

ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED MINING ACTIVITIES ON MINING CLAIMS (72915, 72916, 72917, 72918, 72919, 72920) IN THE OTJOZONDU AREA, OTJOZONDJUPA REGION

Prepared for

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LIST OF ACRONYMS

ANFO:	Ammonium Nitrate/Fuel Oil
DEAF:	Department of Environment and Forestry
DoF:	Directorate of Forestry
DWSSC:	Directorate of Water Supply and Sanitation Coordination
ECC:	Environmental Clearance Certificate
EIA:	Environmental Impact Assessment
EMA:	Environmental Management Act
EMP:	Environmental Management Plan
GDP:	Gross Domestic Product
GSN:	Geological Society of Namibia
HWC:	Human Wildlife Conflicts
I&APs:	Interested and Affected Parties
MC/s:	Mining Claim/s
MEFT:	Ministry of Environment, Forestry and Tourism
MIT:	Ministry of Industrialization and Trade
MLIREC:	Ministry of Labour, Industrial Relations and Employment Creation
MME:	Ministry of Mines and Energy
MoHSS:	Ministry of Health and Social Services
NAMPOL:	Namibian Police
NBRI:	National Botanical Research Institute
NEPL:	Non-Exclusive Prospective License
NPC:	National Planning Commission
PPP:	Public Participation Process
SWMU:	Solid Waste Management Unit
TLB:	Tractor-Loader-Backhoe
ToR:	Terms of Reference

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

Mrs. Lizzie Caroline Armstrong, hereinafter referred to as the proponent, intends to commence with mining activities on six mining claims 72915-72920 which are located within the EPL 3539 in the Otjozondu area, Otjozondjupa region. All MCs are registered for base and are located within the EPL 3539 and area adjacent to each other.

EPL 3539 belongs to the Otjozondu Mining (Pty) Ltd owns which also owns a Mining Licence (ML 145) located in the same proximity. Mining activities in the Otjozondu area has taken place intermittently since the 1950s and continues today. This has led to the establishment of the existing Manganese Mine Project consisting of a manganese pit, processing plant and supporting infrastructure. Otjozondu Mining is currently in possession of an Environmental Clearance Certificate for the existing operations. All minerals to be mined from the new mining claims will undergo the processing, beneficiation at the existing Otjozondu Mine. The processed minerals will be transported to Walvis Bay for export market.

In terms of the Environmental Management Act No. 7 of 2007 and Environmental Impact Assessment Regulations of February 2012, all mining and quarrying activities cannot be undertaken without an Environmental Clearance Certificate, hence this study. The objective of the EIA is to identify the potential impacts associated with the mining activities and to provide mitigation measures and ensure that potential impacts to the environment are managed effectively and that positive impacts are enhanced. Given the fact that the proposed activities are taking place within a pristine environment where conservation is a priority, a specialist study on the ecological impacts of the proposed mining was conducted and a report has been attached hereto this report.

1.2 Objectives of the EMP

The specific objectives of this EMP are to.

- Present measures to avoid, lessen and mitigate adverse impacts on various environmental components, protect environmental resources, and enhance the value of environmental components where possible.
- Define the roles and responsibilities for the implementation of environmental management and mitigation measures.
- Explain the need for compliance with regulatory provisions and guidelines at local, regional, and national levels.
- Formulate operational standards for continual improvement in environmental performance and reduce adversity of potential impacts.
- Explain procedures for compliance monitoring and reporting to the relevant competent and regulatory authorities.
- Formulate procedures for environmental rehabilitations and post closure provisions.

2. DESCRIPTION OF PROPOSED ACTIVITIES

The method to be used in mining include mainly drilling and blasting to test the composition of the individual structural components, leading to the final establishment of the open pit boundaries, and start-up benches for ore extraction.

