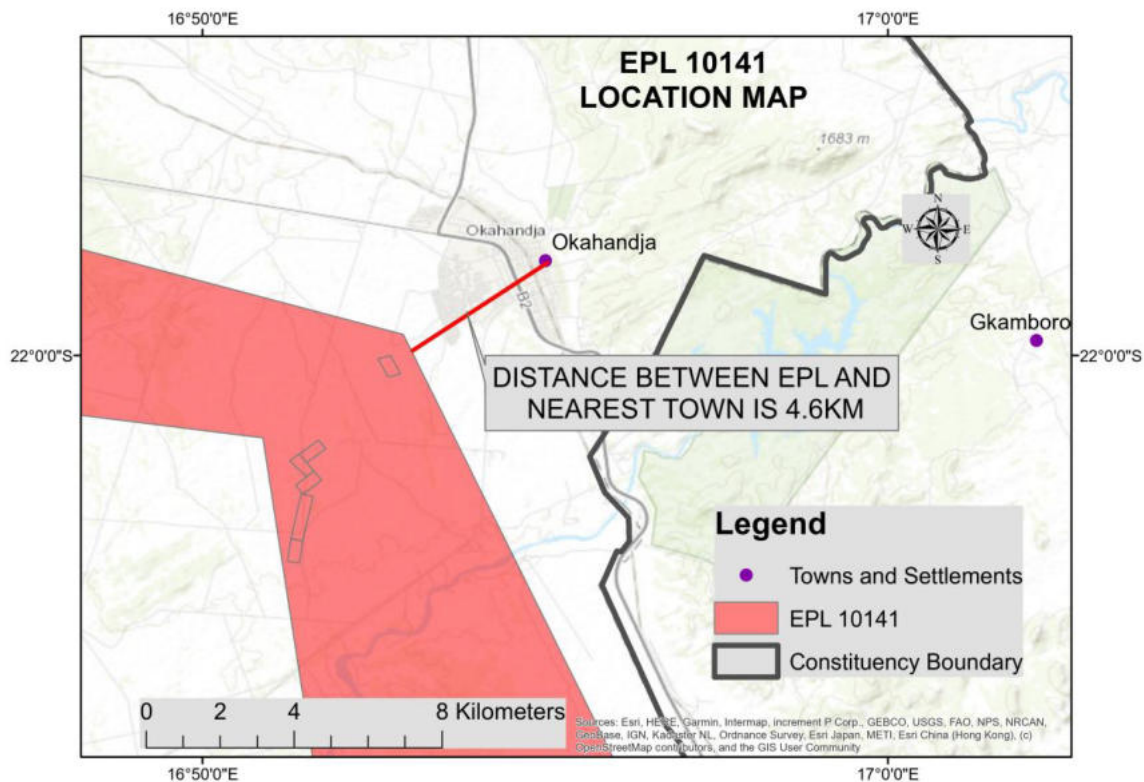


# ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED EXPLORATION STUDY FOR DIMENSION STONES AT EPL10141, OKAHANDJA DISTRICT, OTJOZONDJUPA REGION, NAMIBIA

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**EMP: ENVIRONMENTAL IMPACT ASSESSMENT (EIA) FOR THE  
PROPOSED EXPLORATION STUDY FOR DIMENSION STONES AT  
EPL10141, OKAHANDJA DISTRICT, OTJOZONDJUPA REGION,  
NAMIBIA**

**EMP**

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### **ABBREVIATIONS AND ACRONYMS**

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



# 1. ENVIRONMENTAL MANAGEMENT PLAN

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## 1.1. BACKGROUND

The proponent proposes to conduct an exploration study to quarry Dimension stones in the Okahandja District, Otjozondjupa Region, on EPL number 10141. In line with the Environmental Management Act No.7 of 2007 and its Environmental Impact Assessment Regulation of 2012, the proposed project is a listed activity that cannot be undertaken without an environmental assessment. Therefore, it is required that an environmental assessment be carried out for the proposed project to ensure the protection of the environment and community members found in the vicinity of the proposed project area. For this reason, Kalahari Environmental and Geological Solutions Cc was appointed to undertake an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the Exploration, Quarry (operational) and decommissioning phases of the exploration study for Dimension stones on EPL number 10141, Okahandja District, Otjozondjupa region, Namibia.

