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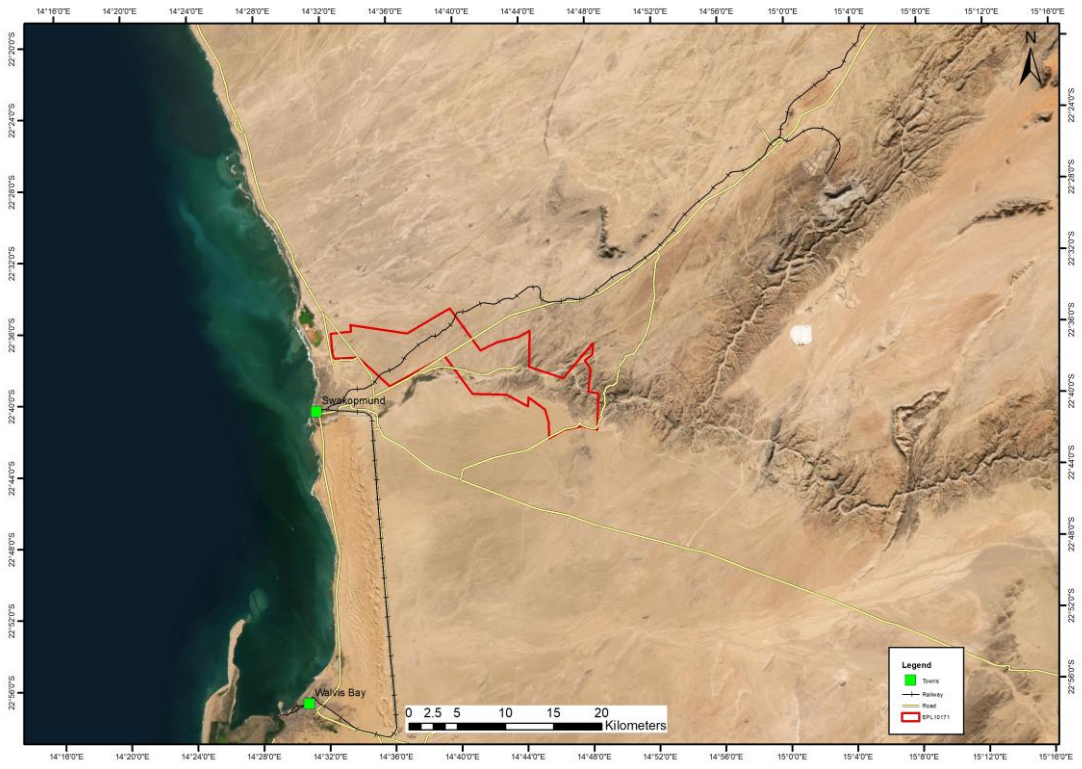
ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED EXPLORATION STUDY FOR BASE AND RARE METALS, NUCLEAR FUEL MINERALS, DIMENSION STONES, INDUSTRIAL MINERALS, AND PRECIOUS STONES AT EPL10171, SWAKOPMUND DISTRICT, ERONGO REGION, NAMIBIA



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EMP

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DOCUMENT CONTROL

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Responsible persons	**Tasks**	**Date**	**Signature**
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Report status	***Final***		

DECLARATION

We hereby declare that:

a. We have the knowledge of and experience in conducting assessments, including knowledge of the Acts, regulations, and guidelines that are relevant to the proposed exploration project.

b. We have performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant.

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Position: Director/Environmental Assessment Practitioner (EAP)

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ABBREVIATIONS AND ACRONYMS

EMP	Environmental Management Plan
EIA	Environmental Impact Assessment
ECC	Environmental Clearance Certificate
EC	Environmental Commissioner
EPL	Exclusive Prospecting License
MEFT	Ministry of Environment, Forestry and Tourism
DWA	Department of Water Affairs
DEAF	Department of Environmental Affairs and Forestry
ML	Mining License
CENC	Contractor Environmental Coordinator
PM	Project Manager
PP	Project Proponent
I&Aps	Interested and Affected Parties
EAs	Environmental Assessments
ECC	Environmental Clearance Certificate

1. ENVIRONMENTAL MANAGEMENT PLAN

1.1. BACKGROUND

The proponent, Randberg Investment CC, is a Namibian-registered company that has been awarded a preparedness-to-grant letter for exclusive rights to EPL No. 10171 by the Ministry of Industries, Mines, and Energy. As a condition of the letter, an Environmental Authorisation for EPL no. 10171 should be obtained from the Ministry of Environment, Forestry, and Tourism before the EPL is awarded to 10171 (the Proponent). EPL No. 10171 is for Dimension Stone and Rare Metals, Industrial Minerals, Precious Metals, and Nuclear Fuel Minerals for which the proponent would The proponent like to undertake exploration activities, intends to undertake exploration activities comprising desktop studies, followed by site-specific activities using techniques such as geophysical surveys, geological mapping, trenching, drilling, and bulk sampling in the Swakopmund District Area of the Erongo Region (Figure 2) for the following registered EPL No: 10171.

In accordance with the Environmental Management Act (2007) and EIA Regulations (2012), an Environmental Impact Assessment (EIA) is required for any “Mining and Prospecting Activities”. Kalahari Geological and Environmental Solutions was appointed to conduct the EIA and develop an Environmental Management Plan (EMP) for the proposed project.

1.2. SUMMARY OF THE PROPOSED ACTIVITIES

Environmental issues related to exploration are mostly local and are common to most surface operations. These issues include oil spills, dust or air pollution, impacts on biodiversity, land disturbance, impacts on groundwater aquifers, and social-economic impacts.

