

## 6. Environmental Management Plan

### 6.1 Overview

This Environmental Management Plan is intended to give effect to the recommendations of the Environmental Impact Assessment. To achieve this goal, it is essential that all personnel involved on the mining and infrastructure development are fully aware of the environmental issues and the means to avoid or minimize the potential impacts of activities on site. The proposed mining and infrastructure development activities are summarized in Section 3 of the scoping report above. Legal and policy requirements are well known and understood by the proponent, its employees and contractors and will be strictly enforced by its management team. A general description of the environment is contained in Section 4, and more site-specific information on particularly sensitive areas is contained in Section 4 as well. Issues and concerns identified in the EIA will form a set of environmental specifications that will be implemented on site. It is the intention that these environmental specifications should form the basis for an agreement between the proponent and the Ministry of Environment and Tourism. By virtue of that agreement, these specifications will become binding on the proponent.

Environmental management requires a joint effort on the part of all parties involved. The proponent has assigned certain roles to ensure that all players fulfil their responsibilities in this regard.

### 6.2 Environmental Management Principles

The proponent will ensure that all parties involved in the project uphold the following broad aims:

1. All persons will be required to conduct all their activities in a manner that is environmentally and socially responsible. This includes all consultants, contractors, and sub-contractors, transport drivers, guests and anyone entering the mining and infrastructure development areas in connection with the mining and infrastructure development project.
2. Health, Safety and Social Well Being

- Safeguard the health and safety of project personnel and the public against potential impacts of the project. This includes issues of road safety, precautions against natural dangers on site, and radiation hazards; and,
- Promote good relationships with the local authorities and their staff.

### 3. Biophysical Environment

- Wise use and conservation of environmental resources, giving due consideration to the use of resources by present and future generations;
- Prevent or minimise environmental impacts;
- Prevent air, water, and soil pollution, Biodiversity conservation and Due respect for the purpose and sanctity of the area.

To achieve these aims, the following principles need to be upheld.

#### **A. Commitment and Accountability:**

The proponent's senior executives and line managers will be held responsible and accountable for:

Health and safety of site personnel while on duty, including while travelling to and from site in company vehicles and environmental impacts caused by mining and infrastructure development activities or by personnel engaged in the mining and infrastructure development activities, including any recreational activities carried out by personnel in the area

#### **B. Competence**

The proponent will ensure a competent work force through appropriate selection, training, and awareness in all safety, health and environmental matters.

#### **C. Risk Assessment, Prevention and Control**

Identify, assess and prioritise potential environmental risks. Prevent or minimize priority risks through careful planning and design, allocation of financial

resources, management and workplace procedures. Intervene promptly in the event of adverse impacts arising.

#### **D. Performance and Evaluation**

Set appropriate objectives and performance indicators. Comply with all laws, regulations, policies and the environmental specifications. Implement regular monitoring and reporting of compliance with these requirements.

#### **E. Stakeholder Consultation**

Create and maintain opportunities for constructive consultations with employees, authorities, other interested or affected parties. Seek to achieve open exchange of information and mutual understanding in matters of common concern.

#### **F. Continual Improvement**

Through continual evaluation, feedbacks, and innovation, seek to improve performance regarding social health and well-being and environmental management throughout the lifespan of the mining and infrastructure development project.

#### **G. Financial Provisions for mining and infrastructure development**

In line with Namibia's environmental rehabilitation policy, the proponent will make the necessary financial provision for compliance with the EMP.

### **6.3 Impacts on the Bio-physical Environment**

#### **6.3.1 Impacts on Archaeological Sites**

The **nature of impact** is outlined below:

- Potential damage to archaeological sites as a result of vehicle tracks, footprints and actions of contractors, employees and visitors of the mining and infrastructure development sites.
- As the mitigation measures below are fully enforced, any impact will be significantly reduced compared to with present situation.

**Mitigation Measures** to be enforced (recommended by archaeologist):

- Action by person identifying archaeological or heritage material:
    - a) If operating machinery or equipment stop work
    - b) Identify the Site with flag tape
    - c) Determine GPS position if possible
    - d) Report findings to foreman
  
  - Action by foreman
    - a) Report findings, Site location and actions taken to superintendent
    - b) Cease any works in immediate vicinity
  
  - Action by superintendent
    - a) Visit Site and determine whether work can proceed without damage to findings
    - b) Determine and mark exclusion boundary
    - c) Site location and details to be added to project GIS for field confirmation by archaeologist
  
  - Action by archaeologist
    - a) Inspect Site and confirm addition to project GIS
    - b) Advise NHC and request written permission to remove findings from work area
    - c) Recovery, packaging and labelling of findings for transfer to National Museum
  
  - In the event of discovering human remains
    - a) Actions as above
    - b) Field inspection by archaeologist to confirm that remains are human
    - c) Advise and liaise with NHC and Police
    - d) Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed.
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**Methods for monitoring:**

- An archaeologist will inspect any identified archaeological sites before commencing with the mining and infrastructure development activities.