## 1.2. SUMMARY OF THE PROPOSED ACTIVITIES

The environmental issues associated with small-scale surface mining are mostly local and common to most surface operations. These issues include oil spillage, dust or air pollution, impact on biodiversity, land disturbance, impact on groundwater aquifer and also socio-economic impacts. The quarrying operations, processes and associated activities are as follows:

- Ground or land disturbances will take place, and this will result in localised loss of flora as well as any other fauna that may depend on such specific flora;
- Cutting, Drilling, trenching, and bulk sampling will be used in test mining for loosening the hard rock.
- The creation of access roads around the EPL 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 required in implementation of the mitigation measures for minimizing and maximizing the identified negative and positive impacts respectively. This EMP gives commitments including financial and human resources provisions for effective management of the likely environmental liabilities during and after the 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 followings:

- Definition of the environmental management objectives to be realized during the life of a project (i.e. Exploration, quarry (operation) and/or decommissioning phases) in order to enhance benefits and minimize 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 have 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, roles, and responsibilities requirements for the proponent's implementation of environmental management strategies through contractors and subcontractors who will undertake 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 Okahandja 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 sub-contractors, is made responsible for implementing the

relevant sections of the EMP and is required to abide by the conditions stipulated in this document.

## **2. ANTICIPATED ENVIRONMENT IMPACTS**

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### **2.1. POSITIVE IMPACTS**

#### **2.2.1. EMPLOYMENT/JOB CREATION**

The Dimension Stones quarry will create both direct and indirect jobs. The sampling activities will employ about 30 people, whereas the transporting, offloading and shipping of samples will create about 10 jobs. Indirect jobs will come from the multiplier effects of the pressure on disposal sites and upstream service providers to the proposed project.

#### **2.2.2. ENHANCEMENT MEASURES FOR EMPLOYMENT/JOB CREATION**

- Where unskilled labour can be used, the proponent should consider a 'locals first' policy.
- It is proposed that local people, meaning the community members from Grootfontein Town, should be employed as far as possible, especially where no specific skills are required.
- The Grootfontein Town Councillor or the relevant Traditional authority could 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.

#### **2.2.3. SUPPORT TO LOCAL RETAILERS SHOP**

Mining is the highest foreign currency earner and GDP contributor to the Namibian economy; therefore, the presence of mining activities near local authorities stands to benefit the local economies from project-related purchases, for example, the retail, accommodation and recreation sectors.

#### **2.2.4. ENHANCEMENT MEASURES FOR SUPPORT TO LOCAL RETAILERS SHOP**

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

#### **2.2.5. 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 the project on infrastructure, being it water, road or electricity and also sanitation facilities nationwide.

#### **2.2.6. 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.

### **2.3. NEGATIVE IMPACTS**

#### **2.3.1. 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, has the potential to reach both groundwater and surface

water if there are active pathways. 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:

#### 2.3.1.1. *EXPLORATION PHASE*

- Contain spillage and remove the contaminated soil for storage into bags.
- Access to spill prevention and response equipment should be visible and readily accessible to all employees at all times.

#### 2.3.1.2. *QUARRY (OPERATION) PHASE*

- Access to spill prevention and response equipment should be visible and readily accessible to all employees at all times.
- 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.

### 2.3.2. *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. Solid waste generated by this project, if not managed, 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.

#### 2.3.2.1. *EXPLORATION PHASE*

- Waste disposal sites should be established on-site where paper, plastic and wire should be kept during the exploration and operation period.
- The collected solid waste should be disposed of at the Grootfontein Town Council solid waste disposal sites.
- During the construction phase, human waste should be collected in on-site mobile toilets for workers. Once these facilities are full, the collected waste should be disposed of at the Grootfontein Council human waste disposal site.
- Prior to the disposal of the above-mentioned waste by the Contractor must enter into an agreement with Grootfontein Town Council for permission to use their facility.

#### 2.3.2.2. QUARRY (OPERATION) PHASE

- Management of solid waste generated during the operation phase would include collection, transportation, and disposal in a manner so as 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 mobile waste disposal drum to be assigned at the project site.
- To handle human waste during project operations, a permanent ablution facility will be erected at the irrigation field, with proper lining of the collector to prevent infiltration of human waste into underground aquifers.
- Prior to the disposal of the waste as mentioned above by the Contractor/the proponent must enter into an agreement with the Grootfontein Town Council 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.

