified. |
| | Nature Conservation Ordinance 4 of 1975 | • Permit needed for the removal or destruction of protected species such as *Acanthosicyos horridus and Acacia erioloba*. |
| HERITAGE | National Heritage Act No 27 Of 2004 | • No archaeological/heritage site or cultural remains may be removed, damaged, altered or excavated.<br>• Section 48 sets out the procedure for application and granting of **permits,** such as the permit required in the event of damage to a protected site occurring as an inevitable result of development. Section 51 (3) sets out the requirements for impact assessment.<br>• Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. |
| EXPLOSIVES AND | Explosives Act No 26 Of 1956 | A licensed inspector is required to visit the site to assess its safety and to issue a permit. |

| THEME | LEGISLATION | REQUIREMENT |
|---|---|---|
| PETROLEUM | Petroleum Products And Energy Act, No 13 Of 1990 | Storage of petroleum products<br>Proponent needs to apply at MME for a consumer installation certificate. |

### 2.3.2 Standards and Guidelines

*I. Air Quality Standards*

No ambient air standards are included in Namibia's Atmospheric Pollution Prevention Ordinance (No. 11 of 1976). When local criteria are not available or are in development, international criteria are typically used. See **Table 3** below.

**Table 3:** International assessment criteria for pollutants (Airshed Professionals, 2023)

| POLLUTANT | AVERAGING PERIOD | WHO GUIDELINE VALUE (µG/M³) | EC DIRECTIVE LIMITS (µG/M³) | US NAAQS (µG/M³) | SOUTH AFRICA NAAQS (µG/M³) |
|---|---|---|---|---|---|
| SULPHUR DIOXIDE ($SO_2$) | 1-year | - | 20 | - | 50 |
| | 24-hour | 125 (IT-1)<br>50 (IT-2)<br>20 (guideline) | 125 | - | 125 |
| | 1-hour | - | 350 | 196 | 350 |
| | 10-minute | 500 (guideline) | - | - | 500 |
| NITROGEN DIOXIDE ($NO_2$) | 1-year | 40 (guideline) | 40 | 100 | 40 |
| | 1-hour | 200 (guideline) | 200 | 188 | 200 |

| POLLUTANT | AVERAGING PERIOD | WHO GUIDELINE VALUE (µG/M³) | EC DIRECTIVE LIMITS (µG/M³) | US NAAQS (µG/M³) | SOUTH AFRICA NAAQS (µG/M³) |
|---|---|---|---|---|---|
| PARTICULATE MATTER (PM10) | 1-year | 70 (IT-1)<br>50 (IT-2)<br>30 (IT-3) | 20 | - | 50<br>40 |
| | 24-hour | 20 (guideline)<br>150 (IT-1)<br>100 (IT-2)<br>75 (IT-3)<br>50 (guideline) | 50 | 150 | 120<br>75 |
| PARTICULATE MATTER (PM2.5) | 1-year | 35 (IT-1)<br>25 (IT-2)<br>15 (IT-3)<br>10 (guideline) | - | 15 | 25<br>20<br>15 |
| | 24-hour | 75 (IT-1)<br>50 (IT-2)<br>37.5 (IT-3)<br>25 (guideline) | - | 35 | 65<br>40<br>25 (s) |

### *II. Health Screening Criteria*

A proposed set of evaluation criteria derived from various international criteria is provided for health risk assessment in **Table 4.**

**Table 4:** Proposed Air Quality Objectives for the Project (Airshed Professionals, 2023)

| Pollutant | Averaging Period | Criteria | Reference |
|---|---|---|---|
| $NO_2$ | 1-hour average (µg/m³) | 200[(a)] | AQG & EC & SA NAAQS |
| | 24-hour average (µg/m³) | 120[(b)] | WHO IT1 |
| | Annual average (µg/m³) | 40 | WHO IT1 & EC & SA NAAQS |
| $SO_2$ | 1-hour average (µg/m³) | 350[(a)] | EC Limit & SA NAAQS (no WHO guideline) |
| | 24-hour average (µg/m³) | 50[(b)] | WHO IT2 (seen as a per 40% of the SA and EC limits) |
| | Annual average (µg/m³) | 50 | SA NAAQS (no WHO AQ level) |
| | 24-hour average (µg/m³) | 75[(b)] | WHO IT3 & SA NAAQS (as per SEMP AQMP) |

| Pollutant | Averaging Period | Criteria | Reference |
|---|---|---|---|
| Particulate matter ($PM_{10}$) | Annual average (µg/m³) | 40 | SA NAAQS (as per SEMP AQMP) |
| Particulate matter ($PM_{2.5}$) | 24-hour average (µg/m³) | 37.5[(b)] | WHO IT3 (as per SEMP AQMP) |
| | Annual average (µg/m³) | 15 | WHO IT3 & SA NAAQS (as per SEMP AQMP) |
| Dustfall | 30-day average (mg/m2/day) | 600[(c)] | SA NDCR & Botswana residential limit |
| | | 1 200[(c)] | SA NDCR & Botswana industrial limit |
| | | 2 400 | Botswana Alert Threshold |

**Notes:**

(a) Not to be exceeded more than 88 times per calendar year (SA Standard).
(b) Not to be exceeded more than 4 times per calendar year (SA Standard).
(c) Not to be exceeded more than 3 times per year or 2 consecutive months

### *III. Water Quality Guidelines*

The Water Quality Guidelines of Namibia (MAWLR, 2023) are applicable for drinking water, livestock watering and discharge of waste water and are appended as APPENDIX A of the EMP.

## 2.4 Monitoring, Auditing and Review

It is essential to monitor the environment to determine if the recommended management strategies are effective. Monitored outcomes should be measured against benchmarks established during the ESIA initiation (such as groundwater quality), as recommended by IFC (2012). If corrective action is needed, it should be documented to include not only the corrections made, but also preventive measures to prevent future recurrences. It is important to follow up on this in all future monitoring efforts to ensure the effectiveness of the program. In the following sections, monitoring actions required during normal operation of the mine are outlined in the tables.

In addition to keeping record of monitoring actions and outcomes, the implementation of this EMP will be internally audited on a quarterly basis after which the document will be updated or revised on a bi-annual basis (as required) to address the issues and mitigation measures identified during the audit. During this audit, the appropriateness of the EMP to current activities, monitoring studies and legislation will be reviewed. This will enhance the relevance of the document and verify compliance and progress towards the desired outcomes.

The environmental manager will provide monthly updates to the construction/project manager on routine monitoring and auditing results.