The overall aim of the proposed project (exploration/Prospecting activities) is to search for potential economic mineral resources, including base, rare and precious stones, dimension stones, and industrial minerals, within the EPL area. The exploration activities to be undertaken, as assessed in this environmental assessment, are as follows:

i. Initial desktop exploration activities (no fieldwork undertaken);
ii. Regional reconnaissance field-based mapping and sampling activities (subject to the positive results of i.;
iii. Initial local field-based mapping and sampling activities (subject to the positive results of i. and ii.;
iv. Detailed local field-based activities such as local geological mapping, geochemical mapping and sampling, trenching and drilling of closely spaced boreholes and bulk sampling (subject to the positive results of i. – iii. Above), and
v. Prefeasibility and feasibility studies (Subject to positive results of i. – iv. Above).

The scope and scale of the possible fieldwork are very limited, focusing on specific delineated localities to validate the recommendations from the initial desktop activities.

A. Initial Local Field-Based Activities

The following is a description of the proposed initial desktop exploration activities to be implemented by the proponent as assessed in the EIA report:

i. General evaluation of satellite, topographic, land tenure, accessibility, supporting infrastructures and socioeconomic environment data;
ii. Purchase and analysis of existing Government high-resolution magnetics and radiometric geophysical data;
iii. Purchase and analysis of existing Government aerial hyperspectral, and
iv. Data interpretation and delineating of potential targets for future reconnaissance, regional field-based activities for delineated targets

No fieldwork is envisaged at this stage of the proposed exploration activities, which are expected to last between six (6) and twelve (12) months.

B. Regional Reconnaissance Field-Based Activities

The following is a detailed outline of the proposed regional reconnaissance field-based exploration activities to be implemented by the proponent, as assessed in the EIA report

i. Regional geological, geochemical, topographical and remote sensing mapping and data analysis;

ii. Regional geochemical sampling aimed at identifying possible targets based on the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken;
iii. Regional geological mapping aimed at identifying possible targets based on the results of the initial exploration and regional geological, topographical and remote sensing mapping and analysis undertaken;
    i. Limited field-based support and logistical activities lasting between one (1) and two (2) days, and
iv. Laboratory analysis of the samples collected and interpretation of the results, and delineation of potential targets for future detailed site-specific exploration if the results are positive and support further exploration of the delineated targets.

The scope and scale of the possible fieldwork are very limited, focusing on specific, delineated localities to validate the recommendations from the initial desktop activities.

C. Initial Local Field-Based Activities

The following is a detailed outline of the proposed initial local field-based exploration activities to be implemented by the Proponent as assessed in the EIA Report;

i. Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during regional reconnaissance field activities;
ii. Local geological mapping aimed at identifying possible targeted resources based on the results of the regional geological analysis undertaken;
iii. Ground geophysical survey (subject to the positive outcomes of i and ii above)
iv. Possible trenching (subject to the outcomes of i – iii above)
v. Field-based support and logistical activities will be very limited focus on site-specific area for a very short time (maximum five (5) days, and
vi. Laboratory analysis of the samples collected, interpretation of the results, and delineation of potential targets.

The scope and scale of the possible fieldwork are very limited, focusing on specific delineated localities to assess the economic viability of the target (s). Detailed Local Field-Based Activities. The following is a detailed outline of the proposed local field-based exploration activities to be implemented by the Proponent as assessed in the EIA report if economic and viable targets are delineated within the EPL area:

i. Access preparation and related logistics to support activities;

ii. Local geochemical sampling aimed at verifying the prospectivity of the target/s delineated during the initial field-based activities;
iii. Local geological mapping aimed at identifying possible targets based on the results of the regional geological analysis undertaken, and;
iv. Ground geophysical survey, trenching, drilling and sampling (subject to the positive outcomes o i and ii above)

The scope and scale of the possible fieldwork are likely to be extensive, focusing on a specific, delineated locality to assess the economic viability of the target(s).

D. <u>Prefeasibility and feasibility studies</u>

The following is a detailed outline of the proposed prefeasibility and feasibility studies related exploration activities to be implemented by the proponent as assessed in the EIA report, if economic and viable targets are delineated within the EPL area:

i. Detailed site-specific field-based support and logistical activities, surveys, and detailed geological mapping;
ii. Detailed drilling, bulk sampling, and testing for reserve calculations;
iii. Geotechnical studies for mine designs;
iv. Mine planning and designs, including all supporting infrastructures (water, energy and access) and test mining activities;
v. EIA and EMP to support the ECC for mining operations, and;
vi. Preparation of the feasibility report and application for the mining license

Field-based support and logistical activities will be extensive because the local fieldwork will be undertaken in a specific area for a very long time (up to one year or more in some instances). The activities will be supported by existing tracks and campsites/ lodging facilities available in the area.

1.3. WHAT IS AN EMP

An Environmental Management Plan (EMP) can be defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced”. EMPs are therefore important tools for ensuring that the management actions arising from Environmental Impact Assessment (EIA) processes are clearly defined and implemented through all phases of the project life cycle (construction, operation and decommissioning).