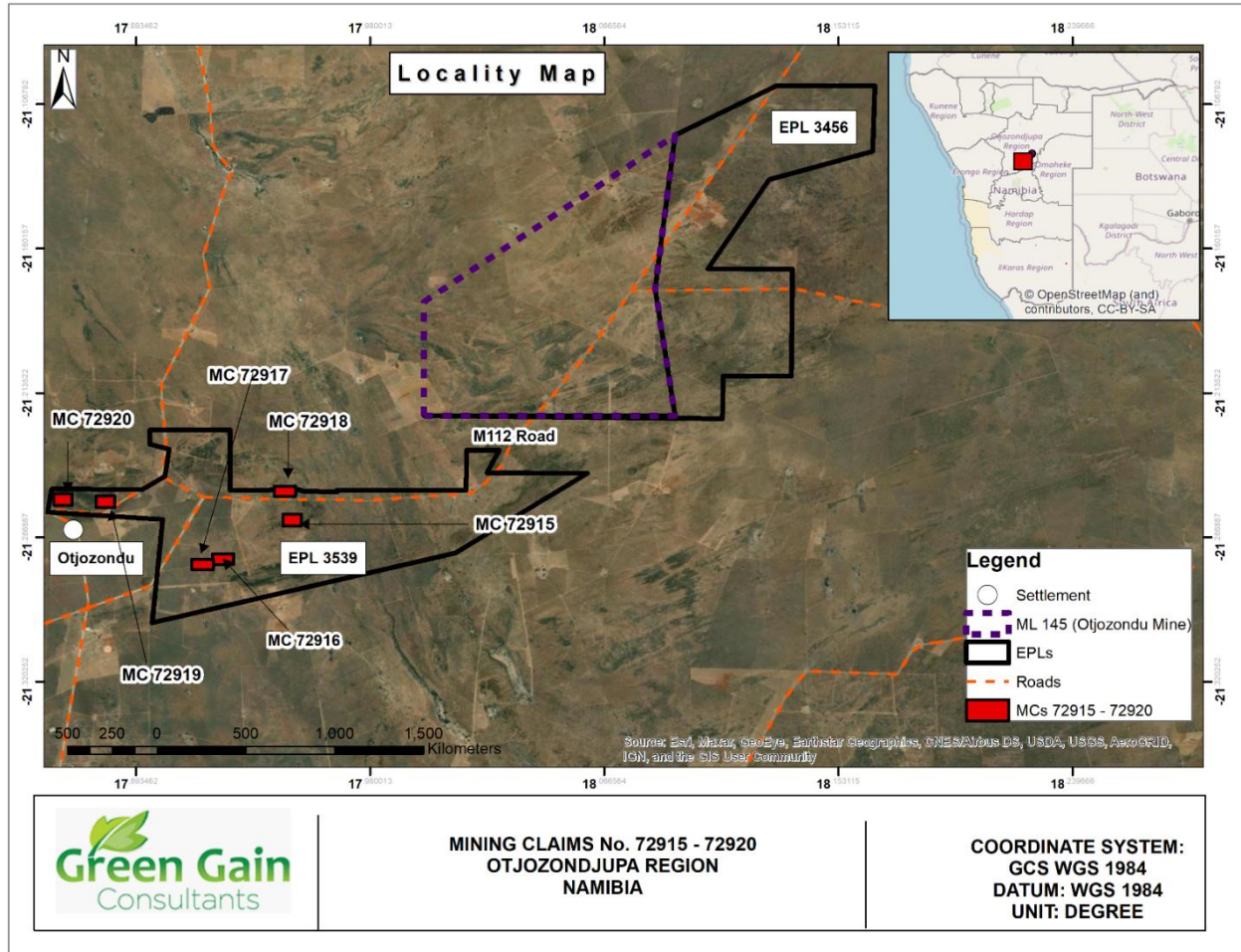


Figure 1: Proposed mine layout plan

3. IMPLEMENTING THE ENVIRONMENTAL MANAGEMENT PLAN

3.1 Role players and responsibilities

The implementation of this EMP is an ultimate responsibility of the proponent. However, the implementation also requires various administrations of authorities at local, regional, and national levels as described below.

Table 1: Roles and Responsibilities

Role Player	Responsibilities
1. Institutions	
1.1. MME Competent Authority	<p>The Ministry of Mines and Energy has the overall responsibility and mandate to regulate the proposed mining activities. Some of the responsibilities relevant to mining are as follows.</p> <ul style="list-style-type: none"> • In terms of Section 10 of the Environmental Regulations, MME is a relevant competent authority. Hence, on receipt of the Scoping Report and the EMP, MME must forward applications to the Environmental Commissioner to obtain Environmental Clearance Certificates as well as the documents referred to in regulation 7(2). • Department of Mines <ul style="list-style-type: none"> ○ Registration of Non-Exclusive Prospective Licence and Mining Claims to authorize mining activities. ○ Issuing of transport permits ○ Mining Division should conduct regular inspections. • Mineral Ancillary Rights Commission should oversee the consultative process between proponent and MEFT or land user/operator to resolve conflicts when they arise. • Geological Survey of Namibia should provide geo-technical support i.e., geo-data, laboratory services etc. to the proponent to enable them in making informed decisions.
1.2. MEFT Regulatory Authority	<p>The Ministry of Environment, Forestry and Tourism is the Regulatory Authority in terms of the Environmental Impact Assessment Regulations and has the following responsibilities:</p>

	<ul style="list-style-type: none"> • Department of Environmental Affairs and Forestry (DEAF) is responsible to oversee the implementation of the EMP. • Moreover, DEAF is also responsible for conducting compliance monitoring, reviewing of environmental and incidental reports and approval of renewal, transfers, and amendments of ECCs. • The Directorate of Forestry (DoF) must enforce relevant Regulations of the National Forest Act, monitor vegetation clearance, and ensure control of invader species and forest fire etc. • The Directorate of Wildlife Conservancy and National Parks should resolve all human-wildlife related conflicts.
1.3. MAWLR	<ul style="list-style-type: none"> • Ministry of Agriculture Water and Land Reform with assistance from Erongo Communal Land Board must resolve land use conflicts, i.e., Land Tenure, grazing areas, settlements etc. • The Directorate of Water Supply and Sanitation Coordination (DWSSC) shall provide water abstraction permits as well as to monitor water utilizations at the site in accordance with the contractual agreement. This can be done by means of regular site inspections and assessments.
1.4. MLIREC	<p>The Ministry of Labour, Industrialization and Employment Creation has the mandate to provide labour (industrial) relations and employment and social protection services as per of Constitution of the Republic of Namibia and to ensure compliance with the Labour Act, No.11 of 2007, Affirmative Action Act, No. 29 f 1998 (Employment Act).</p> <p>The Division of Labour should carry out specific activities as follows.</p> <ul style="list-style-type: none"> • Conducting labour inspections. • Investigating workplaces complaints. • Conducting workplace accident investigations; and • Conducting stakeholders' meetings when
1.5. Farm Owners	<ul style="list-style-type: none"> • Ensure that all mining activities are conducted in line with the agreement