# 3 IMPACT MITIGATION AND RESOURCE MANAGEMENT

## 3.1 Structure of the EMP

The EMP was developed based on the findings and recommendations of the individual specialist studies included in the Environmental and Social Impact Assessment (ESIA) report. For each of the potential impacts associated with the implementation of the proposed project, the specialist studies assessed the vulnerability of the specific features of their specialist field. In order to reduce the risks associated with the identified impacts, management measures/strategies have been proposed.

For each of the environmental elements listed in this report, the following are described:

- Management objectives – main outcomes to be achieved by the prescribed management strategies;
- Management strategies – in table format, including for each aspect:
  - The project phase - i.e., planning and design phase, construction phase, operation phase, monitoring during normal operations and decommissioning or mine closure;
  - The project component – i.e., the specific component of the mine site e.g., mine pit or waste rock dump;
  - Mitigation measures – i.e., individual tasks or actions that need to be undertaken at the mine component during the specific phase.
- Management strategies for decommissioning, rehabilitation and final mine closure.

## 3.2 Land and Soils

### 3.2.1 Objectives

- Disturbed land areas and slopes are progressively restored, as close as practically possible, to pre-mining conditions;
- Reasonable and practical measures are taken to minimise short- and long-term soil erosion and the adverse effects of sediment transport.

### 3.2.2 Management strategies

Land clearing for mining and construction will inevitably involve earthworks, increasing erosion risks. It is recommended that the following measures be adopted during the project's different phases to minimize erosion impacts:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| PLANNING AND DESIGN PHASE | | |
| TENDER PROCESS | All components | A topsoil management plan should be included in the tender documents. |
| TOPSOIL | All components | The top 200-300mm of topsoil should be saved for use in rehabilitation. The soil should be stripped and stockpiled not exceeding 1m in height. |
| | Topsoil stockpiles | If not used within 1 year, the stockpile should be levelled and contoured and natural grass allowed to grow over the area. This will keep the soil biologically active. |
| VEGETATION CLEARING | All components | Vegetation clearing should be restricted to areas essential for the envisaged development to minimise the length of time soil is exposed. |
| | Borrow pits | The ECO (Environmental Control Officer) shall visit all proposed areas for clearing and indicate where and how material may be removed, before works commence. If material is only available around significant mature trees, a radius of soil of at least 3m shall be kept around the base of the trunk, and it shall be endeavoured not to expose the roots of such trees. |
| AESTHETICS AND EROSION | All disturbed components | Areas temporarily disturbed during construction that will not be required for operations (e.g. lay down areas) will be identified, graded and rehabilitated to improve aesthetics and reduce erosion. |
| STORM WATER AND RUNOFF | Disturbed components | Storm water and runoff should be diverted away from active mining and disturbed areas. |
| MONITORING ACTIONS DURING NORMAL OPERATIONS | | |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| MONITORING | Disturbed components | Cleared areas and removed soil shall be left at as gentle a slope angle as possible, to minimise the risk of erosion and to enable revegetation. |
| MONITORING | Disturbed components | Disturbed areas around construction sites should be rehabilitated promptly and not left un-rehabilitated for long periods at end. |
| | | Areas disturbed by mining activities and infrastructure are to be rehabilitated to a stable landform with self-sustaining vegetation cover. |
| CONTINUOUS REHABILITATION | | |
| MONITORING | Eroded areas | An erosion monitoring procedure should be developed whereby mined areas and other potential erosion sites are visually monitored at the end of the wet season every year to identify erosion gullies. Areas where erosion was remediated previously should also be monitored. |

## 3.3 Surface and Groundwater

### 3.3.1 Objectives

- Spills are contained and remediated with no adverse impacts to surface or ground water resources.
- Acid mine drainage is monitored and controlled.
- Minimise impacts to groundwater quality and flow from the project.
- Maintain community water supply throughout the life of the project.

### 3.3.2 Management strategies

The developer is aware of the critical importance of local people, as well as its employees, having access to a source of clean and treated drinking water and on a sustainable basis. The intention is to enable such a supply to be delivered or made available either by pipeline, by tanker delivery to a standpipe and local storage tank or by such other means as are agreed and practical as well as economically feasible. Such a potable water supply will be incorporated into the wider design of the core mine infrastructure and be located consistent with the source(s) of natural groundwater to be

treated. It also must consider the storage facility and location, with reference to other possible uses of the untreated stored supply (e.g. for fish farming and agrohorticulture). The developer is committed to consultation with interested parties before delivery of the final design and operating system.

Proposed actions for managing potential impacts to surface and groundwater quality and flow, monitoring and corrective actions are provided below:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| **PLANNING AND DESIGN PHASE** | | |
| **TENDER PROCESS** | All project components | During the construction phase, an Emergency Response Plan will be prepared to address the response during an emergency situation as well as the clean-up procedures afterward. The plan will include roles in disaster preparedness and response such as training, notification, evacuation and first aid. |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| **SURFACE AND GROUNDWATER** | General | • No runoff should reach the embankment of the WRD and ROM stockpile area.<br>• Drainage lines indicate a general slope in a southwestern direction towards the Kuiseb River. Runoff is to be diverted away from the stockpiles towards the southwest following the natural drainage.<br>• It is advised to closely monitor and divert storm water drainage using berms and peripheral trenches to collect seepage water.<br>• At mine closure, stock piles need to be graded to encourage drainage and lessen infiltration. The surface has to be covered with soil and vegetated.<br>• Prevent surface runoff water from entering the pit and allow it to exit it.<br>• Limestone or marble, which are acid neutralizing materials, could be sourced and added to the mine pit. |
| **STORM WATER** | ROM stockpile | Berms and peripheral trenches should be used to collect storm water drainage with seepage water and close monitoring is recommended. |
| **WASTE ROCK DUMP** | Waste rock dump | The addition of pulverized limestone (marble) to the stockpile to raise the pH in the long term is recommended.<br><br>Install monitoring boreholes around the waste rock dump site to establish current baseline hydrogeologic and hydrochemistry and for use as ongoing groundwater quality monitoring points. |
| **WASTE WATER AT MINE SITE** | Water treatment facility | Waste water is not to be disposed in the natural environment unless effluent quality guidelines are met. A Waste Water Discharge Permit will be required from the MAWLR for such disposal. |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| LOCAL WATER SUPPLY | | Baseline water samples should be collected from boreholes in the area, in order to represent baseline conditions. As such, they can be important in forecasting potential environmental impacts, and can become measurements against which future changes are compared.<br><br>Monitoring points and parameters are recommended for providing an early warning system. |
| GROUNDWATER INFLOW | Mine Pit | • Monitoring of groundwater levels surrounding the pit from the beginning of operations is recommended for an understanding of the expected seasonal fluctuations and recharge.<br>• Monitoring of water levels and pumping from the pit when inflow of water to the pit is encountered with depth.<br>• The chemistry of the groundwater inflow to the pit to be monitored and recorded during the operation phase so that strategies for neutralisation of acid water can be made. The mine pit could be dosed with acid neutralisation material such as marble or limestone. |

## 3.4 Biodiversity

### 3.4.1 Objectives

- ❖ Removal, modification and fragmentation of habitats are minimized.
- ❖ Fauna and flora are managed at the mine site and the risks to flora and fauna outside the immediate mine area are minimized.
- ❖ Indirect impacts from construction and operation activities are minimized.
- ❖ Progressive restoration to restore ecosystem functions where possible.