1.4. OBJECTIVES OF THIS EMP

The Environmental Management Plan (EMP) provides a detailed plan of action for implementing the mitigation measures to minimise and maximise the identified negative and positive impacts, respectively. This EMP provides commitments, including financial and human resource provisions, for the effective management of the likely environmental liabilities during and after exploration. The specific objectives of this EMP are:

- Ensuring compliance with regulatory authority stipulations and guidelines.
- To formulate measures that will mitigate the adverse impacts of the proposed project on various environmental components, which have been identified during the environmental impact assessment.
- To formulate measures to protect environmental resources where possible.
- To formulate measures to enhance the value of environmental components where possible.
- Responding to changes in project implementation not considered in the EIA.
- Responding to unforeseen events; and
- Providing feedback for continual improvement in environmental performance.

1.5. SCOPE OF THIS EMP

To achieve the above objectives, the scope of this EMP will include the following:

- Definition of the environmental management objectives to be realised during the life of a project (i.e., exploration, quarry (operation) and/or decommissioning phases) in order to enhance benefits and minimise adverse environmental impacts.
- Description of the detailed actions needed to achieve these objectives, including how they will be achieved, by whom, by when, with what resources, with what monitoring/verification measures, and to what target or performance level.
- Clarification of institutional structures, roles, communication and reporting processes required as part of the implementation of the EMP.
- Description of requirements for record-keeping, reporting, review, auditing and updating of the EMP.

1.6. HIERARCHY OF MITIGATION MEASURES IMPLEMENTATION

This EMP has adopted a hierarchy of methods for mitigating significant adverse effects identified in order of preference and as follows:

i. Enhancement, e.g. provision of new habitats.
ii. Avoidance, e.g. sensitive design to avoid effects on ecological receptors.
iii. Reduction, e.g. limitation of effects on receptors through design changes, and
iv. Compensation, e.g. community benefits

1.7. MITIGATION MEASURES IMPLEMENTATION

The EMP provides a detailed plan of action for implementing the mitigation measures to minimise and maximise the identified negative and positive impacts, respectively. The EMP also provides the management actions with roles and responsibilities requirements for the implementation of environmental management strategies by the proponent through the contractors and subcontractors who will be undertaking the exploration activities

1.8. WHAT ARE THE LEGAL IMPLICATIONS AND OBLIGATIONS UNDER THIS PLAN?

The EMP will be sent to the Directorate of Environmental Affairs and Forestry (DEAF) of the Ministry of Environment, Forestry and Tourism (MEFT) for approval. Once the DEAF is satisfied with the contents of the EMP, they will issue an Environmental Clearance Certificate (ECC) to the Proponent to carry out an exploratory study for quarrying Dimension stones in the Swakopmund District Area. The ECC is linked with the recommendations of the Environmental Management Plan.

Once the ECC is issued, the EMP becomes a legally binding document, and each role-player, including contractors and subcontractors, is responsible for implementing the relevant sections of the EMP and for abiding by the conditions stipulated in this document.

2. ANTICIPATED ENVIRONMENT IMPACTS

2.1. POSITIVE IMPACTS

1.1.1. EMPLOYMENT/JOB CREATION

The exploration will create both direct and indirect jobs. The sampling activities will employ about 25 people, whereas the transporting, offloading and shipping of samples will create about 10 jobs. Indirect jobs will result from the multiplier effects of pressure on disposal sites and on upstream service providers to the proposed project.

1.1.2. ENHANCEMENT MEASURES FOR EMPLOYMENT/JOB CREATION

- Where unskilled labour can be used, a ‘locals first’ policy should be considered by the proponent.
- It is proposed that local people, meaning the community members from Swakopmund Town, should be employed as far as possible, especially where no specific skills are required.

- The Swakopmund Town Councillor should be requested to assist with the recruitment of construction workers.
- Both men and women should be granted the opportunity to be employed by this project.

1.1.3. SUPPORT FOR LOCAL RETAILERS' SHOPS

Mining is the highest foreign currency earner and the largest contributor to the Namibian economy's GDP. The presence of mining activities near local authorities is expected to benefit local economies through project-related purchases, for example, in the retail, accommodation, and recreation sectors.

1.1.4. ENHANCEMENT MEASURES FOR SUPPORT TO LOCAL RETAILERS' SHOP

- The proponent and his employees are encouraged to purchase or support local retailers in Swakopmund and neighboring Towns unless the intended material/product to purchase is not available.

1.1.5. EXPORT TAXES AND VAT PAYMENTS

Export taxes and VAT payments contribute significantly to the national economy. Thus, without these payments, our government will not be able to roll out nationwide infrastructure projects, including water, roads, electricity, and sanitation facilities.

1.1.6. ENHANCEMENT MEASURES FOR EXPORT TAXES AND VAT PAYMENTS

- The proponent and his employees are encouraged to make these payments when applicable to support the economic growth of the country.

2.2. NEGATIVE IMPACTS

2.2.1. LIQUID WASTE: USED OIL OR OIL SPILLAGE AND WASTEWATER

This risk, associated with leaks or spills of fuel at the mining site during the exploration and operation phases of the project, could reach both groundwater and surface water if active pathways exist. In addition, spillage is a concern, although the likelihood of this

risk occurrence is low; the impact if it happens is significant. For this reason, the risk is highlighted as a going concern of high priority, and therefore, mitigation measures to be taken are presented below:

2.2.1.1. EXPLORATION PHASE

- Contain spillage and remove the contaminated soil for storage in bags.
- Accessibility to spill prevention and response equipment, such equipment should be visible and accessible to all employees at any given time.

2.2.1.2. QUARRY (OPERATION) PHASE

- Accessibility to spill prevention and response equipment, such equipment should be visible and accessible to all employees at any given time.
- Spills will be cleaned up immediately to the satisfaction of the Regional Manager by removing the spillage together with the polluted soil and by disposing of them at a recognized facility.
- Designated waste collection tanks should be available on-site and away from waterways, and such isolation should be maintained at all times.
- Necessary response teams; such teams should be adequate to respond to possible risks of oil if it threatens fauna and flora.

