



## Environmental Management Plan (EMP) for the Proposed Exploration and Quarrying of Slate for Slate Stone Production on Mining Claims 72110 and 72111, Hardap Region, Namibia

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Proponent: Olivia Platt

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## EXECUTIVE SUMMARY

Olivia Platt (hereinafter referred to as the *Proponent*) intends to carry out small-scale quarrying and processing of mudstone/shale/siltstone/slate and sandstone rocks for the production of slate stone floor and wall tiles on their mining claims (MCs) 72110 and 72111. These MCs are located north of the Gibeon village in the Hardap Region, Namibia. The two MCs share the same borders and have a combined surface area of 35.6049 hectares of which 17.6747 hectares is for 72110 and the remaining 17.9302 hectares is for 72111.

The proposed quarrying and semi-processing activities are among the listed activities under the Environmental Management Act (EMA) No. 7 of 2007 and its 2012 Environmental Impact Assessment (EIA) Regulations, which may not be undertaken without an environmental clearance certificate (ECC). For this reason, the proponent appointed Omavi Geotechnical & Geo-Environmental Consultants CC (hereinafter referred to as *Omavi Consultants*) to conduct an Environmental Impact Assessment (EIA) and an Environmental Management Plan (EMP) that would support application for an ECC from the Ministry of Environment, Forestry and Tourism (MEFT).

This Environmental Management Plan (EMP) has been prepared as part of the Environmental Scoping Assessment (ESA) report for the small-scale quarrying of slate for slate stone production purposes on Mining Claims (MCs) 72110 and 72111. The content thereof has been designed as stipulated by the Regulations of the Environmental Management Act, 2007 (Act No 7 of 2007). The aim is to provide practical mitigation measures to address potential adverse effects whilst enhancing potential positive impacts that have been identified in the ESA report. It is essential for personnel involved on the ground to be fully aware of the possible environmental issues and the means to avoid or minimize the potential impacts of activities on site.

Impacts identified form the basis of a set of environmental specifications that will be implemented on site. These environmental specifications shall form the basis for an agreement between the proponent and Ministry of Environment, Forestry and Tourism (MEFT), and these specifications shall become binding on the proponent.

## Potential environmental impacts identified for the project

### Omavi consultants have identified the following impacts that could arise as the project transition from the early phase to decommissioning phase:

- Physical disturbance of soils and land surface;
- Impact on air quality (dust generation);
- Impacts on biodiversity (forced migration of fauna and removal flora);
- Potential increase in noise level from project activities;
- Impact on aesthetic value (visual impact);
- Potential environmental pollution (on landscape and water resources);
- Potential disturbance of archeological/heritage site;
- Health and safety impacts;
- General social nuisance to farmers/landowners; and

Other potential impacts identified by the Omavi Consultants based on experience similar projects.

- Poor relationships between proponent and landowners due to poor, improper or untimely liaison between project Proponent and farmers or occupiers of land.
- Impact on farm and surrounding services infrastructure such as access roads, water infrastructure and sources, fences and gates, and potential damage to water pipelines by heavy trucks.

The **positive impacts** anticipated from the project are as listed below:

- Socio-economic development through employment creation and skills transfer
- Improved geological understanding of the site.
- Investment opportunities into nearby economic hubs such as Mariental and Gibeon due to the global sought-after commodity such as the explored and mined slate stone.
- Contribution towards national economy through the payment of taxes and levies to the responsible local authorities and institutions of the Government of the Republic of Namibia (e.g. MME).
- Potential economic upliftment of the traditional authority's financial position through payment of loyalties and or procurement of services