**6.3.2 Impacts on Fauna**

The **nature of impact** is outlined below (as outlined in the Fauna specialist study):

- There are four large wildlife species of concern in the area: leopard, mountain zebra, brown hyena and klipspringer. The threats they face from the development are habitat loss, human-wildlife conflict, disturbance, potential poaching and potential road-kills.
- There is one reptile of concern in the area: the Karoo girdled lizard. The threats it faces from the development are habitat loss, potential illegal collecting for the pet trade and potential road-kills.

**Mitigation Measures** to be enforced (as recommended by fauna specialist):

- The habitat loss within the MLA is unavoidable if the development proceeds. The best way to offset this loss would be to ensure that there is absolutely no habitat loss or disturbance of wildlife outside the MLA. Except for the MLA and access roads to it, all surrounding mountainous areas under the control of the developer should be declared no-go areas, to be enforced by mine security with appropriate consequences for transgressions.
- Road kills (mainly brown hyaena at night) may be minimised by appropriate speed limits, especially at night. There are many other human safety reasons for maintaining low speed limits as well.
- Illegal collecting might be minimised by educating employees, while the normal security control for equipment entering and leaving the mining and infrastructure development area could be expanded to prevent movement of living animals as well.

**Methods for monitoring:**

- Regular monitoring of any unusual signs of animal habitat.

### 6.3.3 Impacts on Flora

The **nature of impact** is outlined below (as outlined in Flora specialist study):

- Direct destruction of plants of conservation concern and/or their habitats, which occurs as a result of movement of vehicles over previously undamaged areas, drill sites and target areas.
- Loss of woody vegetation due to illegal harvesting of wood for fuel and for sale.
- Loss of riverine trees due to unsustainable water abstraction.
- Illegal collection of plants or plant parts is a problem in Namibia. *Geophytes and succulents, inter alia Commiphora, Lithops, Dinteranthus, Conophytum, Aloe*, and many species, are at particular risk of being harvested for sale or horticultural purposes. This is a massive and growing threat here and in South Africa. Collection of plants or plant material of any kind, including seeds, may only be done under the auspices of a permit from the Ministry of Environment, Forestry and Tourism.

**Mitigation Measures** to be enforced (as outlined in Flora specialist study):

- Tracks must be kept to a minimum and must be adhered to. Track proliferation will be a major source of damage, especially on the plain.
- Efforts should be made to avoid unnecessary collateral damage as far as is practically possible. Education of drivers of large machinery is important.
- As many individuals of *Commiphora gracilifrons* as possible must be rescued from the areas to be mined or used for the haul road. At least a proportion of these should be used in a relocation trial to provide information for future projects in this area. The remainder should come to the National Botanic Garden in Windhoek, and to Namib Trees for propagation. This work must be supervised by a suitably knowledgeable and experienced person.
- Water abstraction from springs and boreholes must be minimised, and the health of trees around abstraction points and water level drops should be monitored. Both the level and the speed of the level dropping are important.
- Collection of wood for fuel must be disallowed.
- No collection of any plant or parts of a plant should be allowed. Strict and heavy penalties should be in place for violations.

### 6.3.4 Impact on Avifauna

The **nature of impact** is outlined below (as outlined in Fauna specialist study):

- There are four birds of prey of concern in the area: Verreaux's eagle, rock kestrel, spotted eagle-owl and barn owl. The threats they face from the development are habitat loss and potential road-kills.

**Mitigation Measures** to be enforced (as outlined in Fauna specialist study):

- habitat loss is unavoidable if the development proceeds but may be offset by ensuring that the surrounding areas remain no-go areas where the birds may hunt and nest without interference.
- Speeds limits would minimise road kills of especially owls at night as well.

### 6.3.5 Impacts of Alien invasive Plants

The **nature of impact** is outlined below:

- Plant or seed material may adhere to car tyres or animals
- Seed or plant material may be imported to site in building materials if the source is contaminated.
- Seeds may blow from debris removed at sites.

**Mitigation Measures** to be enforced:

- The explorer will ensure that debris is properly disposed of.
- Vehicle tyre inspections can be carried out although this may not be a practical mitigation measure.
- Eradicating alien plants by using an Area Management Plan

**Methods for monitoring:**

- Regular monitoring of any unusual signs of alien species.
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### 6.3.6 Impacts on Socio-Economic

The **nature of impact** is outlined below:

- Impact from loss of grazing for domestic livestock in “exclusive use zone”
- Impacts on cultural and spiritual values.
- Demographic factors: Attraction of additional population that cannot benefit from the project.
- Perception of Health and Safety risks associated with mining and infrastructure development.