2.2.2. SOLID WASTE: WIRES, DRILL BITS, AND HUMAN WASTE

Human activities at the mining site will, to some extent, produce litter, particularly small items that people throw away on the ground. Solid waste management is a challenge during the exploration and operational phases of projects of this nature. Therefore, proper handling and management of waste are critical for protecting the environment and surrounding communities. If not managed, solid waste generated by this project will affect the environment. The following are the mitigation measures to be taken to minimize the impact of solid waste during the exploration and operation of the project.

2.2.2.1. EXPLORATION PHASE

- Waste disposal sites should be established on-site were paper, plastic and wire should be kept during exploration and operation period.
- The collected solid waste should be disposed of at the Swakopmund municipality solid waste disposal sites.
- For human waste, during the construction phase, the mobile toilet should be made available on-site for workers and once these facilities are full, the collected human waste should be disposed at the Swakopmund Municipality human waste disposal site.
- Prior to the disposal of the above-mentioned waste by the Contractor must enter into an agreement with Swakopmund Municipality for permission to use their facility.

2.2.2.2. QUARRY (OPERATION) PHASE

- Management of solid waste generated during the operation phase would include collection, transportation, and disposal in a manner to cause minimal environmental impact.
- It will be made mandatory for waste to be segregated right at the source of waste generation. Segregated waste would be collected from the quarrying site and amenity areas.
- Waste disposal sites for usage during the operation period to be included in the design of the quarrying project. If possible, a mobile waste-disposal drum should be assigned to the project site.
- For human waste during the operation of the project, a permanent ablution facility will be erected at the irrigation field with a proper lining of the collector to avoid any infiltration of the human waste into the underground aquifers.
- Prior to the disposal of the above-mentioned waste by the Contractor/the proponent must enter into an agreement with Swakopmund Municipality for permission to use their facility.

- Reusable and recyclable waste will be disposed of by selling to scrap dealers and private contractors for resale.
- Non-degradable waste will be transferred to the municipal solid waste management system.

2.2.3. LAND AND SOIL DISTURBANCE: ON-SITE

The sampling process will involve cutting bulk samples from in situ dimension stone outcrops, thereby disturbing the landform and the soil cover in the immediate surroundings of the mining site. This undertaking will have a visual impact and may disturb the structural integrity and biological productivity of the topsoil.

2.2.3.1. EXPLORATION PHASE

- Existing roads shall be used as far as practicable.
- Should there be a need to construct a new access road, the following must be adhered to:
    - The route shall be selected so that the minimum number of bushes or trees are felled, and existing fence lines shall be followed as far as possible.
    - Water courses and steep gradients shall be avoided as far as is practicable.
    - Adequate drainage and erosion protection in the form of cut-off berms or trenches shall be provided where necessary.
- In order to protect the structural integrity and biological productivity of topsoil. The following must be followed:
    - The topsoil from 0 to 30cm is to be removed and stockpiled and used during the rehabilitation process.
    - The topsoil in the immediate vicinity of the sampling site should be removed and stored for re-cultivation during decommissioning.
    - It is recommended that topsoil to be removed down to the subsoil, where it is significantly thicker than 0.5m, as topsoil is always a

scarce resource, and even if this lower material does not contain seed and is poorer in soil organisms, it has been found to be useful in reclamation.

- Where topsoil is less than 150mm thick the unconsolidated material beneath should also be removed and treated as topsoil.

2.2.3.2. QUARRY (OPERATION) PHASE

- During the operation phase, no other routes will be used by vehicles or personnel for the purpose of gaining access to the site.
- Land markings and pits induced during sampling shall be restored to the original landform and, as much as possible, to the visual state. Furthermore, this mitigation measure shall extend and apply to any disturbance induced by any access road. Raking or dragging with tyres could help restore vehicle tracks.
- In the case of dual or multiple uses of access roads by other users, arrangements for multiple responsibilities must be made with the other users. If not, the maintenance of access roads will be the responsibility of the holder of the mining permit.

2.2.4. BIODIVERSITY (FAUNA AND FLORA)

Some of the activities of the proposed project, i.e., vehicles, human movements, and excavations, pose a risk to the integrity of baseline biodiversity as well as the biological productivity of the site and the immediate vicinity. The following mitigations are to be undertaken to minimise further impact on the existing biodiversity:

2.2.4.1. EXPLORATION PHASE

- Rules pertaining to safeguarding against poaching and the collection of plant and plant products must be established and enforced.

- Remove (e.g. capture) unique fauna and sensitive fauna before commencing with the development activities and relocating to a less sensitive/disturbed site if possible.
- Where it is clear that certain large species will be destroyed, consideration should be given to offering to rescue the individuals involved and relocate them to nearby gardens in Swakopmund
- Prevent and discourage fires – especially during the exploration phase(s) – as this could easily cause runaway field fires and could affect the local fauna and could also cause further problems (e.g. loss of grazing & domestic stock mortalities, etc.) for the neighbouring farmers.
- The mining area must be clearly demarcated by means of beacons at its corners, and along its boundaries, if there is no visibility between the corner beacons and the quarrying of and prospecting for any mineral shall only take place within this demarcated mining area.