2. Proponent

- Be fully conversant with this Environmental Management Plan, and all relevant environmental legislation.
- Ensure that all stipulations within the EMP are communicated and adhered to by all employees or sub-contractors where applicable.
- Implement various applicable mitigation measures outlined on Table 5-7 of this EMP.
- Conduct monitoring of identified environmental receptors as per Chapter 6 of this EMP.
- Signing of Environmental Contracts with MEFT-DEAF
- Obtain necessary permits, licenses, consents etc. as outlined on Table 3 of this report.
- Compile and submit environmental monitoring reports to MEFT every twelve months as per Section 5.4 (1) and (2) of the Environmental Impact Assessment Regulations. The purpose of the monitoring report is to provide progress on the implementation of the EMP.
- The proponent should ensure the renewal of ECCs every three years and Mining Claims every after three years and thereafter, every after two years.

3.2 Awareness and training

It is important to ensure that all employees have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimization of environmental harm.

To achieve effective environmental management, it is important that all employees are aware of their responsibilities in terms of the relevant environmental legislations and the contents of this EMP. This can be achieved by providing trainings.

Environmental training for employees should typically include the following aspects:

- Basic understanding of the key environmental features of the site and the surrounding environment.
- The significant environmental impacts, actual or potential, as a result of their activities.
- The environmental benefits of improved personal performance.
- Their roles and responsibilities as well as importance in achieving conformance with the environmental policy and procedures.
- The potential consequences of deviating from specified operating procedures.
- The mitigation of negative impacts.
- The importance of not littering.
- The need to use water sparingly.
- Waste management strategies.
- Awareness on the importance of archaeological and historical sites that are found in the surrounding and the need to conserve them.
- Awareness on the fauna and flora of special concern.
- The need for environmental rehabilitation and proper decommissioning during and after mining operations.

4. LEGAL FRAMEWORK AND OPERATIONAL STANDARDS

4.1 Legal compliance

The proposed mining activities affects several sectors such as land, forestry, water, energy, trade etc. Hence, various licenses, permits, consents are required to ensure due diligence and legal compliance.

Table 2: Legal compliance requirements

Aspect	Activities	Legal Requirement/s	Reporting Frequency	Regulatory Authority
Mining	-Mining, transportation, and marketing	-Non-exclusive prospecting license -Mining claim -Ancillary rights -Transport permit -Export permit for international market	-Quarterly and annual reports. -Renewal of MCs after three years and thereafter, every two years.	MME
Land tenure	-Mining, accommodation and supporting infrastructures	-Consent letter from MEFT -Leasehold agreement	-None	MAWLR
Environment	<u>Listed Activities</u> mining, quarrying, blasting and waste management	-EMP -ECC	-Annual reports -Renewal of ECC after three years	MEFT
Vegetation	-Forest permit, -Wood collection	-Forest permit	-None	MEFT-DoF
Water	Water abstraction	-Water abstraction permit	-None	MAWLR-DWSSC
Waste Management	-Effluent discharge -Solid waste generation, disposal	-ECC -Effluent discharge permit	-None	MEFT, MAWLR-DWSSC
Energy	-Storage of fuel -Solar plant -Gas storage facilities	-ECC for +200liter -ECC for 30MW solar plant -ECC for storage of 30 cubic of liquefied petroleum gas	-None	MME MEFT
Health and Safety	-Manufacture, storage, use of explosive containing gunpowder and other listed abrasives -Mining (excavations, blasting etc.).	-Explosive permit -Blasting certificate	-None	NAMPOL-Explosive Unit MME

4.2 Minimum operational standards

The proponent must adhere to the following minimum operational standards for effective implementation of the Environmental Management Plan.

4.2.1 Mining Claim area

- Any person who wants to carry out any prospecting or mining operations in the private farmland must obtain approval from respective farm owners, prior to the making of any application as contemplated in the Minerals (Prospecting and Mining) Act 33 of 1992.
- All MCs or EPL should be pegged and registered in accordance with Section 16-45 of the Minerals (Prospecting and Mining) Act 33 of 1992.
- The mining area must be clearly demarcated by using beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- The prospecting and mining of the group of minerals registered for in the MC, shall only take place within this demarcated mining area.
- Areas with abundance of protected species are noted and such sites must be avoided and considered as no-go zone areas.

4.2.2 Access roads

- Existing roads shall be used as far as practicable.
- Access road to the new sites and the campsite must be established in consultation with the farm owners.
- Permit for accessory works should be obtained from MME before creation of new roads.
- The construction, and location of access roads to District roads should be in accordance with the requirements laid out by the Roads Authority (RA).

4.2.3 Temporary accommodation

- Approval should be obtained from farm owners prior to the establishment of temporary accommodation facilities within the farm area.
- The temporary accommodations should not be a place of abodes, hence only people that are directly involved in the mining operations can stay at the camping site.
- All pets and companion animals to be kept by workers at accommodation facilities such as dogs, cats etc. must be under control.