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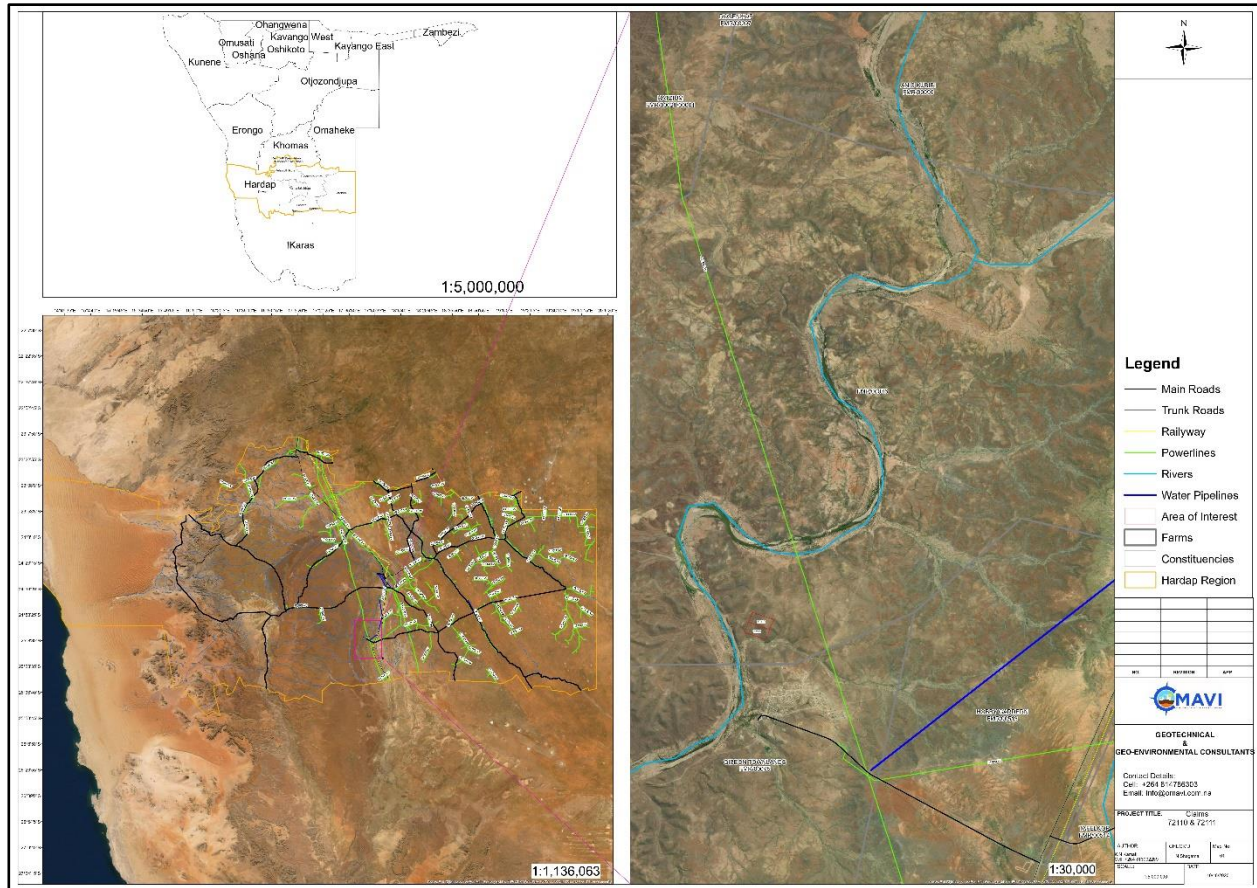
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## **LIST OF ABBREVIATIONS**

<b>ECO</b>	Environmental Control Officer
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>EMA</b>	Environmental Management Act
<b>ECC</b>	Environmental Clearance Certificate
<b>I&amp;APs</b>	Interested and Affected Parties
<b>PPE</b>	Personal Protective Equipment
<b>MC</b>	Mining Claim
<b>MEFT</b>	Ministry of Environment, Forestry and Tourism
<b>MFO</b>	Manager Field Operations
<b>MME</b>	Ministry of Mines and Energy
<b>OGGC</b>	OMAVI Geotechnical and Geo-environmental Consultants cc

# 1. PROJECT LOCATION

Mining Claims 72110 – 72111 are located north of the Gibeon village in the Hardap Region. The site can be accessed via the B1 and D1089 roads, approximately 55 km south west from the town of Mariental (refer to Figure 1).