**Mitigation Measures** to be enforced:

- The population change can be mitigated by employing people from the local community and encouraging the contractors to employ local individuals.
- The perception of risks will be mitigated by putting up safety signs wherever possible and ensuring that all employees and visitors to the site undergo a safety induction course.

**Methods for monitoring:**

- Public meetings will be held by the proponent whenever necessary.

### 6.3.7 Impacts on Groundwater

The **nature of impact** is outlined below (as outlined in the hydrogeological specialist study):

- There is no evidence of possible contamination to any groundwater resources. Pseudo section from Line 1, where the mine offices are proposed, has a low chance of a very deep aquifer system at a depth of 250m from the surface. However, the existence of a thick section of over 240m of solid bedrock suggests little or no impact on groundwater resources. This also suggests that there may be a need for external water supply for office activities.

**Mitigation Measures** to be enforced (as outlined in the hydrogeological specialist study):

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- precautions will always be taken to prevent contamination of the groundwater.

### 6.3.8 Use of Natural Resources

Water and electricity are very scarce in Namibia. During the mining and infrastructure development, best international practices will be considered as a minimum standard for operation. The bulk of the power supply to the mining and infrastructure development site will be sourced from the proponent's own generator. The proponent will maximise water recycling opportunities wherever possible.

### 6.3.9 Generation of Solid Waste

Correct management of solid waste will involve a commitment to the full waste life cycle by all the employees and contractors of the site. The Proponent's goal is to avoid the generation of solid waste in the first place and if not possible, to minimise the volumes generated by looking at technologies that promote longevity and recycling of products. Ideally, the proponent should transport solid waste to a registered site for disposal. However, it is not certain if such facilities are available in the area or if they have the capacity to handle large increases in volume. Appropriate on-site facilities will be designed to store large volumes of waste.

### 6.3.10 Noise

The **nature of impact** is outlined below (as outlined from the specialist noise impact study):

During the pre-operational phase, it was observed that noise was generated on site by drilling machinery, power generation and vehicular movements. Noise source during this stage is considered a point source, and the noise model predicts that there would be a significant increase in localized noise which is expected during mining operation and construction of mining infrastructure. Noise will be from drilling and milling activities including equipment unload and installation and other heavy machinery, as well as noise from goods and material transportation. Though noise levels may be high, the impacts will be temporary and localized, and can be further mitigated.

**Mitigation Measures** to be enforced (as recommended in the noise impact study):

- Drilling and blasting activities, and particularly noisy ones, are to be limited to reasonable hours during the day and early evening. Construction of mining infrastructures should be strictly prohibited during the night-time (22:00 h to 07:00 h).
- Low-noise equipment should be selected as much as possible. Equipment and machinery should be equipped with mufflers and should be properly maintained to minimize noise.
- Proper PPE will be provided to workers to meet the requirements in occupational exposure limits for hazardous agents in workplace and EHS Guidelines.
- Transportation routes and delivery schedules should be planned during detailed design to avoid sensitive areas to noise pollution and high traffic times. Vehicles transporting materials or waste should slow down and not use their horn when passing through or nearby sensitive locations, such as neighbouring communities and administrative areas.

### 6.3.11 Air Quality

The **nature of impact** is outlined below (as indicated in the air quality specialist study):

- Fugitive emission of dust (measured as TSP) during drilling and vehicular movements earthworks and are expected to be the main air pollutants during the pre-operational stage.
- Fugitive dust will be generated on construction sites during earthworks from construction activities at mining infrastructure and other related activities, uncovered earth material stockpiles on construction sites and temporary spoil storage and disposal areas (and containers), and from vehicles hauling loads, especially if loads are uncovered. With mitigation measures such as frequent watering of unpaved areas and haul roads this study believes that the amount of dust could be reduced by 70% or more and the impact area be reduced to within 100 m downwind of earthwork activities.
- Dust generated from loading, hauling, and unloading.
- Dust generated from disturbed and uncovered drilling and construction areas, especially on windy days.

- Dust generated by the movement of vehicles and heavy machinery on unpaved access and haul roads.
- Dust generation from drilling, crushing, and milling unit and heavy diesel machinery and equipment.