### 3.4.2 Management strategies

The mitigation measures for reducing the loss of flora and fauna habitat during the various phases of the project include:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| **PLANNING AND DESIGN PHASE** | | |
| **REMOVAL OF LARGE TREES** | Entire mine site | • Unnecessary land clearing should be prevented. Trees to be left in place, undisturbed, should be clearly marked (such as with hazard tape) so that they are not accidentally destroyed.<br>• Where possible, removal of taller and rarer species should be avoided. Careful landscaping during the plant layout process should aim to retain large trees wherever possible in the mine plant, administration and parking areas.<br>• Continuous planting of trees. |
| **LAPPET-FACED VULTURE NESTING SITES – IN THE HOPE/GOROB AREAS*** | Nesting sites | • Disturbances around these nesting sites should be avoided, especially between May-July during peak breeding season.<br>• The developer to provide awareness to all employees as a part of their induction training programme of the need to avoid unnecessary disturbance to vulture nesting sites and to report to the Mine Manager any risk or evidence of disruption, especially during the breeding season.<br>• The proponent must identify and address to the extent possible any habitat disturbance (including nesting sites) of the lappet-faced vulture population. This will include sensitive deployment of critical and noise-generating equipment and considering optimal routes for access roads and related noise, and sources of disturbance by movement - whether continuous or occasional.<br>• The proponent will implement offset actions including the raising and deployment of supplementary Acacias for possible future adoption by vultures as new nest sites opportunities. |
| **BROWN HYENA LATRINES – ALL AREAS THROUGHOUT THE HOPE/GOROB PROJECT AREA** | Latrine areas | • Latrine areas should be avoided so as not to affect their social/territorial behaviour. |
| **CONSTRUCTION PHASE** | | |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| LAND CLEARING | Entire mine site | • The operators of all earth working machines and bulldozers should be thoroughly instructed about where land clearing should happen and where it should not.<br>• Wherever possible, the mine should plant and encourage indigenous trees to replace the ones lost in the land clearing, and to enhance the working environment with pleasant surroundings. |
| FAUNAL SAFETY | Reservoirs | All reservoirs should be covered with a roof of solid sheeting. If the reservoir must be left open, steps down the inside, or a log left floating on the surface but attached to the side, will assist any bird or other animal get itself out of the water. |
| ILLEGAL HARVESTING/ POACHING | All employees | Illegal harvesting and poaching is prohibited. Thorough security around the mine site and construction activities is required, and the mine should promote its green principles to encourage people to take pride in their surrounding natural heritage, rather than to illegally exploit it. |
| OPERATIONS | | |
| REHABILITATION | Disturbed areas | Progressive rehabilitation in the form of backfilling of overburden, topsoil management and revegetation activities should be conducted as the mine progresses. |
| *The mine infrastructure will not impinge on sensitive and active nesting sites, this is underpinned by the ridges and gullies of the natural terrain blocking sightlines and noise (Cunningham, 2024). | | |

## 3.5 Air Quality

### 3.5.1 Objectives

- ❖ Minimize the impacts of particulates and gaseous emissions on the surrounding environment.
- ❖ Reduce dust and gaseous emissions within specific target ranges, by employing appropriate suppression strategies.
- ❖ Control and reduce sulphur dioxide emissions.