4.2.4 Toilet facilities and wastewater handling

- As a minimum requirement, the proponent shall provide ablution facilities by means of a ventilated improved pit (VIP) latrine for all sites without sewer lines, as recommended by the DWSSC. Alternatively, a portable toilet connected to a septic is recommended.
- All wastewater from domestic activities shall be channeled into the pit or septic tank which should be emptied regularly. Wastewater should be collected and disposed of, at the nearest wastewater oxidation ponds or treatment plant.
- According to the general Health Regulations (GN 121 of 1969), at least one VIP latrine for each group of 15 people (adult) and separate toilets for male and female is recommended.
- All ablution facilities should not be less than 200 meters, from any stream, or borehole.
- Any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognized facility.

4.2.5 General and hazardous waste handling

- The proponent shall always make suitable covered containers available for the disposal of waste.
- General wastes should be collected and disposed of at the Okahandja disposal site. All recyclables should be collected separately and sent to the nearest recycling center.
- No waste should be buried or burned on site.
- All used oils, grease or hydraulic fluids shall be placed in separate containers, and these containers will be removed from the site on a regular basis for disposal to Walvis Bay Landfill site (Note: not to be disposed of at Okahandja disposal site).
- All spills should be cleaned up immediately to the satisfaction of the Mining Inspector.

4.2.6 Managing occupational health hazards

As part of the operation standard, it is also very crucial that the proponent addresses various occupational health hazards as identified in EIA study. These are as follows.

Occupational Hazard	Hazard type	Potential Risks	Proposed Enforcement/Measure
Dust	Ergonomic	Lung diseases, skin irritation and eye damage	PPE (dust mask) Reduce exposure time
Noise	Physical	Insomnia	PPE (earmuffs) Reduce exposure time
Vibration	Ergonomic	Insomnia	PPE (earmuffs) Reduce exposure time
Noxious gases	Chemical	Lung diseases, cancer, respiratory diseases etc.	PPE (dust mask) Reduce exposure time
Falling rocks	Physical	Injuries, death	PPE (gloves, shoes)
Flying rocks	Physical	Injuries	PPE (gloves, shoes, goggles/glasses)
Heights	Ergonomic	Falling, injuries, death	PPE (safety harness)
Toxic and hazardous substances	Radiological	Poisoning	PPE (gloves, masks)
Explosions	Physical	Fire, damage, injuries, death	Awareness PPE
Heavy loads	Ergonomic	Fatigue	Awareness Technology
Long distances	Physical	Physical fatigue	Transport
Long working hours	Ergonomic	Physical fatigue, insomnia	Working in shifts Breaks Limit working hours (8hrs daily)
Poisonous plants	Biological	Poisoning	Awareness
Predators	Biological	Injuries, death	Awareness Protection
Snake bites	Biological	Injuries, death	Awareness Safety Aid (anti-venom)
Harsh weather	Physical	Fatigue	Dehydrate (drink water)
Conflicts/Disagreements	Behavioral	Body harm Injuries	Communication Disciplinary Actions

The exposure to these hazards could be aggravated by risk factors such as the lack of experience & limited knowledge, nature of work and non-compliance to health safety standards. In order to reduce the likelihood and adversity of the identified hazards, it is recommended that the proponent compile a detailed provide detailed hazard analysis for each specific activity. In addition, employees should receive training on their respective duties and task to be performed, accompanied by regular safety talks. Moreover, there must be safety representatives/committee to oversee all safety related issues together with the management.

5. MANAGEMENT AND MITIGATION MEASURES

5.1 Table 3: Management of biophysical impacts

Below are the proposed mitigation measures to avoid, prevent and mitigate the identified potential impacts of the proposed mining activities to the biophysical environment during the operational and decommissioning phases.

Significant Impacts	Source of Impacts	Proposed Mitigation Measures	Responsibility of Action Implementation	Monitoring Actions and Responsible Authority
<ul style="list-style-type: none"> Vegetation loss or destruction 	<p>-Potential impacts on vegetation through; trampling, clearance, dust generation, soil disturbance and veld fire.</p>	<ul style="list-style-type: none"> Minimize vegetation clearance and avoid damage to sensitive areas. Use existing access roads as far as possible. Only vegetation that are directly affected by the mining activities should be removed. Areas with abundance of <i>Welwitschia mirabilis</i> should be excluded from mining. Adhere to speed limit of 40km/hr. in the farm area and 60 km/h on gravel road. Rehabilitate the area by backfilling excavations. Fireplaces should be well secured to prevent fire outbreaks. 	Proponent	Inspection around the mining area by MEFT- DoF.
<ul style="list-style-type: none"> Loss or reduction of local Fauna 	<p>-Mining operations in sensitive areas could cause large habitat fragmentation</p>	<ul style="list-style-type: none"> All “No-go-zone areas” as identified in the scoping report must be avoided. 	Proponent	Inspection around the mining area by MEFT-