**FIGURE 1: LOCATION OF THE MINING CLAIMS (PROJECT SITE) NEAR GIBEON VILLAGE IN THE HARDAP REGION (ZOOMED-IN MAP)**

## 1.1. Purpose of EMP

A 'management plan' is defined as: "a plan that describes how activities that may have significant environments effects on the environment are to be mitigated controlled and monitored."

An EMP provides a link between the impacts identified in the EIA process and synthesizes all the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. Therefore, it can be said that the purpose of an EMP includes:

- To prevent, reduce and manage potential negative impacts.
- To enhance potential positive impacts.
- To ensure implementation of recommended mitigation measures; and
- To monitor how effective the mitigation measure proposed are.

This EMP has been compiled based on the scoping assessment conducted for the area. The project specific information used in this document is as provided by the Proponent, from site observations, OMAVI Consultants experience and relevant literature. OMAVI therefore assumes that all the project technical information and data provided by the Proponent is correct and accurate, and that all necessary information has been disclosed which led to the development of this EMP.

It is important to note that an EMP is a legally binding document and a person who contravenes the provisions of this EMP may face imprisonment and/or a fine. This EMP is a live document and shall be amended as the project activities alter to address changes and/or environmental conditions and feedback from compliance monitoring.

## **2. ENVIRONMENTAL MANAGEMENT PRINCIPLES**

**The proponent is accountable to ensuring that all parties involved in the project perform their duties in a manner which fosters the following:**

- 1) All personnel will be required to conduct activities in a manner that is environmentally and socially friendly. This includes all consultants, contractors, and sub-contractors, transporters, guests and anyone entering the site area in connection with the project.
- 2) All activities shall safeguard the health and safety of project personnel and the public against potential impacts of the project; and promote and maintain good relationships with the surrounding settlements and other stakeholders.
- 3) All proposed activities shall safeguard the biophysical Environment by:
  - o Propoting and ensuring wise use and conservation of environmental resources, giving due consideration to the use of resources by present and future generations;
  - o Preventing or minimising environmental impacts;
  - o Minimizing air, water, and soil pollution; and
  - o Conserving Biodiversity

**The following principles need to be maintained in order to attain the environmental management goals of the project:**

### *a) Commitment and Accountability*

The proponent and all executives and managers of the operation will be held responsible and accountable for:

- o Health and safety of site personnel while on duty, including travelling to and from site in company vehicles; and,
- o Environmental impacts caused by project activities or by personnel engaged in them.

b) Competence

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

c) Risk Assessment, Prevention and Control

Prior to commencing any of the proposed activities the designated personnel shall perform a risk assessment by identifying, assessing and prioritising potential environmental risks. Thereafter measures to prevent or minimize risks shall be identified and implemented. Additionally, careful planning, allocation of financial resources, and effective enforcement of management and workplace procedures. Prompt intervention should be the norm in the event of adverse impacts manifesting.

d) Performance and Evaluation

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

e) Stakeholder Consultation

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

f) Continual Improvement

Through continual evaluation, reports, and innovation, seek to improve performance with regard to social health and well-being as well as environmental management throughout the lifespan of the project.

g) Financial Provisions for Exploration and mining

In line with the internationally recognised "polluter pays principle" the proponent will make the necessary financial provision for compliance with the EMP.



### 3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT

#### 3.1. Communication between Parties

Emphasis will be put towards open communication between all parties involved in the project. This will ensure that a proactive approach towards identifying and tackling potential environmental issues arising from the project is accomplished. Such an approach will further strengthen a sense of inclusivity and strengthen relationships between the project managers and the affected community. In the medium to long run this attitude will guarantee that environmental impacts are foreseen, prevented, or minimised, rather than adopting a reactive approach after harm has already been incurred.

In order to effectively implement the EMP there needs to be a strong sense of accountability amongst all project players. For such level of accountability to be achieved clear roles and responsibilities ought to be defined and assigned. Table 1 below stipulates the roles and responsibilities of the parties involved in the proposed project (Table 1).