### 3.5.2 Management strategies

Proposed actions for managing potential impacts to air quality and associated facilities with monitoring and corrective actions are provided below:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| PLANNING AND DESIGN PHASE | | |
| INSTALLATION/ PRE-CONSTRUCTION REQUIREMENTS | • All roads<br>• Crusher<br>• Waste Rock Dump | • All haul roads as well as the access road should be treated with chemical surfactants to minimize dust emissions.<br>• The temporary roads should be sprayed with water in combination with a chemical stabilizer.<br>• The crusher should be fitted with an extraction system as per the design specifications.<br>• Water sprays should be applied at all material handling operations should these result in visual dust plumes.<br>• The vehicle fleet should comprise of new technology engines (tier-2 or tier-3 compliant engines) to ensure low combustion emissions.<br>• Keep active areas small and use water sprays to reduce the potential for wind erosion to minimise windblown dust from the waste rock dump and ore stockpile.<br>• Reshape all disturbed areas to their natural contours, cover disturbed areas with previously collected topsoil and replant native species, and rock cladding with larger pieces of waste rock.<br>• Materials transfer points should be done using water sprays at the tip points. Regular clean-up at loading points is recommended.<br>• Vehicles should be maintained and serviced regularly and vehicle idling times should be limited to minimize NO2 emissions and impacts.<br>• Low sulphur fuels should be used for the mine vehicle fleet and equipment. |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| $SO_2$ CONCENTRATIONS | All mining components | • Sampling of ambient $SO_2$ emissions before construction as well as for the duration of operational phase. Results are to be analysed by an external consultant and if found necessary to map high risk areas where personnel are required to wear safety gear. |
| CONSTRUCTION PHASE | | |
| $PM_{10}$ CONCENTRATIONS | • Processing plant<br>• All roads | • Measures must be taken to reduce emissions from unpaved roads: (a) measures aimed at reducing the extent of unpaved roads, e.g. paving, (b) traffic control measures aimed at reducing the entrainment of material by restricting traffic volumes and reducing vehicle speeds, and (c) measures aimed at binding the surface material or enhancing moisture retention, such as wet suppression and chemical stabilization<br>• Water sprays on roads, material handling points and cleared areas.<br>• Speed limits need to be adhered to: On the mine site (40km/h) and access road (60km/h). |
| OPERATIONS | | |
| $PM_{10}$ AND $_{2.5}$ CONCENTRATIONS | • Processing plant<br>• Opencast pit<br>• All roads | • Water sprays and/or chemical suppressants should be used on:<br>  • the roads<br>  • the crusher and screen, and<br>  • materials handling points. |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| DUST SUPPRESSION | Crushing and screening | • Dust extraction (hooding with cyclone) (65% control)<br>• Water sprays to keep ore wet (50% control)<br>• Wind screens on the windward side of the crusher (30% control)<br>• Dust deposition rates less than 1200 mg/m$^2$.day at downwind dust bucket.<br>• Maintenance of water spray system to maximise control efficiency.<br>• Addition of chemical surfactants to water sprays to lower water surface tension and increase binding properties.<br>• Spillage clean up, at least once a week<br>• Water spraying road surface in loading area. |
| MATERIALS HANDLING | • Loading to trucks in the pit<br>• Unloading at ROM pad<br>• FEL loading at ROM pad<br>• FEL unloading at the crusher | • Water-sprays on dry material at off-loading points.<br>• Wetting of material on ROM pad (if practical)<br>• Ensuring tip distance is minimal i.e. drop height into truck and onto stockpiles<br>• Keep material being handled by dozers and wheeled loader moist to achieve a control efficiency of 50%.<br>• Regular clean-up at loading areas |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| WIND EROSION | • ROM stockpile<br>• Waste Rock Dump | • Water sprays on ROM stockpile under conditions of high wind speed.<br>• Reshape all disturbed areas to their natural contours, cover disturbed areas with previously collected topsoil and replant native species, and rock cladding with larger pieces of waste rock.<br>• Use of best available technologies such as the installation of selective catalytic reducers, oxidation catalysts and diesel particulate filters to reduce PM10 emissions.<br>• Uses of low sulfur content fuels are recommended to<br>• minimise SO2 emissions from both vehicle tailpipe emissions as well as generator emissions. |
| MONITORING ACTIONS DURING NORMAL OPERATIONS | | |
| | | • The existing dustfall monitoring network should be extended to include one dust bucket on the site boundary (to the west of the plant area) and one bucket to the west of the Gorob pit area. The dustfall units must be maintained and the monthly dustfall results used as indicators to tract the effectiveness of the applied mitigation measures. Dustfall collection should follow the ASTM method. |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| MONITORING | All mining operations | • Occupational $PM_{10}$, $SO_2$ and $NO_2$ exposure should be measured regularly. Personal samplers should be issued to selected employees covering various mining activities and areas over the 8-hour working shift. The sampled $PM_{10}$ filters should be analyzed for graphite content to determine exposure to inhalable graphite dust. This is useful to obtain a data record of exposure levels at the mine.<br>• A passive $SO_2$ and $NO_2$ sampling campaign should be conducted bi-annually (summer and winter) at the same locations used for dust fallout monitoring.<br>• The passive samplers should be exposed for a period of at least one month during each campaign.<br>• Personal samplers can be issued to selected employees covering various mining activities and areas over the 8-hour working shift. |
| QUANITIFICATION OF $SO_2$ CONCENTRATIONS | All mining operations | • $SO_2$ concentrations should be sampled to:<br>  • Determine the impact of vehicle exhaust emissions and sulphide oxidation on the surrounding environment.<br>  • Determine the impact of sulphide oxidation on employee health.<br>  • Determine the rate of sulphide oxidation. |
| DUST DEPOSITION | All mining operations | • A dust deposition monitoring network is to be established to monitor the dust deposition due to routine operations, as well as the dust deposition during high-wind periods.<br>• Dust monitoring should be established before operations commence to measure baseline conditions. It should remain active throughout the life of the mine as well as for a few years post closure to determine the effectiveness of tailing storage facility mitigation measures. |

## 3.6 Noise

### 3.6.1 Objectives

- Minimizing noise nuisances to sensitive receptors beyond the boundaries of the project.

### 3.6.2 Management strategies

Construction and operation of the mine will have a limited noise impact due to the distance from sensitive receptors, as well as the surrounding landforms, which are expected to limit the noise's travel. However, the following management measures are prescribed to further reduce any potential noise from the mine:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| PLANNING AND DESIGN PHASE | | |
| EQUIPMENT AND VEHICLES | All project components | All vehicles and mobile equipment should be fitted with appropriate exhaust and muffler devices where possible in compliance with international environmental and occupation health standards. |
| CONSTRUCTION PHASE | | |
| EQUIPMENT AND VEHICLES | All project components | Regularly maintain equipment and vehicles to minimize noise. |
| OPERATIONS | | |
| TRANSPORT OF PRODUCT AND MATERIALS | All project components | Transport of product and materials to and from the mine should preferably occur during daylight hours only. |
| BLASTING | All project components | Consult with nearby sensitive receptors (i.e., neighbouring settlements and communities, Gobabeb Centre) about the potential for noise nuisance from blasting operations including schedule, duration and repetitions. |

## 3.7 Cultural Heritage

### 3.7.1 Objective

- Ensure due consideration is given to matters regarding the cultural and general wellbeing of the affected community and matters incidental thereto.

### 3.7.2 Management strategies

The following mitigation measures are prescribed to avoid or limit any potential impact on culturally significant sites that may occur in the project area:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| PLANNING AND DESIGN PHASE | | |
| ARCHAEOLOGY | All project components | Familiarise with Archaeological Impact Study findings and implement accordingly. |
| CONSTRUCTION AND OPERATION PHASES | | |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| ARCHAEOLOGY | All project components | Should a heritage site or archaeological site be uncovered or discovered during the construction phase of the project, a "chance find" procedure should be applied in an order as follows:<br>• If operating machinery or equipment: stop work;<br>• Demarcate the site with plastic warning tape;<br>• Determine GPS position if possible;<br>• Report findings to foreman;<br>• Report findings, site location and actions taken to superintendent;<br>• Cease any works in immediate vicinity;<br>• Visit site and determine whether work can proceed without damage to findings;<br>• Determine and demarcate exclusion boundary;<br>• Site location and details to be added to the project's Geographic Information System (GIS) for field confirmation by archaeologist;<br>• Inspect site and confirm addition to project GIS;<br>• Advise the National Heritage Council (NHC) and request written permission to remove findings from work area; and<br>• Recovery, packaging and labelling of findings for transfer to National Museum.<br>Should human remains be found, the following actions will be required:<br>• Apply the chance find procedure as described above;<br>• Schedule a field inspection with an archaeologist to confirm that remains are human;<br>• Advise and liaise with the NHC and Police; and<br>• Remains will be recovered and removed either to the National Museum or the National Forensic Laboratory. |

## 3.8 Waste Management

### 3.8.1 Objectives

❖ Waste is managed according to the waste management hierarchy (prevention, reduction, re-use,

recycling, disposal);

- ❖ All waste is properly handled, stored, transported and disposed of;
- ❖ Contaminant spills are avoided or immediately contained;