	<p>and drive away wildlife from their natural habitats.</p> <p>-Mining and other anthropogenic activities in wildlife zones may cause conflicts with wildlife.</p> <p>-Settlement in wildlife areas may also lead to illegal poaching.</p>	<ul style="list-style-type: none"> • Adhere to the speed limit of within the farm and on gravel road. • Mining should be done strictly during daytime and no operations during nighttime. • Campsites must not be placed in wildlife zones. • Trapping, chasing, or killing of wildlife (both large and small) is prohibited. • The movement of pet animals such as dogs, and cats must be under control. 		Wildlife and Nature Conservation Division.
<ul style="list-style-type: none"> • Destruction of Topography, Landscape and Drainage 	<p>Open pit mining cause disturbance on larger areas and decrease the sense of place and aesthetical value.</p> <p>Changes in the topography caused by the mining activities could alter wind direction, flow of surface water and aesthetic appearance of the area.</p>	<ul style="list-style-type: none"> • Waste rocks should properly and carefully be disposed of and where possible, excavations from mining activities should be rehabilitated. • Waste rocks and overburden should not be placed in riverbeds or main drainage. • Important topographic views should be preserved. 	Proponent	Inspections by MME
<ul style="list-style-type: none"> • Ecological degradation and habitat fragmentation 	<p>The mining activities, especially those using semi-mechanized method have potential to cause large scale habitats fragmentations.</p> <p>The intensification of the mining operations will degrade the ecological functions and ecosystem connectedness.</p>	<ul style="list-style-type: none"> • Minimize vegetation clearance and disturbances. • Only designated access roads should be used. • Sensitive habitats i.e., riverbeds, valleys, caves should be avoided. 	Proponent	Inspections by MME

<ul style="list-style-type: none"> Soil erosion and contamination 	<p>-De-vegetation of the area due to mining will increase soil erosion by wind or water and increase suspended sediment loads in nearby streams and rivers.</p> <p>-Contamination from spillage, leakages, and direct discharge of pollutant in the soil.</p>	<ul style="list-style-type: none"> The topsoil should be properly and securely stockpiled and should not be mixed with overburden and should be backfilled after mining. Soil conservation measures such as berms and gabions should be used on-site to help reduce erosion. Any cases of erosion should be contained. Vehicles and equipment with oil leaks should be inspected and properly maintained. Spillage or leakage should be contained, and contaminated soil should be carefully removed and disposed of at the Okahandja waste disposal site. 	<p>Proponent</p>	<p>Inspections by MME</p>
<ul style="list-style-type: none"> Disturbance of geology 	<p>-Unintended disturbance of geotechnical of the soil during the mining process</p>	<ul style="list-style-type: none"> Obtain geo-technical data from the GSN to make informed decisions on mining. 	<p>Proponent</p>	<p>Inspections by MME</p>
<ul style="list-style-type: none"> Water Resources pollution and increased demand 	<p><u>Pollution</u> -Pollution of fresh water sources from mining activities and poor handling of mine waste.</p> <p><u>Increased demand</u> -Water is a very scarce commodity in the area, hence, using water in mining operations will increase the local demand significantly.</p>	<ul style="list-style-type: none"> Wastewater should not be discharged directly in the environment. It should be collected and disposed of at the nearest oxidation ponds or wastewater treatment plant (Okahandja). Waste rocks and overburdens should be disposed away from water sources and in such a way that there is no contact with drainage or freshwater. Water should be primarily used for domestic purposes. 	<p>Proponent</p>	<p>Record keeping</p>
<ul style="list-style-type: none"> Groundwater contamination and over-abstraction 	<p><u>Contamination</u> -Groundwater sources could be easily</p>	<ul style="list-style-type: none"> Mining camps should be equipped with VIP latrines. 	<p>Proponent</p>	<p>Ensure monitoring of groundwater quality every year or as required by</p>

	<p>contaminated from poor waste handling.</p> <p><u>Over-abstraction</u> -Groundwater of the area is of poor quality and limited quantity, hence, over-abstraction will deteriorate the quality further.</p>	<ul style="list-style-type: none"> • All borehole drilling should be approved by the DWSSC under the MAWLR. • Un-productive boreholes should be rehabilitated or decommissioned. 		MAWLR during the life span of mine
<ul style="list-style-type: none"> • Air pollution 	<p>-The major source of air pollution is fugitive dust from excavations, loading, transportation, hauling of waste rocks, as well as wind erosion of open pits.</p>	<ul style="list-style-type: none"> • Minimize dust generation and where possible provide dust suppression i.e., sprinkle with water. • Avoid excavation during windy days/times. 	Proponent	<p>Inventory of all dust generating activities and ensure regular inspections.</p> <p>Inspections by MME</p>
<ul style="list-style-type: none"> • Land Degradation 	<p>-Land degradation could occur because of surface disturbance, vegetation clearance, reduced/disturbance of grazing areas, water, and wood over utilization and resources over-extraction.</p>	<ul style="list-style-type: none"> • Cutting down of trees for wood collection should be prohibited. Vegetation that are already damaged should be used for firewood. • All spillage and contaminated soil should be carefully removed and disposed of at the Okahandja disposal site. • Mined out areas should be rehabilitated after mining. 	Proponent	-Inspections by MME

5.2 Table 4: Management of socio-economic impacts

Below are the proposed mitigation measures to avoid, prevent and mitigate the identified potential impacts of the mining activities to the socio-economic environment during the operation and decommissioning phase.