**TABLE 1: ROLES AND RESPONSIBILITIES**

<b>RESPONSIBLE PARTY</b>	<b>RESPONSIBILITY</b>
The Project Owner	<p>The Proponent or Project Owner is ultimately responsible for implementing all impact management and mitigation measures recommended for all stages of the project.</p> <ul style="list-style-type: none"><li>– The responsible persons will be the company's Environmental Control Officer (ECO) and Managing Director who shall ensure that:</li><li>– The EMP and its environmental specifications are included in contractual documents and it is required that contractors, and subcontractors, consultants etc. meet the EMP requirements;</li><li>– The company and all its subcontractors, consultants etc. comply with all Namibian legislation and policies and any relevant International Conventions;</li><li>– Compliance with the environmental specifications are enforced on a day-to-day basis;</li><li>– Environmental audits are conducted periodically by a suitably qualified ECO to confirm that the environmental requirements are properly understood, data being collected through monitoring programs is</li></ul>

	<p>being utilized, and that the EMP is being implemented effectively;</p> <ul style="list-style-type: none"> <li>- Sufficient budget is provided to implement those measures that have cost implications;</li> <li>- The Site Manager must commission tree surveys well in advance of planned road construction or drill pad preparation so that the necessary site visits by forestry personnel and forestry permits are acquired; and,</li> <li>- Open and effective communication is maintained between all parties concerning environmental management on the project.</li> </ul>
<p>Site Manager or Supervisor</p>	<p>Day-to-day responsibility for environmental management will be assigned to the ECO and Site Manager/ Supervisor for the duration of all activities. The key roles and responsibilities of these personnel will be to:</p> <ul style="list-style-type: none"> <li>- Familiarize themselves with the contents of the EMP and applicable sections of the EIA and the measures recommended therein pertaining to each specific environmental aspect;</li> <li>- Monitor compliance with the environmental specifications on a daily basis and enforce the environmental compliance on site by communicating the ECO's directions to all personnel involved;</li> <li>- In the event of any infringements leading to environmental damage, personnel need to consult with the ECO and seek advice on any remedial measures to limit or rectify the damage;</li> <li>- Maintain a record (through photographs and written records) of "before-and-after" conditions on site;</li> <li>- Facilitate communication between all role players in the interests of effective environmental management; and</li> <li>- Plan and mark out new access routes in advance and arrange for plant surveys by a suitably qualified person so that forest permits can be applied for when necessary.</li> </ul>

Environmental Control Officer (ECO)	<p>The proponent must appoint a suitably qualified ECO either on a full-time or part-time basis who shall be responsible for:</p> <ul style="list-style-type: none"> <li>- Undertaking environmental audits of overall compliance with the environmental specifications. This should be done at least bi-annually for the mined area,</li> <li>- Submitting a site inspection report to the Managing Director and Site Manager;</li> <li>- Advising the Site Manager on interpretation and implementation of the environmental specifications as required; and,</li> <li>- Making recommendations for remedial action in cases of non-compliance with the environmental specifications.</li> <li>- Ensuring that environmental audit reports are submitted to the MEFT periodically at the time interval stipulated by law.</li> </ul>
Exploration/ Mining/ Quarrying Contractors	<p>All contractors appointed will have the responsibility to:</p> <ul style="list-style-type: none"> <li>- Familiarize themselves with the requirements of the EMP and comply with the environmental specifications within;</li> <li>- Notify the ECO through the MFO timeously in advance of any actions that might have significant negative impacts. Mitigatory measures should be discussed and implemented before negative impacts arise;</li> <li>- Conduct or arrange for environmental training for employees and sub-contractors;</li> <li>- Undertake rehabilitation measures where required by the EMP. As far as possible, rehabilitation measures should be carried out progressively and not left till the end of the project.</li> <li>- Make time and budgetary provisions for all personnel and environmental safety and health measures in their schedules and budgets</li> </ul>
The Affected community	The affected community shall have the key responsibility

	<p>of:</p> <ul style="list-style-type: none"><li>- Monitor implementation of the EMP by the Proponent and review performance reporting;</li><li>- Monitor legal compliance;</li><li>- Actively participate in stakeholder forums including any development foundations</li><li>- Launch any complains and grievances to the proponent through the ECO</li><li>- Ensure transparent and efficient decision making on permit applications</li><li>- Sanction poor performance and non-compliance where appropriate through directives, penalties and fines</li></ul>
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## **4. ENVIRONMENTAL SPECIFICATIONS**

### **4.1. Compliance with the Environmental Specifications**

The exploration and quarrying will be conducted in an environmentally and socially responsible manner. All contractors and personnel on site will comply with the environmental specifications contained in this section.