### 3.8.2 Management strategies

Proposed actions for managing potential impacts associated with waste are provided below:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| PLANNING AND DESIGN PHASE | | |
| WASTE MANAGEMENT PLAN | All project components | A Waste Management Plan should be developed and implemented and should include project and site-specific details on waste types, procedures and facilities where it will be disposed of. |
| INDUCTION AND TRAINING | All project components | Implement a training program and inductions for waste management for all project personnel. |
| WASTE PREVENTION | All project components | Encourage careful project planning in the purchasing policy and usage to minimize unnecessary materials on site. |
| WASTE REUSE | All project components | Reuse or recycle solvents, metals and oils. |
| CONSTRUCTION AND OPERATION PHASE | | |
| | All project components | All heavy construction vehicles and equipment on site should be provided with a drip tray.<br>• Drip trays are to be transported with vehicles wherever they go.<br>• Drip trays should be cleaned daily and spillage handled, stored and disposed of as hazardous waste. |
| | All project components | All heavy construction vehicles should be inspected regularly to prevent oil leakages. |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| HAZARDOUS WASTE | Workshop and wash bay | Maintenance and washing of construction vehicles should take place only at a designated workshop area.<br>• The workshop area should be lined with concrete.<br>• The workshop should have an oil-water separator for collection of run-off from washing.<br>• Oil filters should be stored in marked containers that allow oil to drain but not escape from storage. |
| | All project components | Spilled concrete (wet or dry) should be treated as hazardous waste and disposed of in the appropriate hazardous waste containers. |
| | All project components | All hazardous substances (e.g., fuel etc.) or chemicals should be stored in a specific location on an impermeable, bunded surface. |
| | All project components | Hazardous waste to be handled by trained personnel only and disposed of at an appropriately licensed facility off-site. |
| | All project components | Spill management kits, Personal Protective Equipment (PPE) and relevant emergency procedures should be available at the workshop and storage facilities. |
| | All project components | Any spills should immediately be contained and cleaned up and the contaminated soil appropriately disposed of. The receiving environment should then be remedied where necessary to prevent the spill from entering the storm water drainage system. |
| SEWAGE AND GREY WATER | Waste water treatment facility | Sewage will be managed on a Decentralised Wastewater Treatment (DWWT) basis. The trickling filter system proposed in the project design may be used to treat onsite sewage.<br>• Sewage (black water) may not be discharged directly into the environment;<br>• Grey water should be recycled and can be used for:<br>  ○ Dust suppression;<br>  ○ Watering a vegetable garden, lawns etc.<br>  ○ Support a small community nursery; |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| | | ○ Cleaning of equipment etc. |
| GENERAL WASTE | All project components | • The construction site should be kept tidy at all times. All domestic and general construction waste produced on a daily basis should be cleaned and contained daily.<br>• No waste may be buried, burned or disposed to land on site, outside of an approved waste disposal facility.<br>• Waste containers (bins) should be emptied regularly and removed from site to an approved (municipal) waste disposal site. All recyclable waste needs to be taken to the nearest recycling depot.<br>• A sufficient number of separate waste containers (bins) for hazardous and domestic/general waste must be provided on site. These should be clearly marked as such.<br>• Construction laborers should be sensitized to dispose of waste in a responsible manner and not to litter.<br>• No waste may remain on site after the completion of the project |

## 3.9 Social and Community Values

### 3.9.1 Objectives

- ❖ Minimize the impact on social services, infrastructure and social or cultural values due to the operations of the mine.
- ❖ Minimize negative visual amenity changes or changes in the sense of place resulting from the construction and operation of the mine.
- ❖ Minimize any adverse impacts on the surrounding land uses.
- ❖ Minimize any potential health impacts that may result from the project.
- ❖ Optimize the advantages of the project by engaging in social projects and providing local employment opportunities as far as possible.
    - ○ On this particular objective, the company has conceptualised a social project that aims at combining a mine production - community relations project for Hope and Gorob mine with the local Topnaar community. See Appendix B for a detailed narrative and

associated diagram of the project concept.

### 3.9.2 Management strategies

Proposed actions for managing potential impacts impacting on social and community values are provided below:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| **PLANNING AND DESIGN PHASE** | | |
| **CONTRIBUTION TO LOCAL ECONOMY** | All project components | • Source goods and services locally as far as possible. |
| **ACCOMMODATION OF WORKFORCE** | Workforce | • Construction workers to be housed on-site.<br>• Enter into agreement with the relevant authorities on a suitable area with less sensitivities.<br>• Provide adequate infrastructure and stringent environmental control. |
| **HIV/AIDS** | Workforce | • An HIV/AIDS policy should be adopted by the contractors and the mine for both the construction and operational phases. Initiatives should be implemented with regards to raising awareness on HIV/AIDS. |
| **OPERATIONS** | | |
| **TRAFFIC** | Roads | • Transport of staff/workers should preferably take place outside of peak traffic hours such as 07h00-08h30 and 16h00-17h30.<br>• Avoid travelling at night. |
| **PUBLIC COMMUNICATION** | All project components | • All the neighboring communities/land users should be informed regarding the dates and times for blasting. |
| **MONITORING ACTIONS DURING NORMAL OPERATIONS** | | |
| **CONTRIBUTION TO ECONOMY** | All project components | • Contribution of the mine to the Namibian economy should be monitored and reported on through annual reviews. Such reports should be produced by the mine as part of its management, and shared with relevant institutions, where necessary. |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| CORPORATE SOCIAL RESPONSIBILITY | All project components | • The company should craft, implement and report on its Corporate Social Responsibility initiatives. They should indicate their aim of serving the community and meeting development needs for example: agroecology, fish farming, health, education etc. |
| TRAFFIC | Mine access roads | • A logbook should be kept at the gate of the access road indicating the time of entrance or exit, the type of vehicle, and its destination. By doing so, traffic to and from the mine can be monitored. |

## 3.10 Labour and Working Conditions

### 3.10.1 Objectives

- To promote equal opportunity of workers.
- To promote compliance with national employment and labour laws.
- To promote safe and healthy working conditions, and the health of workers.