Significant Impacts	Description of the Impacts	Proposed Mitigation Measures	Responsibility	Monitoring Actions and Responsible Authority
Non-compliance	<p><u>Lack of awareness</u> Employees are likely to ignore the requirements of this EMP and continue with their activities as usual if they are not provided with training on this EMP. This will mean that the identified environmental impacts of the mining activities will continue unabated.</p>	<ul style="list-style-type: none"> All employees should be given training on the content of this EMP and should be made aware of the legal requirements and due diligence. The training should be given in the respective vernacular languages. 	MME	Proof of training of all employees
Public Health and Safety	<p><u>Blasting and Drilling</u> -The noise, dust and vibration and noxious gases caused by blasting and drilling is not only a nuisance to people but also a health hazard. Moreover, abrasive material and the surface being blasted may contain toxic materials (e.g., lead paint, silica) that are hazardous to workers and residents.</p> <p><u>Excavations:</u> Uncovered excavations, pits and trenches from mining</p>	<ul style="list-style-type: none"> Only use blasting abrasive and explosive listed under Group I and II of the Explosive Act No. 26 of 1956. <i>gunpowder, nitro-glycerine, dynamite, guncotton, blasting powders, fulminate of mercury or of other metals, coloured fires, and every other substance, whether similar to those herein mentioned or not, which is used or manufactured with a view to produce a practical effect by explosion or a pyrotechnic effect.</i> 	Proponent	<p>Inspections by MME and NAMPOL</p> <p>Inspections by MME</p>

	<p>activities are a safety hazards for animal and humans. People and animals are at risk of falling or being trapped into the un-rehabilitated pits and trenches.</p> <p><u>Nuisance</u> According to the Labour Act 11 of 1992) a nuisance is described as noise, dust and odor pollution. Fugitive dust (sand and soil) will be dominant on dry sunny days due to excavation, backfilling and the operation of heavy equipment. Mining implements and machinery could also generate high level noise which could be regarded as a nuisance to the employees and residents.</p>	<ul style="list-style-type: none"> • Use abrasives that can be delivered with water (slurry) to reduce dust. • Blasting should ONLY be carried out by a registered company/person. • Police Clearance should be obtained from the local NAMPOL offices. • No major blasting should take place within 1km from residential areas. • Keep people away from the blasting area. • Provide a Blasting Notice by means of a sign board onsite. • Excavated areas must be backfilled and properly rehabilitated. • Identified wildlife corridors and sensitive habitats in the area must be avoided. • Noise level at semi-mechanized sites should not exceed 85db (Health and Safety Regulations No.156). • Provide regular maintenance of all equipment/machines to reduce noise generation. • Employees should always wear PPE. • Apply soundproof to operational machineries/equipment. 	<p>Proponent</p>	<p>Inspections by the MLIREC</p>
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		<ul style="list-style-type: none"> Operations should be limited to daylight hours (8:00-19:00). Avoid operating during odd hours and nighttime. 		
Explosions and fire outbreaks	<p><u>Use and storage of fuel for mining purposes.</u> If not properly stored, fuel could cause fire outbreaks. Uncovered fuel may also be poisonous to animals through drinking, especially if stored in large quantity.</p>	<ul style="list-style-type: none"> The proponent is advised to keep less than 200L of fuel at the site as per the Petroleum Products Regulations of 2000. Petrol should be stored in underground sources while diesel should be kept at properly secured site. 	Proponent	MME
Visual appeal and aesthetics	<p>Temporary housing structures and excavated pits may also be visible from the road and not necessarily visually attractive to tourists or visitors to the area.</p>	<ul style="list-style-type: none"> Temporary structures should be made of local materials available and should be comparable to the local landscapes. Control of fugitive dust by suppression or reduce dust generating activities 	Proponent	Inspections by MME
Visibility	<p>Mining activities generate excessive dust which causes visual intrusion in the area.</p>	<ul style="list-style-type: none"> If lighting is to be used onsite, it should be installed in such a manner that it does not cause annoyance to the local wildlife and residents. 	Proponent	Inspections by MEFT
Waste Generation	<p>Mining activities generate different types of waste such as waste rocks, litter, scrap metals, and sewage waste. If not properly handled it could cause various environmental impacts, i.e.,</p>	<ul style="list-style-type: none"> Topsoil and waste rocks should be backfilled in the trenches where possible. General waste generated on site should be gathered, collected regularly and properly disposed at the 	Proponent	Inspections by the Erongo Regional Council and MEFT-SWMU

	contamination of fresh water sources, pollution of the surrounding environment etc.	<p>nearest Municipal or approved disposal site.</p> <ul style="list-style-type: none"> • Hazardous waste i.e., used oil, batteries generated should be collected and transported to specialized waste collectors for proper disposal procedures. No dumping or littering should be allowed. • Unwanted and old temporary structures not in use must be removed from the site and disposed of by the owner. 		
Land use conflicts and competition	<p>-Mining activities are likely to compete with other land users for resources such as land, water etc.</p> <p>Expansion of mining activities may encroach on community lands. Destruction of the environment through mining may render the land not suitable for agriculture and livestock keeping and hence force traditional communities to migrate in search for more fertile lands. This also will cause interference with the livelihood activities of the local communities.</p>	<ul style="list-style-type: none"> • No permanent dwellings should be erected on site without prior approval from farm owners. • The proponent should demonstrate respect to local cultural, heritage or political status of the local people. • Proponent should obtain consent from MEFT. 	Proponent	Issuing of Ancillary Rights by MME
Temporal Housing for Employees	The absence of basic services will lead to pollution of the environment because	<ul style="list-style-type: none"> • All employees are required to have access to a pit latrines and proper hygiene 	Proponent	Inspections by MEFT