**Mitigation Measures** to be enforced (as recommended in the air quality specialist study):

- Reduce speed for all trucks and vehicles on the mine and community roads to reduce dust emissions.
- Stockpiles should be covered with dust binding chemical to reduce fugitive emissions.
- Chemical binding substance can be applied to road surfaces to suppress dust particle and reduce emission within the mine which will reduce fugitive emissions in the community and environs.
- Recycled water can be sprayed on roads, stockpiles, and conveyors to suppress dust there by reducing dust emissions.
- To create a buffer zone between the mine and the community, the mine management should consider purchasing additional land surrounding the mine to act as a buffer zone, which may help in reducing noise and dust impact on the surrounding community by reducing the distance.
- Planting of trees in the buffer zones can further help to minimise the visual impact of mining operations on local communities and reduce the levels of noise and dust.
- Continuous weather monitoring on site and purchasing of quiet trucks and excavators and customised trucks with rubber matting to dampen sounds when they are being loaded.

#### **6.4 Summary of Environmental Management Plan during construction, operation and decommissioning phases**

<b>Construction/Initial Phase</b>			
<b>Environmental Impact</b>	<b>Proposed mitigation measures</b>	<b>Responsibility</b>	<b>Monitoring plan</b>
<b>Air pollution</b>	<ul style="list-style-type: none"> <li>Control speed and operation of construction vehicles.</li> <li>Prohibit idling of vehicles.</li> <li>Maintenance of vehicles and equipment.</li> <li>Sensitize field mining workers and contractors.</li> <li>Workers should be provided with dust masks if working in sensitive areas.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Site Manager</li> </ul>	<ul style="list-style-type: none"> <li>Amount of dust produced.</li> <li>Level of Landscaping carried out.</li> </ul>
<b>Noise pollution</b>	<ul style="list-style-type: none"> <li>Maintain equipment and vehicles.</li> <li>Work should only be carried out only during daytime i.e. 08h00 to 17h00.</li> <li>Workers should wear earmuffs if working in noisy section.</li> <li>Management to ensure that noise is kept within reasonable levels.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Management</li> </ul>	Amount of noise
<b>Solid waste</b>	<ul style="list-style-type: none"> <li>Any debris should be collected by a waste collection company</li> <li>If trenches are dug, waste should be re-used or backfilled.</li> <li>The site should have waste receptacles with bulk storage facilities at convenient points to prevent littering during mining.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	Presence of well-Maintained receptacles and central collection point.
<b>Oil leaks and spills</b>	<ul style="list-style-type: none"> <li>Vehicles and equipment should be well maintained to prevent oil leaks.</li> <li>Contractor should have a designated area where maintenance is carried out and that is protected from rainwater.</li> <li>All oil products should be handled carefully.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	No oil spills and leaks on the site
<b>First aid</b>	<ul style="list-style-type: none"> <li>A well-stocked first aid kit shall be maintained by qualified personnel</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	Contents of the first aid kit.
<b>Visual</b>	<ul style="list-style-type: none"> <li>Environmental considerations will always be adhered to before clearing roads, trenching and excavating.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Employees will be trained on the importance of minimising visual impacts.</li> </ul>
<b>Archaeological Sites</b>	<ul style="list-style-type: none"> <li>Buffer zones will be created around the sites.</li> <li>Adhere to practical guidelines provided by an archaeologist to reduce the archaeological impact of mining and infrastructure development activities.</li> <li>All archaeological sites to be identified and protected before further mining and infrastructure development commences.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Register of all archaeological sites identified.</li> </ul>
<b>Occupational Health and Safety</b>	<ul style="list-style-type: none"> <li>Provide Personal Protective Equipment</li> <li>Train workers on personal safety and how to handle equipment and machines.</li> <li>A well-stocked first aid kit shall be maintained by qualified personnel.</li> <li>Report any accidents / incidences and treat and Compensate affected workers.</li> <li>Provide sufficient and suitable sanitary conveniences which should be kept clean.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Workers using Protective Equipment.</li> <li>Presence of Well stocked First Aid Box.</li> <li>Clean sanitary facilities.</li> </ul>
<b>Fauna</b>	<ul style="list-style-type: none"> <li>Some habitat areas such as trees of the riverbeds and tunnels outcrops will be avoided wherever possible.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Regular monitoring of any unusual</li> </ul>