2.2.4.2. QUARRY (OPERATION PHASE)

- Disturbed areas must be kept to a minimum
- Barriers/barricades confining driving trucks must be erected to avoid stray driving and trampling on the habitat
- Avoid damage to protected or high-use-value trees during mining and the usage of heavy machines.
- Disturbance of marginal vegetation in the mountains should be limited.
- Avoid disturbance on invertebrate on-site and along the gravel road stretch.
- During operation, avoid the creation of multiple road strips, which could result in the disturbance of breeding sites for various mammals.
- Preferably, workers should be transported in/out to the quarrying site on a daily basis to avoid excess damage to the local environment (e.g. fires, wood collection, poaching, etc.).

2.2.5. AIR POLLUTION (IMPACT ON AIR QUALITY ON SITE)

During the quarry (operation) phase, dust will be generated onsite by earth-moving equipment and also on the gravel road by trucks and vehicles. Epidemiological studies indicate that workers exposed to construction process dust are at increased risk of asthma symptoms, chronic bronchitis, nasal inflammation, and impairment of lung function (Camici et al., 1978; Angotzi et al., 2005; Leikin et al., 2009).

2.2.5.1. QUARRY (OPERATION) PHASE

- The liberation of dust into the surrounding environment shall be effectively controlled by the use of, inter alia, water spraying and/or other dust-allaying agents.
- The speed of haul trucks and other vehicles must be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.
- All gravel roads in quarry areas should have a speed limit of 60km/h for light vehicles and 30km/h for heavy vehicles in order to minimize the amount of dust generated by vehicles.
- Transportation of raw materials required for construction will be carried out during non-peak hours.
- Dust covers will be provided on trucks used for the transportation of materials prone to fugitive dust emissions.
- Covering scaffolding and cleaning of vehicles that can reduce dust and vapou emissions will be used.
- Measures such as the use of wet processes, enclosure of dust-producing processes under negative air pressure (slight vacuum compared to the air pressure outside the enclosure),
- Exhausting air containing dust through a collection system before emission to the atmosphere, and exhaust ventilation should be used in the workplace.

- Use of personal protective equipment for proper dust control for respiratory protection, and should be used only where dust control methods are not yet effective or are inadequate.
- Direct skin contact should be prevented by gloves, and wearing respiratory protection during the cleanup.

2.2.6. ARCHAEOLOGICAL IMPACT

Heritage resources may be impacted through unintentional destruction or damage during exploration activities. Furthermore, no information was provided about known heritage or cultural sites within the project site. Therefore, this impact can be rated medium to low if no mitigation measures are in place. At the sites, there are no known heritage areas or artefacts deemed to be impacted by the exploration activities. However, there may be unknown archaeological remains within the EPL area; hence, the Proponent is required to follow the chance find procedures and consult the Heritage Council immediately. Upon implementation of the necessary measures, the impact will be low.

The Proponent should consider having a qualified and experienced archaeologist on standby during the exploration and sampling phase and, as required, throughout the entire operational phase. This action may assist in uncovering sub-surface graves or other cultural/heritage objects and will advise the Proponent accordingly. Identified graves or any archaeologically significant objects on the site should not be disturbed, but are to be reported to the project Environmental Officer or National Heritage Council offices. If discovery of unearthed archaeological remains to be uncovered, the following measures (chance find procedure) shall be applied:

- Works to cease, area to be demarcated with appropriate tape by the site supervisor, and the Site Manager to be informed
- Site Manager to visit the site and determine whether work can proceed without damage to findings, mark exclusions boundary

- If work cannot proceed without damage to findings, the Site Manager is to inform the Environmental Manager, who will get in touch with an archaeologist for advice
- Archaeological specialist is to evaluate the significance of the remains and identify appropriate action, for example, record and remove; relocate or leave in situ (depending on the nature and value of the remains) - Inform the police if the remains are human, and
- Obtain appropriate clearance or approval from the competent authority, if required, and recover and remove the remains to the National Museum or National Forensic Laboratory as appropriate.

2.2.7. NOISE ON SITE

Noise emissions are commonly associated with all earthmoving equipment and drilling activities. The main noise sources are associated with drilling, breaking, crushing and handling–moving, screening, and transport of equipment or materials to or from the quarry site.

2.2.7.1. QUARRY (OPERATION) PHASE

- Reduction of noise from drilling rigs by using downhole drilling or hydraulic drilling;
- Installation of proper sound barriers and/or noise containment, with enclosures and curtains at or near the source equipment.
- Use of rubber-lined or soundproof surfaces on processing equipment (e.g. screens, chutes, transfer points, and buckets);
- Use of rubber-belt transport and conveyors;
- Installation of natural barriers at facility boundaries (e.g. Vegetation curtains or soil berms);

- Optimisation of internal-traffic routing, particularly to minimize vehicle-reversing needs (reducing noise from reversing alarms) and to maximize distances to the closest sensitive receptors;
- Workers working near high-noise mining machinery will be provided with ear muffs/ earplugs.

3. ENVIRONMENTAL MANAGEMENT PLAN ORGANIZATION AND IMPLEMENTATION

During the exploration phase, contractors and the site-in-charge will be responsible for implementing all the mitigation measures listed above. In the operational phase, work will continue alongside post-monitoring. In the preceding sections, the environmental aspects which may be affected by the proposed project have been categorized into negative and positive impacts. As an extension of the preceding sections, this section summarizes the objectives, indicators to be observed, schedules to adhere to, and the roles and responsibilities of various stakeholders to the EMP. The following tables list the mitigation measures to be undertaken during the exploration & operational phases, respectively, along with the agency responsible for implementation.