### 3.10.2 Management strategies

Proposed actions for managing potential impacts associated with labour and working conditions are provided below:

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| PLANNING AND DESIGN PHASE | | |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| HEALTH AND SAFETY | Personnel | • Ensure the health and safety of labourers (construction and operation) and those potentially affected from the public.<br>• Ensure the Health and Safety Regulations adhere to all legal requirements as laid out in legal section of the ESIA report.<br>• Compile a **Health and Safety Plan**: The basic principles to include in this plan are:<br>  • Awareness raising<br>  • Information sharing<br>  • Access to health care services i.e., counselling and testing.<br>  • Develop an **Emergency Response and Procedures Framework** for any safety incidents occurring on site that covers:<br>  ✓ Accidental spills of hazardous materials,<br>  ✓ Accidents involving personnel on the work sites, and<br>  ✓ Major failures such as landslides, mine failures, structural collapse etc.<br>  The basic principles to include are:<br>  ✓ Consider preventive and responsive actions<br>  ✓ Who should be responsible to coordinate such actions<br>  ✓ Reporting on incidents on site<br>  ✓ Corrective measures to flawed methods of response<br>• Compile a **Health and Safety report** that identifies PPE – specifically for inhalation protection – for the various mining activities. Supervisors and contractors are responsible for maintaining the health of all employees and labourers during the period of employment. All necessary PPE as required for doing work will be provided to the employees. |

| | | |
|---|---|---|
| **EMPLOYMENT/ RECRUITMENT** | Personnel | • The developer and its Contractors will make their best efforts to employ local labour where practicable. The written agreement between the developer and the main contractor should contain the 'Locals First' clause stipulating the commitment to employ local communities, where possible.<br>• Once the unskilled or semi-skilled labour needs have been identified, a fair and transparent employment scheme should be established in consultation with the Traditional Authority and/or Local/Regional Council.<br>• Ensure that recruitment takes place in a legal and fair manner so as to minimise conflict.<br>• The recruitment process should be gender inclusive, i.e. qualified women should be given an equal opportunity where possible. Remuneration should also meet Namibian set standards.<br>• Adhere to the legal provisions for the recruitment of labour (target percentages for gender balance, optimal use of local labour and SME's, etc.) in the contract.<br>• The recruitment process must be formal and organised.<br>• Ensure that all sub-contractors are aware of recommended recruitment procedures and discourage any recruitment of labour outside the agreed upon process.<br>• Contractors should give preference in terms of recruitment of sub-contractors and individual labourers to those from the local community.<br>• Clearly explain to all job seekers the terms and conditions of their respective employment contract (e.g. period of employment etc.) – make use of interpreters when necessary.<br>• Secure accreditation for in-house skills transfer which recognizes and certifies any training courses. |

| ASPECT | PROJECT COMPONENT | MITIGATION MEASURE |
|---|---|---|
| CONSTRUCTION AND OPERATIONAL PHASE | | |
| AIR QUALITY SAFETY MEASURES | Personnel | Develop and implement work practices to minimize the release of contaminants into the work environment:<br>• Provide appropriate PPE to mine personnel in conjunction with training, use, and maintenance of the PPE;<br>• Enclose operations which may result in direct release of dust into areas where people work such as the crusher;<br>• Ensure all areas in the processing plant are well ventilated; and<br>• Ensure enclosed climate controlled cabins for mine vehicles and equipment (i.e. haul trucks, excavators, drill rigs, etc.). |
| RECORD KEEPING | Project personnel | • During the construction phase, the project team should compile an annual report indicating the number of contractors used, the amounts paid to them, as well as their country of origin. Each contractor should supply information on the number of Namibians they employ. Such reports will provide an indication of the number of Namibian contractors and employees used during the construction phase. The same should be true for products procured. |
| | | • During the operational phase, the project team should record on the number of employees, as well as their salary scales. The amount spent on salaries will be an indication of the amount of money that will be spent in the local, regional and national economy by the employees. Reports should also be compiled on how and where operational costs were spent indicating the local, regional and national goods and services used. |

# 4 SPECIFIC MONITORING PLANS AND REPORTING

## 4.1 Air Quality Monitoring

Ambient air quality should be monitored by implementing the recommendations provided by Airshed Planning Professionals (2023):

### 4.1.1 Dust Deposition

Dustfall should be collected in order to:

- Track progress of air pollution control measures being implemented at the material handling points, at the crusher and most importantly at windblown dust sources.
- Quantify the nuisance risk to the surrounding environment.

The existing dustfall monitoring network should be extended to include one dust bucket on the site boundary (to the west of the plant area) and one bucket to the west of the Gorob pit area. The dustfall units must be maintained and the monthly dustfall results used as indicators to tract the effectiveness of the applied mitigation measures. Dustfall collection should follow the ASTM method.

### 4.1.2 PM10 concentrations

$PM_{10}$ concentration should be sampled in order to:

- Track progress of air pollution control measures on the impact on the surrounding environment.
- Quantify the health risk to the surrounding environment, beyond the premises of the Hope and Gorob Mine.

It is recommended that the $PM_{10}$ monitor be installed downwind from the mining operations.

### 4.1.3 NO2 concentrations

$NO_2$ concentrations should be sampled to determine the impact of vehicle exhaust emissions on the surrounding environment. NO2 should be sampled with passive diffusive samplers that can be attached to dust bucket stands. SO2 and NO2 sampling campaigns should be done bi-annually – one during winter and one during summer. It would be useful to conduct one sampling campaign before the mine operations commence in order to determine baseline conditions.

### 4.1.4 SO2 concentrations

$SO_2$ concentrations should be sampled to:

- Determine the impact of vehicle exhaust emissions and sulphide oxidation on the surrounding environment.

- Determine the impact of sulphide oxidation on employee health.
- Determine the rate of sulphide oxidation.

The following methods are recommended to quantify the impact of $SO_2$ on the surrounding environment and employee health:

- Determination of $SO_2$ emissions from ore oxidation.
- Sampling of ambient $SO_2$ emissions before construction as well as for the duration of operational phase.

## 4.2 Surface and Groundwater Monitoring

The following measures are provided for the monitoring of surface and groundwater.

### 4.2.1 Water level and discharge monitoring points

Regular groundwater levels monitoring should be maintained in existing and proposed new boreholes.

### 4.2.2 Water quality monitoring

The following recommendations are made for the water quality monitoring:

- ❖ Water quality monitoring of boreholes will include the parameters as outlined in the water quality guidelines in Appendix A. Water well head chemistry parameters would include pH, electrical conductivity, temperature, and alkalinity. Monitoring needs to be carried out on monthly basis.
- ❖ The monitoring of wellhead parameters of selected points is to begin before start of operation in order to establish background levels and seasonal fluctuations if any.
- ❖ Re-assessment of sampling parameters and frequency of the sampling is recommended after each 2 years of operation.