	<ul style="list-style-type: none"> <li>A fauna survey will be conducted to determine the effect of fragmented habitat on game species should the need arise.</li> <li>No animals shall be killed, captured or harmed in any way.</li> <li>No foodstuff will be left lying around as these will attract animals which might result in human-animal conflict.</li> </ul>		signs of animal habitat.
<b>Alien Invasive Plants</b>	<ul style="list-style-type: none"> <li>The explorer will ensure that debris is properly disposed of.</li> <li>Vehicle tyre inspections can be carried out although this may not be a practical mitigation measure.</li> <li>Eradicating alien plants by using an Area Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Regular monitoring of any unusual signs of alien species.</li> </ul>
<b>Loss of vegetation</b>	<ul style="list-style-type: none"> <li>Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating.</li> <li>Paths and roads will be aligned to avoid root zones. Permeable materials will be used wherever possible.</li> <li>The movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive areas will be avoided.</li> <li>The movement of vehicles will be restricted to certain tracks only.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Warning signs on site</li> <li>restored vegetation</li> </ul>
<b>Operational Phase</b>			
<b>Environmental/ Social Impact</b>	<b>Proposed mitigation measures</b>	<b>Responsibility</b>	<b>Monitoring plan</b>
<b>Noise pollution</b>	<ul style="list-style-type: none"> <li>Maintain vehicles and drilling equipment.</li> <li>mining and infrastructure development should be carried out only during daytime.</li> <li>Workers to wear earmuffs if working in noisy section</li> <li>Management to ensure that noise is kept within reasonable levels.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Amount of noise</li> </ul>
<b>Visual</b>	<ul style="list-style-type: none"> <li>Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Employees will be trained on the importance of minimising visual impacts.</li> </ul>
<b>Fauna</b>	<ul style="list-style-type: none"> <li>Some habitat areas such as trees of the riverbeds and tunnels outcrops will be avoided wherever possible.</li> <li>A fauna survey will be conducted to determine the effect of fragmented habitat on game species should the need arise.</li> <li>No animals shall be killed, captured or harmed in any way.</li> <li>No foodstuff will be left lying around as these will attract animals which might result in human-animal conflict.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Regular monitoring of any unusual signs of animal habitat.</li> </ul>
<b>Alien Invasive Plants</b>	<ul style="list-style-type: none"> <li>The explorer will ensure that debris is properly disposed of.</li> <li>Vehicle tyre inspections can be carried out although this may not be a practical mitigation measure.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Regular monitoring of any unusual signs of alien species.</li> </ul>

	<ul style="list-style-type: none"> <li>Eradicating alien plants by using an Area Management Plan</li> </ul>		
<b>Loss of vegetation</b>	<ul style="list-style-type: none"> <li>Environmental considerations will be adhered to at all times before clearing roads, trenching and excavating.</li> <li>Paths and roads will be aligned to avoid root zones. Permeable materials will be used wherever possible.</li> <li>The movement of vehicles in riverbeds, rocky outcrops and vegetation sensitive areas will be avoided.</li> <li>The movement of vehicles will be restricted to certain tracks only.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Warning signs on site</li> <li>restored vegetation</li> </ul>
<b>Solid waste</b>	<ul style="list-style-type: none"> <li>Minimize solid waste generated on site.</li> <li>Recycle waste especially waste from trenching.</li> <li>Debris should be collected by waste collection company.</li> <li>Excavation waste should be re-used or backfilled.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Amount of waste on Site</li> <li>Presence of well-Maintained receptacles and central collection point.</li> </ul>
<b>Oil leaks and spills</b>	<ul style="list-style-type: none"> <li>Machinery should be well maintained to prevent oil leaks.</li> <li>Contractor should have a designated area where maintenance is carried out and that is protected from rainwater.</li> <li>All oil products should be stored in a site store and handled carefully.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>No oil spills and leaks on the site.</li> </ul>
<b>Archaeological Sites</b>	<ul style="list-style-type: none"> <li>Buffer zones will be created around the sites.</li> <li>Adhere to practical guidelines provided by an archaeologist to reduce the archaeological impact of mining and infrastructure development activities.</li> <li>All archaeological sites to be identified and protected before further mining commences.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Update Register of all archaeological sites identified.</li> </ul>
<b>First aid</b>	<ul style="list-style-type: none"> <li>A well-stocked first aid kit shall be maintained by qualified personnel</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Contents of the first aid kit.</li> </ul>
<b>Fire preparedness</b>	<ul style="list-style-type: none"> <li>Firefighting drills carried out regularly.</li> <li>Firefighting emergency response plan.</li> <li>Ensure all firefighting equipment are regularly maintained, serviced and inspected.</li> <li>Fire hazard signs and directions to emergency exit, route to follow and assembly point in case of any fire incidence.</li> </ul>	<ul style="list-style-type: none"> <li>Management</li> </ul>	<ul style="list-style-type: none"> <li>Number of fire drills carried.</li> <li>Proof of inspection on firefighting equipment.</li> <li>Fire Signs put up in strategic places.</li> <li>Availability of firefighting equipment.</li> </ul>