The following abbreviations are used to indicate who is responsible for what impact mitigation objective:

- **Contractor Environmental Coordinator** **CENC**
- **Site Foreman** **SF**
- **Project manager** **PM**
- **Project Proponent** **PP**
- **Environmental Commissioner** **EC**

Table 1: Project Planning and Implementation

Objectives	Indicators	Schedule	Responsibility
Establish a strong environmental protocol from project implementation to final closure to ensure the least possible impact on the environment	Resources (Financial, human, equipment and safety gear) are provided for awareness, meetings, monitoring, and reporting.	At the beginning of the quarrying phase.	PP
To maximize the economic spin-off into the local economy.	Expedite the appointment of a senior person to assume the responsibility of an environmental coordinator (ENC)	At the planning stage or at the beginning of the implementation phase of the quarrying phase	PP

Table 2: Mitigation measures during the exploration phase

No	Affected Environmental Parameters	Likely adverse impacts in the absence	Nature of the impact	Proposed mitigation measures	
				Action to be taken	Implementing agency

		of mitigation measures			
1	Land Environment	Impact on fauna and flora	Significant and permanent if not controlled	Avoid construction within 20m of the main drainage line(s). Avoid disturbance of marginal vegetation Remove (e.g. capture) unique fauna	**Contractor/CENC**
		Generation of solid waste and debris. Aesthetically unpleasant. Health problems of laborers	Temporary	Segregation to facilitate reuse/ recycling. Recyclable wastes will be segregated and sent for recycling. Adequate facilities for the storage of these waste materials on site	**Contractor/CENC**
2	Air Quality	Traffic congestion Increase air pollution risks	Significant and temporary	Idling of the trucks and dumpers on the roads will not be allowed. Raw materials will be procured from the nearest material supplier.	**Project manager/Contractor/CENC**

				Material will be brought in batches so that there is no sudden increase of traffic volume at one particular time. On-site use of Concrete batching plant. Use of dust covers over construction material during transportation. Keeping all stationary equipment downwind. Stabilization of dust prone areas by sprinkling water	
3	Noise Quality	Increase in noise levels causing a nuisance to the nearby Community Members/farm	Significant and temporary	Prohibition for use of equipment emitting noise of greater than 90 dB (A) for 8 hour operation. Prohibition of	**Project manager/Contractor/CENC**

				noise from construction activities during nighttime. Provide workers on machinery with earmuffs/ earplugs. Provision of Temporary barricading around site	
4	Water Environment	Surface and groundwater pollution due to fuel spillage. Turbidity and suspended solids due to soil erosion. Blocking of natural drains due to the deposition of construction materials.	Significant and temporary	Mining to be carried out before periods of strong winds and erosion protection measures to be taken. Mining materials to be stored in enclosures. Cleaning of drains on regular basis to avoid blockage. No accumulation of stagnant water	**Contractor/CENC**
5	Other Impacts	Soil erosion,	Significant	Construction of	**Contractor/CENC**

		additional exposure to noise/ air pollution	and permanent	necessary scaffolding and retaining structure for protection from waste material and water. Tree plantation to enhance bio aesthetic value. Guidelines for planting saplings of trees to be strictly followed.	
6	Spillage of oil management	Contamination of surface and groundwater	Significant and permanent	Contain spillage and remove the contaminated soil. Access to spill prevention and response equipment should be visible and readily accessible to all employees at all times.	**Contractor/CENC**

Table 3: Mitigation measures during the quarry (operation) phase

No	**Affected Environmental Parameters**	**Likely adverse impacts in the absence of mitigation measures**	**Nature of the impact**	**Proposed mitigation measures**	
				Action to be taken	**Implementing agency**
1	Land Environment	Change in land use pattern due to the proposed quarry project	Significant and permanent if not controlled	Controlled and planned quarrying system	Project Proponent

		Contamination of soil by fuel and lubricants from construction equipment and vehicles. Increased solid waste generation in the area. If not managed properly will affect the health of local residents.	Significant and temporary	Avoiding spillage of oil and fuel to prevent seepage into ground and reaching surface water bodies. Waste management practices like waste segregation at source, recycling and reuse, mechanical composting etc. will be adopted Provision of mechanical composting units within the site. Regular collection of non-degradable solid waste from the site. Provision of a well engineered landfill site.	Project Proponent

4	Water Environment	Water shortage within the area. Water flooding during rainy season. Increase in turbidity of water Reduced runoff Due to increased paved areas.	Significant and permanent	Blockage of natural drains to be avoided and cleaning and maintenance to be carried out. Regular maintenance of stormwater drains, cleaning and effective soil erosion measures. Water harvesting to recharge on-site to be encouraged for use during the period of pumping failure. Prevent pollution from run-off. Sewage treatment plants to recycle domestic sewage and reuse for toilet flushing/	**Project Proponent**
5	Public Health and Safety	Health problems to people staying within the plots.	Moderate and Permanent	Road maintenance to prevent air/	**Project Proponent**

				noise pollution within site. Provision of adequate road safety like signage- posts/ road-crossings etc. Firefighting / Disaster Management Plan provisions for buildings.	

4. MONITORING EMP

The Contractor's monitoring of the EMP performance for the proposed project emphasises early detection, reporting, and corrective action. It is divided into three parts, namely:

- Monitoring of project activities and actions to be undertaken by the Environmental Coordinator (ENC) appointed by the Contractor.
- The Environmental Coordinator (ENC) shall report all incidents and situations which have the potential of jeopardising compliance with statutory provisions as well as provisions of this EMP to the Project Proponent.
- The Environmental Coordinator (ENC) shall take corrective, prompt measures, adequate and long-lasting in addressing non-compliance activities or behaviour.