#### 2.3.3. LAND AND SOIL DISTURBANCE: ON-SITE

The sampling process will involve cutting out bulk samples from in situ Dimension stone outcrops and therefore disturbing the landform and the soil cover in the immediate surroundings of the mining site. This undertaking will have a visual impact and has the potential to disturb the structural integrity and biological productivity of topsoil.

##### 2.3.3.1. 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.
  - Watercourses 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 to be removed and stockpile and to be 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.

#### 2.3.3.2. 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 their visual state. Furthermore, this mitigation measure shall extend and applies to any disturbance induced by any access road. Raking or/dragging with tyres could help in the restoration of 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.

#### 2.3.4. BIODIVERSITY (FAUNA AND FLORA)

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

##### 2.3.4.1. EXPLORATION PHASE

- Rules pertaining to safeguarding against poaching and 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 relocate 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 Grootfontein.
- 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.

##### 2.3.4.2. 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 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.).

### 2.3.5. 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 stand an increased risk of suffering from asthma symptoms, chronic bronchitis, nasal inflammation and impairment of lung function (Camici et al., 1978; Angotzi et al., 2005; Leikin et al., 2009).

#### 2.3.5.1. 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 transportation of materials prone to fugitive dust emissions.
- Covering scaffolding and cleaning of vehicles that can reduce dust and vapor 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, wearing respiratory protection during the cleanup,

### 2.3.6. ARCHAEOLOGICAL IMPACT

Heritage resources may be impacted through unintentional destruction or damage during exploration activities. Furthermore, there was no information provided about known heritage or site of cultural values within the project site. Therefore, this impact can be rated medium to low, if there are no mitigation measures in place. At the sites, there are no known heritage areas or artefacts deemed to be impacted by the exploration activities. However, there might



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 will be to assist in the possibility of uncovering sub-surface graves or other cultural/heritage objects and 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 unearthened 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, 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.

### 2.3.7. 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.

#### 2.3.7.1. QUARRY (OPERATION) PHASE

- Reduction of noise from drilling rigs by using downhole drilling or hydraulic drilling;
- Installation of proper sound barriers and (or) noise containments, 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

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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 summarises the objectives, indicators to be observed, schedules to adhere to, and the roles and responsibilities of various stakeholders to the EMP. The following tables give the mitigation measures to be undertaken during the exploration & operational phase, respectively, with the agency responsible for implementation.

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

- Contractor Environmental Coordinator
- Site Foreman
- Project manager
- Project Proponent
- Environmental Commissioner

CENC  
SF  
PM  
PP

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 impacts on the environment	Resources (Financial, human, equipment and safety gear) are provided for the 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 of mitigation measures	Nature of the impact	Proposed mitigation measures	
				Action to be taken	Implementing agency
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	<b>Contractor/CENC</b>
		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	<b>Contractor/CENC</b>
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.	<b>Project manager/Contractor/CENC</b>

				<p>Raw materials will be procured from the nearest material supplier.</p> <p>Material will be brought in batches so that there is no sudden increase of traffic volume at one particular time.</p> <p>On-site use of Concrete batching plant.</p> <p>Use of dust covers over construction material during transportation. Keeping all stationary equipment downwind.</p> <p>Stabilization of dust prone areas by sprinkling water</p>	
3	Noise Quality	Increase in noise levels causing a nuisance to the nearby	Significant and temporary	Prohibition for use of equipment emitting noise of greater than	<b>Project manager/Contractor/CENC</b>

		Community Members/farm		<p>90 dB (A) for 8 hour operation.</p> <p>Prohibition of noise from construction activities during night time.</p> <p>Provide workers on machinery with ear muffs/ earplugs.</p> <p>Provision of temporary barricading around site</p>	
4	Water Environment	<p>Surface and groundwater pollution due to fuel spillage.</p> <p>Turbidity and suspended solids due to soil erosion.</p> <p>Blocking of natural drains due to the deposition of construction materials.</p>	Significant and temporary	<p>Mining to be carried out before periods of strong winds and erosion protection measures to be taken.</p> <p>Mining materials to be stored in enclosures.</p> <p>Cleaning of drains on regular basis to</p>	<b>Contractor/CENC</b>

				avoid blockage. No accumulation of stagnant water	
5	Other Impacts	Soil erosion, additional exposure to noise/ air pollution	Significant and permanent	<p>Construction of necessary scaffolding and retaining structure for protection from waste material and water.</p> <p>Tree plantation to enhance bio aesthetic value.</p> <p>Guidelines for planting saplings of trees to be strictly followed.</p>	<b>Contractor/CENC</b>
6	Spillage of oil management	Contamination of surface and groundwater	Significant and permanent	<p>Contain spillage and remove the contaminated soil.</p> <p>Accessibility to spill prevention and response equipment, such equipment should be visible and accessible to all employees at any given time.</p>	<b>Contractor/CENC</b>