<b>Environment Health and Safety</b>	<ul style="list-style-type: none"> <li>• Train workers on personal safety and disaster preparedness.</li> <li>• A well-stocked first aid kit shall be maintained by qualified personnel.</li> <li>• Report any accidents / incidences and treat and compensate affected workers.</li> <li>• Provide sufficient and suitable sanitary conveniences which should be kept clean.</li> <li>• Conduct Annual Health and Safety Audits.</li> </ul>	<ul style="list-style-type: none"> <li>• Management</li> </ul>	<ul style="list-style-type: none"> <li>• Provide sanitary facilities.</li> <li>• Copies of Annual Audit</li> </ul>
<b>Decommissioning Phase</b>			
<b>Environmental/Social Impact</b>	<b>Proposed mitigation measures</b>	<b>Responsibility</b>	<b>Monitoring plan/indicator</b>
<b>Noise &amp; Air pollution</b>	<ul style="list-style-type: none"> <li>• Maintain plant equipment.</li> <li>• Decommissioning works to be carried out only during daytime.</li> <li>• Workers working in noisy section to wear earmuffs.</li> <li>• Workers should be provided with dust masks.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Management</li> </ul>	<ul style="list-style-type: none"> <li>• Amount of noise</li> </ul>
<b>Disturbed Physical environment</b>	<ul style="list-style-type: none"> <li>• Undertake a complete environmental restoration programme and introducing appropriate vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• Management</li> </ul>	
<b>Solid waste</b>	<ul style="list-style-type: none"> <li>• Solid waste should be collected by a contracted waste collection company</li> <li>• Excavation waste should be re-used or backfilled.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Management</li> </ul>	<ul style="list-style-type: none"> <li>• Amount of waste on Site.</li> <li>• Presence of well-maintained receptacles and central collection point.</li> </ul>
<b>Occupational Health and Safety</b>	<ul style="list-style-type: none"> <li>• Provide Personal Protective Equipment.</li> <li>• Train workers on personal safety and how to handle equipment and machines.</li> <li>• A well-stocked first aid kit shall be maintained by qualified personnel.</li> <li>• Demarcate area under decommissioning.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Workers using Protective Equipment.</li> <li>• Presence of a First Aid Box.</li> </ul>

## 6.5 Monitoring, Auditing and Reporting

### 6.5.1 Inspections and Audits

During the life of the project, performance against the EMP commitments will need to be monitored, and corrective action taken where necessary, in order to ensure compliance with the EMP and relevant enviro-legal requirements.

#### 6.5.1.1 Internal Inspections/Audits

The following internal compliance monitoring programme will be implemented:

1. Project kick-off and close-out audits will be conducted on all contractors. This applies to all phases, including drilling contract work during operations:
  - Prior to a contractor beginning work, an audit will be conducted by the applicable phase site manager to ensure that the EMP commitments are included in Contractors' standard operating procedures (SOPs) and method statements.
  - Following completion of a Contractors work, a final close-out audit of the contractor's performance against the EMP commitments will be conducted by the applicable phase site manager.
2. Monthly internal EMP performance audits will be conducted during the construction/initial and decommissioning phases.
3. Ad hoc internal inspections can be implemented by the applicable manager at his/her discretion, or in follow-up to recommendations from previous inspection/audit findings.

#### **6.5.1.2 External Audits**

- At the close of each project phase, and annually during the operational phase, an independently conducted audit of EMP performance will be conducted.
- Specialist monitoring/auditing may be required where specialist expertise are required or in order to respond to grievances or authorities directives.
- Officials from the DEA may at any time conduct a compliance and/or performance inspection of mining and infrastructure development mining operations. The proponent will be provided with a written report of the findings of the inspection. These audits assist with the continual improvement of the mining project and the proponent will use such feedback to help improve its overall operations.

#### **6.5.1.3 Documentation**

Records of all inspections/audits and monitoring reports will be kept in line with legislation. Actions will be issued on inspection/audit findings. These will be tracked and closed out.



#### **6.5.1.4 Reporting**

Environmental compliance reports will be submitted to the Ministry of Environment and Tourism on a bi-annual basis.

### **6.5.2 Environmental Management System Framework**

In order to implement Environmental Management Practices, an Environmental Management System (EMS) will be established and implemented by the proponent and their Contractors. This subchapter establishes the framework for the compilation of a project EMS. The applicable manager will maintain a paper based and/or electronic system of all environmental management documentation. These will be divided into the following main categories:

#### **6.5.2.1 Policy and Performance Standards**

A draft environmental policy and associated objective, goals and commitments has been included in the EMP. The mineral explorer may adapt these as necessary.