**Table 5:** Summary of Monitoring Recommendations

| RISK ITEM | MONITORING |
|---|---|
| SEEPAGE FROM WRD | • Monitoring boreholes around the proposed waste rock dump.<br>• Monthly field water quality parameter measurements<br>• Quarterly water quality analyses |
| CONTAMINATION AND RISK AFTER CLOSURE FROM MINE PIT | • Monitoring of borehole water levels<br>• Monitoring of surface and groundwater quality |

| RISK ITEM | MONITORING |
|---|---|
| WASTE WATER DISPOSAL | • Monitor volume and quality |

# 5 MINE CLOSURE FRAMEWORK

## 5.1 Introduction

International best practice requires a mine closure plan to incorporate both socio-economic considerations and physical rehabilitation to be an integral part of the project life cycle. The objectives of such a plan should be structured so that:

- *"Future public health and safety are not compromised*
- *The after use of the site is beneficial and sustainable to the affected communities in the long term;*
- *Adverse socio-economic impacts are minimized and socio-economic benefits are maximized."*

## 5.2 Objectives

- Ensure that the biodiversity and environment on the site is protected.
- Provide sufficient funds at the end of life of mine, to properly implement the closure plan
- Establish a self-sustaining vegetation community using appropriate native tree, shrub and grass species, and
- Ensure land is made stable, both in terms of geotechnical parameters and erosion so that post mine land use is not compromised by site instability.

## 5.3 Closure Planning

The planning for closure and rehabilitation is an on-going process, which should be adapted and updated during the operational phase of the project, refining the closure criteria and associated costing to develop a preliminary closure and rehabilitation plan. This plan should reflect changes in mine development, operational planning and environmental and social conditions.

Hope and Gorob Mining (Pty) Ltd will be required to undertake a detailed closure and rehabilitation process at the feasibility phase of an operation, based on a thoroughly developed closure strategy, which should be reviewed and improved throughout the life cycle of the mine. The final closure plan should include:

For continuous rehabilitation:

- Progressive rehabilitation plan
- Monitoring plan

For final closure:

- A structured risk/opportunity assessment that considers risks associated with health and safety and the natural and social environment, legal risks and financial risks.
- Social plan (employees and communities)
- Decommissioning plan
- Final rehabilitation plan
- Monitoring plan
- Updated financial breakdown for closure
- Approved suggestions for post mining land use based on further engagement with surrounding communities and key stakeholders.

The closure plan should make provision for all possible closure scenarios including:

- Life of mine closure (i.e. planning closure at the completion of mining operations), and
- Immediate closure (i.e. a sudden closure of operations e.g. due to a drop in the price of copper and/or gold).

Although planning for the latter cannot be done in much detail, being prepared for such unforeseen circumstances rely on having an updated detailed closure plan, which gives the planner the ability to rapidly evaluate the remaining unknowns and risks associated with closure and to develop an appropriate decommissioning plan.

The purpose of this Section in the EMP is to provide a conceptual closure plan, including closure and rehabilitation objectives, financial provisioning and potential suggestions for post mining land use. The structure of this plan is in accordance to the Namibian Mine Closure Framework (The Chamber of Mines of Namibia, 2010).

## 5.4 Socio-economic Considerations

### 5.4.1 Stakeholder engagement

The identification and engagement of key stakeholders is fundamental to the development of a successful Mine Closure Plan since closure can often be responsible for substantial changes in both the community and the environment in which it operates (The Chamber of Mines of Namibia, 2010). Engagement enables stakeholders to have their interests considered as part of the mine closure planning process, whilst creating an understanding for their views and expectations and formulating a balanced, realistic and achievable closure outcome.

Stakeholder engagement is an ongoing process that should start in the planning phase, and continue throughout the operation and mine closure phases. It should include consultation, listing and feedback, as well as distribution of information.

### 5.4.2 Mechanisms to manage socio-economic effects

Various mechanisms are available to manage post closure social issues. The following mechanisms are however recommended:

- Establishment of a Future Forum;
- Mechanisms to Save Jobs and avoid Job Losses and a Decline in Employment;
- Mechanisms to Provide Alternative Solutions and Procedures for Creating Job Security where Job Losses cannot be avoided; and
- Mechanisms to improve the social and economic impact on individuals, regions and economies when retrenchment or closure of the mine is certain.

At this stage, no financial provision is made for the above-mentioned mechanisms and Hope and Gorob Mining (Pty) Ltd will need to ensure that sufficient provision is made for the management of these issues within future iterations of the Mine Closure Plan.

## 5.5 Physical Rehabilitation

The key mine infrastructure components that will be decommissioned and rehabilitation are:

- Processing plant
- Mine pit
- Rom stockpile
- Waste rock dump
- Water supply boreholes, pipelines and reservoirs
- Access roads

- ❖ Administration and ancillary support facilities
- ❖ Sewage treatment facility

The following methods and management strategies are recommended for the decommissioning and rehabilitation of these components during final closure.

| ASPECT | METHODS/STRATEGIES |
|---|---|
| GENERAL | • All rubbish/wastes will be removed from site and disposed of at an approved waste disposal facility.<br>• All decommissioned areas should be stabilized to prevent slope failure and erosion post mine closure.<br>• Prior to decommissioning unused chemicals, hydrocarbons and explosives are to be removed from site. |
| PROCESSING PLANT | • Prior to decommissioning the processing circuit will be emptied of any reagents and fluids.<br>• The processing plant and associated steel work should be dismantled and sold, recycled or removed from the site to an approved waste disposal facility.<br>• The disturbed footprint area should then be graded and re-contoured to match the surrounding landscape.<br>• The surface should be ripped and covered with topsoil to ensure water infiltration and the re-establishment of vegetation. |

| ASPECT | METHODS/STRATEGIES |
|---|---|
| MINE PIT | • On closure, the mine pit should be cordoned off (with a game-prove fence and clear warning signs) to avoid access and use by animals and humans.<br>• Secure the pit against inflow of surface runoff water and discharge.<br>• As soon as the groundwater table is intersected by mining, monitoring of the flow rate and quality of water should start and continue for at least 6 months.<br>• In the last three years of the LOM, the developer should undertake a groundwater study to determine what the water inflow rate will be into the pit. The expected volume of water in the end will determine the amount of neutralizing material required.<br>• Potential backfilling of the pit should be evaluated by the developer to reduce the operations footprint and manage waste rock. If pits are backfilled fully or partially, the infill will be contoured to blend in with the surrounds. |
| ROM STOCKPILE | • On closure of the mine the stock piles are to be graded to encourage runoff and limit infiltration. The surface is to be covered with topsoil and vegetated. The protective berms diverting surface flow are to remain to avoid any erosion of the soil cover |
| WASTE ROCK DUMP | • On closure of the mine the stock piles are to be graded to encourage runoff and limit infiltration.<br>• The surface is to be covered with soil and vegetated.<br>• The protective berms diverting surface flow are to remain to avoid any erosion of the soil cover. |
| WATER SUPPLY BOREHOLES AND PIPELINES | • Consult with communities or local stakeholders about possible take-over agreements of the boreholes.<br>• Disturbed areas around the boreholes and the pipeline should be contoured and ripped to encourage the re-growth of local vegetation. |