	<p>of poor sanitation or lack of waste management.</p> <p>Uncontrolled fire could result in fire outbreak.</p> <p>Placing Temporary housing structures in remote areas or wildlife habitats might result in HWC.</p>	<p>measures shall be established.</p> <ul style="list-style-type: none"> • Fireplaces should be at secure sites and the fire should be put off after use. • The housing areas should be at secured sites and movement of people during night hours should be limited. 		
Archeological impacts	<p>Potential impacts on artefacts may arise from excavation and other mining activities.</p>	<ul style="list-style-type: none"> • Should there be places of archeological importance discovered during mining, it must be reported to the National Heritage Council for possible preservation. 	Proponent	Inspections by NHC
Diseases, theft, poaching and increasing demand of natural resources as a influx of People in the Area	<p><u>Transmission of HIV and AIDS</u></p> <p>-HIV and AID is one of the prevailing diseases in Erongo region. Most people who are involved in mining are unmarried or they leave behind their spouses. In cases of unsafe sex practices, there is a high chance for transmission of HIV.</p> <p><u>Theft and Poaching</u></p> <p>-Uncontrolled movement of people in search for opportunities could also contribute to criminal activities such as poaching or theft.</p>	<ul style="list-style-type: none"> • Educational awareness sessions should be implemented on HIV/AIDS for all the employees. • All employees who are employed or seeking for employment should goes through a medical check-up and receive health trainings. • Education is key to prevention. Employees must be informed & of the value of the fauna in the area. Rules and regulations regarding the illegal harvesting of the fauna must be made clear. 	Proponent	Health awareness campaigns by Regional Councilor in collaboration with MoHSS,

	<p><u>Increase demand of natural resources.</u></p> <p>-Uncontrolled movement of people in the area could also put pressure on local available resources such as land, water, energy etc.</p>	<ul style="list-style-type: none"> • Employees sites should not be a place of abode, hence only people who are actively involved in mining should be allowed to stay at the mining sites. • Employees must keep records of water and energy usage. 		
Increased traffic volumes	<p>-Uncontrolled movement of vehicles will result in deterioration and trampling of vegetation and drive away wildlife in their habitats or grazing/browsing sites.</p>	<ul style="list-style-type: none"> • Only use existing access roads. • New roads should be created in consultation with the farm owners. 	Proponent	MEFT

<p>Occupational Safety and Health impacts</p>	<p>-Employees are exposed to several occupational health risks such as injuries, infections or even fatalities during operations. This can be aggravated by lack of knowledge, nature of work and lack of protective gear/PPE.</p> <p>- Employees are also at risk of physical fatigue and exhaustion. This is contributed by carrying heavy loads, working long hours, walking long distances, and engaging in heavy duty work.</p>	<ul style="list-style-type: none"> • Training should be given to Employees to encourage them to be committed toward maintaining Safety and Health as well as protection of the environment. • Introduce appropriate technologies which will reduce the workload. • Working time should be limited to 8hrs as prescribed in the Labor Act. The proponent should ensure that are. <ul style="list-style-type: none"> ○ Employees are equipped with Personal Protective Equipment (PPE), ○ There is a First Aid Kits onsite and receive regular health check-ups. 	<p>Proponent</p>	<p>Inspections by MME</p>
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5.3 Table 6: Enhancement measures for the positive impacts

Below are the proposed management measures to enhance the identified positive impacts of the envisaged activities.

Significant Impacts	Description of the Impacts	Proposed Enhancement measures	Responsibility of Action Implementation
Employment Creation	The sector provides employment to several people which include self-employment. However, due to the informal status of the sector, there are also a lot of labor malpractices.	<ul style="list-style-type: none"> • There is a need for enforcement of the Labor Act and address all existing labor malpractices. i.e., minimum wages, working hours. occupational health and safety issues etc. • 	MLIREC
Secondary Opportunities (value addition, secondary business and job opportunities etc.).	Very little processing and value addition is taking place in the country as such it limits the economic contribution of the mining sector.	<ul style="list-style-type: none"> • Export of unprocessed minerals should be discouraged. • 	MIT
Economic Contribution	Despite the support that the sector continues to receive from the government and non-governmental agencies, some miners are still finding it difficult to operate efficiently due to high input costs, lack of appropriate tools and uncompetitive prices for their products.	<ul style="list-style-type: none"> • Information on the mining, environmental management, trade etc. should be made readily available and in a simplified manner for employees. 	MME
Source of Livelihood	Mining provides a source of livelihoods to many families through employment creation and income generation.	<ul style="list-style-type: none"> • Collaborative efforts from all government sectors to formalize, expand and sustain this sector. 	National Planning Commission
Gender Issues	The mining industry also project jobs for women through processing and value addition.	<ul style="list-style-type: none"> • More women should be trained and encouraged to participate in this sector. 	MME

6. ENVIRONMENTAL MONITORING DURING THE OPERATIONAL PHASE

To ensure continual improvement in environmental performance and reduce adversity of potential negative impacts, it is advisable to keep monitoring the identified environmental receptors. This compliance monitoring is the ultimate responsibility of respective regulatory authorities. Monitoring activities should be done at different interval/frequencies as indicated in the table below and should be done throughout the mining life span.