#### **6.5.2.2 Enviro-Legal Documentation**

A copy of the approved environmental assessment and EMP documentation will always be available by the proponent. Copies of the Environment Clearance Certificate and all other associated authorisations and permits will also be kept with the mining and infrastructure development team. In addition, a register of the legislation and regulations applicable to the project will be maintained and updated as necessary.

#### **6.5.2.3 Impact Aspect Register**

A register of all project aspects that could impact the environment, including an assessment of these impacts and relevant management measures, is to be maintained. This Draft EMP identifies the foreseeable project aspects and related potential impacts of the proposed project, and as such forms the basis for the Aspect-Impact Register; with the Project Activity. It is however noted that during the life of the project additional project aspects and related impacts may arise which would need to be captured in the Aspect-Impact Register. In this regard, the impact identification principles set forth in the scoping report can be used to update the Register. This method can be modified as required by the applicable manager as necessary during the life of the project.

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### 6.5.2.3 Procedures and Method Statements

In order to affect the commitments contained in this EMP, procedures and method statements will be drafted by the relevant responsible mining and infrastructure development staff and Contractors. These include, but may not be limited:

- Standard operating procedures for environmental action plan and management programme execution.
- Incident and emergency response procedures.
- Auditing, monitoring and reporting procedures, and
- Method statements for EMP compliance for ad hoc activities not directly addressed in the EMP action plans.

All procedures are to be version controlled and signed off by the applicable manager. In addition, knowledge of procedures by relevant staff responsible for the execution thereof must be demonstrable and training records maintained.

### 6.5.2.4 Register of Roles and Responsibilities

During project planning and risk assessments, relevant roles and responsibilities will be determined. These must be documented in a register of all environmental commitment roles and responsibilities. The register is to include relevant contact details and must be updated as required.

### 6.5.2.5 Site Map

An up to date map of the mining site indicating all project activities is to be maintained. In addition to the project layout, the following detail must be depicted:

- Materials handling and storage;
- Waste management areas (collection, storage, transfer, etc.);
- Sensitive areas;
- Incident and emergency equipment locations; and Location of responsible parties.

### 6.5.2.6 Environmental Management Schedule

A schedule of environmental management actions is to be maintained by the applicable phase site managers and/or relevant Contractors. A master schedule of all such activities is to be kept up to date by the manager. Scheduled environmental actions can include, but are not limited to:

- Environmental risk assessment;
- Environmental management meetings;
- Soil handling, management and rehabilitation;
- Waste collection
- Incident and emergency response equipment evaluations and maintenance
- Environmental training;
- Stakeholder engagement; Environmental inspections; and
- Auditing, monitoring and reporting.

### 6.5.2.7 Change Management

The EMS must have a procedure in place for change management. In this regard, updating and revision of environmental documentation, of procedures and method statements, actions plants etc. will be conducted as necessary in order to account for the following scenarios:

- Changes to standard operating procedures (SOPs);
- Changes in scope;
- Ad hoc actions;
- Changes in project phase; and
- Changes in responsibilities or roles

All documentation will be version controlled and require sign off by the applicable phase site managers.

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## 6.6 Closure Plan

The closure vision for the proposed project is to establish a safe, stable and non-polluting post-prospecting landscape that can facilitate integrated, self-sustaining and value generating opportunities, thereby leave a lasting positive legacy. The aim of the closure plan is to:

- Creating a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation.
- Sustaining long term catchment yield and water quality.
- Focusing on establishing a functional post-prospecting landscape that enables self-sustaining agricultural practices where possible.
- To encourage, where appropriate, the re-instatement of terrestrial and aquatic wetland biodiversity

### 6.6.1 Alternatives Considered

Considering that this is a uniform mining project with no chemical processing involved, the proposed project is not complex, and the risks associated with prospecting are understood and can be mitigated at closure. Alternative options for closure are limited. There are only two options that have been considered as activity alternatives for the closure plan:

- **Preferred Alternative:** Closure or Backfill of trenches with overburden removed during mining.
- **Alternative 2:** To Leave trenches open, in-order to allow for groundwater recharge by surface run-off.

### 6.6.2 Preferred Alternative: Rehabilitation/ Backfill of boreholes

Rehabilitation is the restoration of a disturbed area that has been degraded as a result of activities such as mining, road construction or waste disposal, to a land use in conformity with the original land use before the activity started. This also includes aesthetical considerations, so that a disturbed area will not be visibly different to the natural environment. This also involves maintaining physical, chemical and biological ecosystem processes in degraded environments, hence the preferred option of

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backfilling the boreholes with the overburden removed during development and cover with growth medium to establish vegetation. This option has several advantages as discussed below:

**Advantages:**

- The site will be aesthetically acceptable;
- The site will blend in with the environment;
- The site will be a suitable habitat for fauna and flora again.
- The site will be safe and pollution free;
- Revegetating the site will ensure that the site is non-erodible.