To ensure compliance of the Contractor ENC to the implementation of the EMP, it is highly recommended that an External Environmental Expert is appointed by the proponent to ensure the implementation of the EMP. The tables (5-9) below are to be used by the Contractor's ENC for monitoring purposes.

Table 4: Solid waste disposal: wire, paper, drill bits, and human waste

Mitigation	Compliance	Follow-up Action Required	By Whom	When	Date Completed
Are disposal drums/bins available or full?					
Is there any litter around the site and its surroundings?					

Table 5: Oil spillage or used oil

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are disposal drums available or full?					
Is there any oil spills around the site and its surroundings?					

Table 6: Land and Soil Disturbance

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are there any deviations from the provisions of the EMP on land and soil disturbance?					
Are car track barricades in place?					

Table 7: Dust generation on-site and gravel roads stretch

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are there any deviations from the provisions of the EMP on dust pollution?					
Are the fume and particulate levels acceptable?					

Table 8: Biodiversity (fauna and flora)

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are there any deviations from the EMP's provisions on biodiversity?					
Is it a traipsing harvesting plant, taking place, feeding of animals, or the introduction of animals?					

Table 9: Noise and vibrations on-site

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are there any deviations from the provisions of the EMP on noise and vibration on-site?					
Are there any complaints from					

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
the surrounding neighbours about noise emanating from the sites or tracks used to transport materials/produce?					

Table 10: Compliance

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
Are there any deviations from the provisions of the EMP on noise and vibration on-site?					
Are there any complaints from the surrounding neighbours about noise emanating from the sites or tracks used to transport materials/produce?					

5. ENVIRONMENTAL CODE OF CONDUCT

The Code of Conduct outlined in this section of the EMP applies to, and is not limited to, subcontractors, visitors, and permanent and temporary workers. Therefore, anyone who finds themselves within the proponent's boundaries must adhere to the Environmental Code of Conduct outlined in this section of the EMP.

- The Contractor ENC will implement on-site environmental guidelines and has the authority to issue warnings as well as discipline any person who transgresses environmental rules and procedures. Persistent transgression of environmental rules will result in a disciplinary hearing, and thereafter, continued noncompliance behaviour will result in permanent removal from the construction sites.

Natural environment management guidelines

a. Never feed, tease or play with, hunt, kill, destroy or set devices to trap any wild animal (including birds, reptiles and mammals), livestock or pets. Do not bring any wild animal or pet to the construction sites;
b. Do not pick any plant or take any animal out of the construction area EVER. You will be prosecuted and asked to leave the project area;
c. Never leave rubbish and food scraps or bones where it will attract animals, birds or insects. Rubbish must be thrown into the correct rubbish bins or bags provided;
d. Protect the surface material by not driving over it unnecessarily;
e. Do not drive over, build upon, or camp on any sensitive habitats for plants and animals;
f. Do not cut down any part of living trees/bushes for firewood;
g. Do not destroy bird nests, dens, burrow pits, termite hills, etc. or any other natural objects in the area.

Vehicle use and access guidance

i. Never drive any vehicle without a valid license for that particular vehicle and do not drive any vehicle that appears not to be roadworthy;
ii. Never drive any vehicle when under the influence of alcohol or drugs;
iii. DO NOT make any new roads without permission. Stay within demarcated areas;

iv. Avoid U-Turns and large turning circles. 3-point turns are encouraged. Do not ever drive on rocky slopes;
v. Stay on the road, do not make a second set of tracks and do not cut corners;
vi. DO NOT SPEED - 30 km per hour for normal vehicles and 20km per hour for heavy trucks on gravel roads and around the site;
vii. No off-road driving is allowed;
viii. Vehicles may only drive on demarcated roads;
ix. Adhere to speed limits and drive with headlights switched on along any gravel road.

Control of dust guidance

a. Do not make new roads or clear any vegetation unless instructed to do so by your Contractor or the Environmental Coordinator or Site Manager;
b. Do not try to disturb the surface of the natural landscape as little as possible.
c. Do not speed on gravel roads and around the construction sites, and adhere to the speed limits.
d. Apply water to suppress dust were the generation of the dust on either gravel roads or construction sites is beyond control.

Health and safety guidance

a. Drink lots of water every day, but only from the freshwater supplies;
b. Take the necessary precautions to avoid contracting the HIV/AIDS virus;
c. Never enter any area that is out of bounds, or demarcated as dangerous or wander off without informing or permission of team leader;
d. Never climb over any fence or trespass on private property without permission of the landowner or consultation with the Environmental Coordinator or Site Manager.
e. Report to your Contractor if you see a stranger or unauthorised person in the construction area;
f. Do not remove any vehicle, machinery, equipment or any other object from the construction campsite or along with the profile or at a seismic testing station without permission of your Contractor or Site Manager;

g. Wear protective clothing and equipment required and according to instructions from your Contractor or Site Manager;
h. Don not engages in sexual relations with minors and also adheres to zero tolerance to spread HIV/AIDS.

Preventing pollution and dangerous working conditions guidance

I. Never throw any hazardous substance such as fuel, oil, solvents, etc. into streams or onto the ground;
II. Never allow any hazardous substance to soak into the soil;
III. Immediately tell your Contractor or Environmental Coordinator when you spill or notice any spillage of hazardous substance anywhere in the field or camp;
IV. Report to your Contractor or Environmental Coordinator when you notice any container, which may hold a hazardous substance, overflow, leak or drip;
V. Immediately report to your Contractor or Environmental Coordinator when you notice overflowing problems or unhygienic conditions at the ablution facilities, vehicles, equipment and machinery, containers and other surfaces.