Table 7: Compliance Monitoring

Issue to be monitored	Monitoring Objectives	What need to be monitored	Frequency and means of Monitoring	Responsibility
Water	-Sustainable utilization of water resources	-Water quality -Aquifer potential	Biannual reports	MAWLR
Pollution	-Prevent contamination and pollution	-Waste management	Quarterly reports	Proponent
Soil	-Ensure soil conservation	-Soil exposure, pollution, contamination, and soil erosion by windy conditions and water	Monthly	Proponent
Vegetation	-Avoid land degradation and encroachment	-Monitor the presence of any new plant species at the mined area and removal of any invading species	Annually (after rainy season)	Proponent
Air quality	-Ensure air quality	-Dust emission	Daily	Proponent
Noise level	-Ensure noise level is at the required standard (85dB)	-Ambient noise level at mining site	Daily	Proponent
Occupational Health Diseases	-Ensure safety of employees	-Occupational related diseases i.e., silicosis, lung diseases etc.	Annual health check-up	MoHSS
Implementation of the EMP	-Ensure compliance to this EMP and adherence to the regulative measures	-Adherence to the EMP and legal requirements	Quarterly reports	MEFT

7. MITIGATION MEASURES: DECOMMISSIONING PHASE

7.1 Closure and land rehabilitation

For any mining activities, whether small or large scale, there is great disturbance to be expected at the mined area such as destruction of the natural vegetation and creation of open trenches leaving the area prone to soil erosion. This may result in further degradation of the environment if left un-rehabilitated. Thus, it is imperative that the proponent ensure to rehabilitate the disturbed area to its natural or nearly its natural state.

According to the Environmental Management Act 07 of 2007 and the Minerals (Prospecting and Mining) Act 33 of 1992, the Mining Claim holder must take the responsibility to reclaim and rehabilitate the disturbed land at the end of prospecting and mining operations. The mine closure in terms of the mining operations will occur whenever a mining claim is suspended, cancelled, lapsed or the site has been abandoned or and the holder does not wish to renew the right. The abandonment of mining claims shall be done in accordance with Section 43 (1) of the Minerals (Prospecting and Mining) Act 33 of 1992.

7.2 Closure objectives

Depending on the nature or scale of the mining operations and supporting infrastructures installed onsite, the following closure objectives should be met.

7.2.1 Rehabilitation of the mining area

The objective of rehabilitation with respect to the area where mining/prospecting has taken place is to leave the area level and even, and in a natural state containing no foreign debris or other materials. The following actions should be implemented by proponent at the decommissioning and closure of their mining activities.

- All trenches shall be filled and levelled properly as far as possible.
- Where possible, the area should be re-vegetated/re-planted with local vegetation. Where re-vegetation is not possible, the area shall be re-seeded with local adapting species under the supervision of the MEFT-NBRI
- All structures constructed by the miner, and which will no longer be required shall be removed and/or rehabilitated to the satisfaction of the MEFT.
- The areas shall be cleared of any contaminated soil, which must be disposed of properly.

7.2.2 Rehabilitation of temporary housing/camping site

- On completion of operations, all infrastructure, equipment, plant, temporary housing, and other items used during the mining period must be removed from the site.
- All buildings, structures or objects on the vehicle maintenance yard and secured storage areas shall be dealt with in accordance with the Minerals (Prospecting and Mining Act), No.33 of 1992.
- General waste of any description, including scrap, rubble and tyres, should be removed entirely from the mining area and disposed of at the Okahandja disposal site. It is not permitted to be buried or burned on the site.
- Finally, rehabilitation shall be completed within a period specified by the Ministry of Mines and Energy.
- Photographs of the campsite, before and during the mining/prospecting operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the MME.

7.3 Post closure

The main aim of post closure rehabilitation is to establish an acceptable and sustainable post-mining land use. Given the nature of the affected sensitivity of the surrounding environment, the most suitable post-mining land use will be open grazing and browsing area mainly by the desert wildlife. The other objective is to enhance tourist attraction in the area.

Hence, all mining structures and temporary accommodation and maintenance workshop should be removed from the site by the respective owners. Other permanent infrastructure such as roads, boreholes should be reserved as farm infrastructures. Finally, the area should be returned close to the natural state as far as possible.

8. ANNEXURES

8.1.1 Annexure A: Compliance Monitoring Form

8.1.2 Annexure B: Job Hazard Analysis Form

ANNEXURE A: Environmental Compliance Monitoring Checklist

The following checklist should be used during the compliance monitoring.

PART 1: ADMINISTRATIVE INFORMATION

Project Title:		Date:
Project location:	Reporting period	Individual Preparing Checklist:
Region:		Department:
Mine Manager/Foreman:		Phone No.:

PART 2: ENVIRONMENTAL ASPECTS

ENVIRONMENTAL ASPECT/IMPACT	ENVIRONMENTAL COMPLIANCE (AS PER EMP REQUIREMENT?)		Remarks (specify the location, a good practice observed, causes of non-conformity, and proposed action)
	YES	NO	

PART 3: RECOMMENDATION

FOR EACH ITEM CHECKED IN PART 2, DESCRIBE THE CORRESPONDING CONTROLS TO BE IMPLEMENTED TO REDUCE POTENTIAL ENVIRONMENTAL IMPACTS (e.g., spill prevention, erosion controls, air emission controls including dust suppression, selection of materials, etc.). Provide details of the activities and impacts for each box and the proposed mitigations. Include attachments where appropriate. Use the same number system for your input.

ECO: Signature: _____ Date: _____

Mine Manager/Foreman: Signature: _____ Date: _____