Opting for alternative 1, which is to leave trenches without backfilling poses a risk in that, these boreholes may fill in with water, which may become attractive to wildlife and communities leading to drowning and the risk of being trapped in the declines. To mitigate these risks, it is necessary to backfill. Treatment technologies should be used to prevent decanting.

### **6.6.3 Closure Assumptions**

This closure plan has been developed based on limited available information including environmental data. Some of the information currently available may need to be supplemented during the operational period. Therefore, several assumptions were made about general conditions, and closure and rehabilitation of the facilities at the site to develop the proposed closure actions. As additional information is collected during operations, these assumptions will be reviewed and revised as appropriate.

The assumptions used to prepare this plan include the following:

- The closure period will commence once the last planned weight of minerals has been extracted from the site.
- The proposed mining sites will be adhered to minimise the potential impacts.
- Vegetation establishment will be in line with a project area's indigenous vegetation.

- Water management infrastructure developed for the operational phase will be retained for closure /end of the life of the project as necessary.
- There are limited opportunities for any infrastructure to be built on site and if any infrastructure is built, it will be of limited benefit to the community. Therefore, all buildings will be demolished.
- All hazardous and domestic waste will be transported offsite for disposal in licensed landfills.
- No roads are anticipated to be constructed to access the site; existing roads will be used as far as possible. Where access tracks have been developed in cases where there are no roads, these will be rehabilitated and closed as part of normal closure actions.

#### **6.6.4 Closure and Rehabilitation Activities**

The rehabilitation actions intended to be undertaken at the end of the life of the proposed mining activities are described below.

##### **6.6.4.1 Infrastructure**

All infrastructures will be decommissioned, and the footprints rehabilitated for the establishment of vegetation. Material inventories will be managed near the end of mining activities to minimize any surplus materials at closure. Where practicable, equipment and materials with value not needed for post-closure operations will be sold and or removed from the site. Equipment with scrap or salvage value will be removed from the site and sold to recyclers.

A soil contamination investigation will be conducted on completion of demolition activities. The purpose of this is to identify areas of possible contamination and design and implement appropriate remedial measures to ensure that the soil contaminants are removed. Closure actions will include:

- All power and water services to be disconnected and certified as safe prior to commencement of any decommissioning works;
- All remaining inert equipment and decommissioning waste will be disposed to the nearest licensed general waste disposal facility;

- Salvageable equipment will be removed and transported offsite prior and during decommissioning;
- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains;

#### **6.6.4.3 Roads**

Existing roads will be used as far as possible. Closure actions concerning roads and parking areas will include:

- Removal of all signage, fencing, shade structures, traffic barriers, etc.
- All 'hard top' surfaces to be ripped along with any concrete structures.
- All potentially contaminated soils are to be identified and demarcated for later remediation; and
- All haul routes that have been treated with saline dust suppression water need to be treated, with the upper surface ripped and removed to designated contaminant disposal areas.

#### **6.6.4.4 Remediation of Contaminated Areas**

All soil, contaminated with hydrocarbons, will be identified, excavated, if possible, to at least 200 mm below the contaminated zone and then treated.

- All tanks, pipes and sumps containing hydrocarbons will be flushed or emptied.
- Removed soils will be managed as determined by the nature and extent of the contamination.
- Liquid storage tanks will be emptied, the structure removed/demolished and sub-surface holes filled; and
- All equipment in which chemicals have been stored or transported will be cleaned and disposed of in a suitable disposal facility.

#### **6.6.4.5 Vegetation**

Successful revegetation will help control erosion of soil resources, maintain soil productivity and reduce sediment loading in streams utilizing non-invasive plants that

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fit the criteria of the habitat (e.g. soils, water availability, slope and other appropriate environmental factors). Invasive species will be avoided, and the area will be managed to control the spread of these species.

To counter the effects of erosion, naturally occurring grassland species will be planted on slopes. These species will provide soil holding capacity and reduce runoff velocity. The flatter areas will be re-vegetated with the objective of creating a sustainable ecosystem. The occurrence of protected plant species will need to be determined before vegetation is removed and the required permits will be obtained for either destruction or relocation.

#### **6.6.4.6 Waste Management**

Waste management activities will include:

- Hazardous waste will be managed handled, classified and disposed.
- Non-hazardous will be disposed in the nearby licensed landfill site;
- Scrap and waste steel will be sold to recyclers.
- It may be necessary to fence temporary salvage yards for security reasons, particularly where these are located close to public roads.