Disposal of solid and liquid waste guidance

a. Learn to know the difference between the two main types of waste, namely: General Waste, and Hazardous Waste.
b. Learn how to identify the containers, bins, drums or bags for the different types of wastes. Never dispose of hazardous waste in the bins or skips intended for general waste or construction rubble;
c. Never burn or bury any waste on the camp or in the field;
d. Never overfill any waste container, drum, bin or bag. Inform your Contractor or the Environmental Coordinator/ Site Manager if the containers, drums, bins or skips are nearly full;
e. Never litter or throw away any waste on the site, in the field or along any road.
f. No illegal dumping;
g. Littering is prohibited.

Dealing with environmental complaints guidance

a. If you have any complaint about dangerous working conditions or potential pollution to the environment, immediately report this to the Environmental Coordinator
b. If any person complains to you about noise, lights, littering, pollution, or any other harmful or dangerous condition, immediately report this to your Contractor.

Environmental Personnel Register

Table 11 presents the Environmental Personnel Register to be signed by every person who receives or attends the Environmental Awareness Training or who has the training material explained to him or her or in possession of the training material.

Table 11: Environmental Personnel Register

Date	Name	Company	Signature

6. SITE CLOSURE AND REHABILITATION

In the context of the proposed project, rehabilitation refers to the process of returning disturbed land and soil to some degree of its pristine state. The scope of the proponent's site rehabilitation emphasises backfilling sampling/drilling holes and covering them with topsoil in areas disturbed by mining/quarrying activities. These will include, but are not limited to, the access road, vehicle tracks around the site, and the removal and restoration of areas covered by stockpiles and rock piles. Furthermore, this section outlines rehabilitation objectives and proposes rehabilitation commitments which the proponent shall adhere to.

6.1. OBJECTIVES OF THE SITE CLOSURE AND REHABILITATION

- Reduction or elimination of the need for a long-term management program to control and minimise the long-term impacts.
- Clean up, treatment or restoration of disturbed or/and/or contaminated areas.
- In addition, the following rehabilitation measures are important and should be implemented wherever necessary:
- A site inspection will be held after completion of the mining process to determine the nature and scope of the rehabilitation work to be undertaken. The rehabilitation will be done to the satisfaction of both the proponent and MET.
- The rehabilitation work should commence soon after the end of the active mining period.
- The access road and all vehicle tracks should be rehabilitated by raking or dragging with tyres or tree branches (other suitable methods) behind a vehicle.
- With regard to both biological productivity and erosion, topsoil is arguably the most important resource in the project area; for that reason, the recovered topsoil and subsoil should be utilised to reconstruct the original soil profile.
- All waste shall be removed, and potential hazards, particularly pits, shall be closed and left in a safe disposition.
    - All rehabilitated areas shall be considered no-go areas, and the environmental coordinator shall ensure that none of the staff members enter the area after rehabilitation.

7. CONCLUSION AND RECOMMENDATIONS

7.1. CONCLUSION

The fundamental principle behind environmental assessments (EAs) is to ensure a balance among social, economic, and environmental needs, particularly when proposed projects are of a nature that negatively affect some needs at the expense of others. Ultimately, EAs should enhance the proposed projects' propensity to be more beneficial and important by suggesting measures, and by designing and implementing programs and plans to that effect.

Against this background, it is anticipated that this project will be beneficial and important to the proponent, the national economy, the local social conditions, and the local economy if the guidelines and mitigation measures suggested in this EMP are implemented. However, it should be acknowledged that environmental disturbance will occur, but it will be minimal and within legally acceptable levels.

This EMP should be viewed as a framework for integrating mitigation measures and applicable legal tools to ensure both compliance and sustainability. It is therefore very important that the proponent provides adequate resources (human, financial, tangible and intangible assets) for the implementation of the plan.

7.2. RECOMMENDATION

The proposed quarry project may proceed provided that all provisions of the EMP and all issued permits are complied with. Recommended actions to be implemented by the proponent as part of the management of the likely impacts through implementations of the EMP are:

- Contract an Environmental Coordinator / Consultant / suitable in-house resources person to lead and further develop, implement and promote environmental culture through awareness-raising of the workforce, contractors and sub-contractors in the field during the whole duration of the proposed mining program period;

- Provide with other support, human and financial resources, for the implementation of the proposed mitigations and effective environmental management during the planned mining activities ;
- Develop a simplified environmental induction and awareness program for all the workforce, contractors and subcontractors;
- Where contracted service providers are likely to cause environmental Impacts, these will need to be identified, and contract agreements need to be developed with costing provisions for environmental liabilities;
- Implement internal and external monitoring of the actions and management strategies developed during the mineral exploration and possible mining duration and a final Environmental Monitoring report be prepared by the Environmental Coordinator / Consultant / Suitable in-house resource person, and to be submitted to the regulators and to end the proposed quarry project;
- Develop and implement a monitoring program that will fit into the overall company‘s Environmental Management Systems (EMS), as well as for any future EIA for possible quarrying projects.

It is hereby recommended that the proponent take all necessary steps to implement the EMP recommendations and ensure the successful completion of the proposed exploration project for EPL no. 10171, situated in the Swakopmund District, Erongo Region, Namibia.

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