**Table 3: Mitigation measures during 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
		<p>Contamination of soil by fuel and lubricants from construction equipment and vehicles. Increased solid waste generation in the area.</p> <p>If not managed properly will affect the health of local residents.</p>	Significant and temporary	<p>Avoiding spillage of oil and fuel to prevent seepage into ground and reaching surface water bodies.</p> <p>Waste management practices like waste segregation at source, recycling and reuse, mechanical composting etc. will be adopted</p> <p>Provision of mechanical composting units within the site.</p> <p>Regular collection of non-degradable solid waste from the site.</p> <p>Provision of a well engineered</p>	Project Proponent



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

		within the plots.		within site.  Provision of adequate road safety like signage- posts/ road-crossings etc.  Firefighting / Disaster Management Plan provisions for buildings.	
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## 4. MONITORING EMP

Monitoring of the EMP performance for the proposed project by the Contractor emphasizes early dictation, 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 jeopardizing compliance of 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 behavior.

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) provided below are to be used for monitoring purposes by the Contractor's ENC.

**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)**

<b>Mitigation</b>	<b>Compliance</b>	<b>Follow up Action Required</b>	<b>By Whom</b>	<b>When</b>	<b>Date Completed</b>
Are there any deviations from the provisions of the EMP on biodiversity?					
It is traipses harvesting plant taking place feeding of animal or introduction of animals?					

**Table 9: Noise and vibrations on-site**

<b>Mitigation</b>	<b>Compliance</b>	<b>Follow up Action Required</b>	<b>By Whom</b>	<b>When</b>	<b>Date Completed</b>
Are there any deviations from the provisions of the EMP on noise and vibration on-site?					
Are there any complaints from the surroundings neighbor about noise emanating from the sites or tracks transporting materials/produce?					

**Table 10: Compliance**

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

Mitigation	Compliance	Follow up Action Required	By Whom	When	Date Completed
neighbor about noise emanating from the sites or tracks transporting materials/produce?					

## 5. ENVIRONMENTAL CODE OF CONDUCT

The Code of Conduct outlined in this section of the EMP applies and is not limited to, subcontractors, visitors, permanent and temporal workers. Therefore, anybody who finds him or herself within the boundaries of the proponent must adhere to the Environmental Code of Conduct as 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 behavior will result in permanent removal from the construction sites.

### Natural environment management guidelines

- 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;
- 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;
- 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;
- Protect the surface material by not driving over it unnecessarily;
- Do not drive over, build upon, or camp on any sensitive habitats for plants and animals;
- Do not cut down any part of living trees/bushes for firewood;
- Do not destroy bird nest, dens, burrow pits, termite hills, etc. or any other natural objects in the area.

### Vehicle use and access guidance

- Never drive any vehicle without a valid license for that particular vehicle and do not drive any vehicle that appears not to be road-worthy;
- Never drive any vehicle when under the influence of alcohol or drugs;
- DO NOT make any new roads without permission. Stay within demarcated areas;
- Avoid U-Turns and large turning circles. 3-point turns are encouraged. Do not ever drive on rocky slopes;
- Stay on the road, do not make a second set of tracks and do not cut corners;
- 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, Site Manager.
- e. Report to your Contractor if you see a stranger or unauthorized 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 throwaway 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 not be limited to, the access road, vehicle tracks around the site, removal, and restoration of areas covered by stockpile 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 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 utilized to reconstruct the original soil profile.
- All waste shall be removed, and potential hazards particularly pits 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 enters the area after rehabilitation.

## 7. CONCLUSION AND RECOMMENDATIONS

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### 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 affects 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. RECOMMENDATIONS

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 should be prepared by the Environmental Coordinator / Consultant / Suitable in-house resource person and submitted to the regulators to end the proposed quarry project.
- Develop and implement a monitoring program that fits 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. **10141**, situated in the Okahandja District, Otjozondjupa Region, Namibia.

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