| ASPECT | METHODS/STRATEGIES |
|---|---|
| ACCESS ROADS | • In the short term the internal mine access roads will be kept open to allow access for closure monitoring.<br>• The road corridor will be contoured to restore natural drainage.<br>• Re-spread stockpiled topsoil.<br>• Deep rip surface to alleviate compaction and encourage re-growth of local vegetation.<br>• Use seeds of local vegetation to help re-establish vegetation.<br>• Access to the rehabilitated area should be restricted. |
| ADMINISTRATION AND ANCILLARY SUPPORT FACILITIES | • Power, water and drainage systems to be shut off and structures removed from site.<br>• Any scrap metal should be recycled.<br>• Hydrocarbon contaminated soil should be removed.<br>• Contour the area to restore natural drainage.<br>• Rip the surface to alleviate compaction and encourage re-growth of local vegetation. |
| SEWAGE TREATMENT FACILITY | • Empty any sewage from the treatment facility and transfer to Walvis Bay for emptying at the town's sewage works.<br>• Dismantle and remove the sewage treatment facilities from the site.<br>• Recycle any scrap metal.<br>• Contour the area to restore natural drainage.<br>• Rip the surface to alleviate compaction and encourage re-growth of local vegetation. |
| REMAINING MATERIALS | • All other remaining materials, which are anticipated to be small quantities of non-recyclable items and rubbish, should be disposed of at an approved waste disposal facility. |

## 5.6 Post Closure Monitoring

Post-Closure monitoring and management is also accounted for and it is recommended that this involves:

- ❖ Vegetation succession monitoring and management
- ❖ Erosion monitoring and management

- Groundwater quality monitoring
- Surface run-off monitoring

Post closure monitoring should continue for a minimum period of five years depending on the risks.

## 5.7 Post Closure Use of land

According to The Chamber of Mines of Namibia (2010) rehabilitation is not just about making an area neat but also about setting a disturbed ecosystem on a trajectory back to recovery so that it can be sustainably used in the future. Mining is seen as a temporary land use which should be integrated with, or followed by, other forms of land use. Rehabilitation of the mine will be aimed towards a clearly defined future land use for the area. This use will be determined in consultation with relevant interest groups including surrounding landowners, local authorities and other stakeholders.

## 5.8 Financial Provision for Closure

The Minerals Policy of Namibia (1999) endorses the 'polluter pays' principle which places responsibility for pollution mitigation on the party that caused the pollution. This principle is strengthened by the Mine Closure Framework (The Chamber of Mines of Namibia, 2010). It aims to ensure that environmental liabilities do not remain with the government but that mechanisms are put in place by mining industries to make sure that adequate financial resources have accrued at the time of closure to cover these costs at a time when revenue is no longer being generated.

The costs associated with the decommissioning strategies and the monitoring and management program up to a period of five years post-closure should be determined. Hope and Gorob Mining (Pty) Ltd should review the closure provision on an annual basis to ensure that provisions are correct and up to date.

# 6 FINAL CONCLUSION

This EMP becomes a legally binding document once approval is granted and written confirmation to this effect through an environmental clearance certificate by the Ministry of Environment and Tourism is obtained. The provisions and mitigation details given in this EMP must be strictly adhered to and applied by the user of it.

## 7 REFERENCES

Airshed Planning Professionals (Airshed), 2023. Air Quality Impact Assessment for the Proposed Hope and Gorob Mining Project in Namibia.

Aqua Services and Engineering. (2001). Trickling Filter Technology. Windhoek: Aqua Services & Engineering (Pty) Ltd.

Bezant Resources Plc (Bezant), 2023. UPDATED HOPE & GOROB TECHNICAL REPORT FOR ML 246 ON EPL 5796.

Christopher Robben and Hermann Wotruba, 2019. Sensor-Based Ore Sorting Technology in Mining—Past, Present and Future. Minerals 2019, 9, 523.

Crowflight Minerals Inc. (2007). Bucko Lake Nickel Project - Tailings Disposal Alternatives.

Cunningham P.L., 2023. VERTEBRATE FAUNA AND FLORA ASSOCIATED WITH HOPE & GOREB PROJECT AREA (EPL 5796).

Environmental Protection Agency. (1999). Consideration of Cumulative Impacts in EPA review of NEPA Documents. Retrieved from http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf

Kinahan J., 2023. ARCHAEOLOGICAL ASSESSMENT OF HOPE AND GOROB MINES LOCATED ON EPL 5796, ERONGO REGION, NAMIBIA.

Madec G., 2023. Groundwater Study for Hope and Gorob Mining (Pty) Ltd

Namibia Statistics Agency. (2011). Namibia 2011 Population and Housing Census Preliminary Results. Windhoek: National Planning Commission.

Namisun (Petrick, W & Smit, P.), 2022, Internal Environmental Screening Report for Bezant Resources' Hope & Gorob Project in the Namib Naukluft National Park, Namisun.

Peukert et al., 2022. A sensor-based ore sorting method, on the other hand, can improve processing efficiency and reduce tailings by diverting sub-economic material.

Robben C. & Wotruba H.,2019. Sensor-Based Ore Sorting Technology in Mining—Past, Present and Future.

S Pietrzyk and B Tora 2018 IOP Conf. Ser.: Mater. Sci. Eng. 427 012002. Trends in global copper mining – a review.

Saayman, C. (2014). Specialist Study: Socio-Economic Specialist Report. Windhoek: Enviro Dynamics.

Sandsea Consulting (Sandsea), 2023. SOCIO-ECONOMIC IMPACT ASSESSMENT. ENVIRONMENTAL IMPACT ASSESSMENT FOR THE HOPE & GOROB MINING PROJECT IN THE NAMIB-NAUKLUFT NATIONAL PARK, ERONGO REGION.

SLR, 2022, Groundwater and Surface Water Investigation for The Hope and Gorob Project.

Speiser, 2019. ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR VIRGO RESOURCES LIMITED EXPLORATION ACTIVITIES ON EPL 5796 LOCATED IN THE NAMIB NAUKLUFT NATIONAL PARK.

Superfund Research Center (SRC), 2023. University of Arizona. Copper Mining and Processing: Processing Copper Ores. https://superfund.arizona.edu/resources/learning-modules-english/copper-mining-and-processing/processing-copper-ores.

Wieniewski A and Myczkowski A 2017 Achievements and Participations in the Development of

Wilke A., 2023. Hydrology Baseline Report for Hope and Gorob Mining (Pty) Ltd.