### **4.2. Training of Site Personnel and Contractors**

All site personnel and site contractors will receive the training to equip them with the necessary knowledge to comply with the environmental specifications. The Site Manager will ensure that an appropriate level of training is provided at all levels of site personnel.

### **4.3. Stakeholder Relations**

All site personnel will maintain good relations with the land owners and members of the public. Any complaints received by the ECO will be addressed through transparent forums involving the project leaders and community leaders.

### **4.4. Permits**

Water abstraction permits will be required for any boreholes that are to be used for abstracting water for drilling or exploration camp purposes.

Removal or relocation of rare and endangered plants will require a permit from Directorate of Forestry. Access road permits may also be required from the Roads Authority if any new access roads will be developed from the nearby national road.

### **4.5. Site Camp and ablution facilities**

Establishment of field camps should be planned and agreed upon with the local authorities. The conditions of land use should be stipulated in an agreement between the parties.

Ablution facilities should be established near operational and drill sites and regularly serviced by the proponent. All site staff will be instructed to use the facilities provided and not to defecate in the veld or riverbeds.

### **4.6. Waste Management**

The entire mining claim areas need to be kept clean, neat and tidy to the satisfaction of the Site Manager and ECO. Contractors will provide bins at the work sites and will be responsible for the collection and containment of daily refuse and waste generated by his staff. Bins will

be secured in such a way that wind cannot remove papers and plastics. Bins will also be secured against animals around the vicinity, by placing them in fenced off compartments. No waste will be buried on site. All waste will regularly be removed to an approved waste disposal facility in the Gibeon Village Settlement.

#### **4.7. Fuel, Oils and other Hazardous Substances**

All containers of fuel, oil and any other hazardous substances will be kept sealed, and clearly labelled for identification.

The trailer mounted tank for fuels, oils and any other hazardous substances need to be properly sealed at all times and parked on concrete bunds in an adequate manner (110%) to contain any possible spills.

If any spills occur, the contaminated soil will be removed and disposed to the nearest hazardous waste disposal site.

#### **4.8. Road Safety**

The gravel access roads can be dangerous at times due to dust from passing vehicles, poor camber, patches of loose sand and stones, careless drivers and other external factors.

During rainy seasons gravel roads can be slippery. All drivers must be aware of these hazards and take precautions to avoid them. Such precautions will include, but not be limited to:

- Complying with the recommended speed limit of 40km;
- Reducing speed considerably when visibility is poor;
- Travelling with lights on even in daylight;
- Slowing down for animals and birds on the road;
- Being courteous to other road users and allowing faster vehicles to pass safely – taking into account reduced visibility due to dust and;
- Report any signs of irresponsible behaviour in this regard

#### **4.9. Access Tracks**

No new tracks will be made unless there are no pre-existing tracks, and this must be done only after the ECO (with the assistance of any Forestry Officials where necessary) has cleared the new road establishment.

The selected access and site roads will be clearly marked. A single road only will be used to and from each destination. Turning points for vehicles will also be pre-selected and marked. Particular care will be taken to avoid damage to plants.

Any elevated sites, or sites away from existing tracks, will be accessed on foot rather than by a vehicle. Tyre pressures will be kept as low as is compatible with safety and tyre-wear considerations. Recreational driving by exploration personnel is not permitted within the MCs.

#### **4.10. Conservation of biodiversity**

Damage to all plants species will be avoided wherever possible as plants in such arid terrains are generally of high conservation importance.

Drill pads must be located few metres from the adjacent sensitive plant population barricaded for the duration of the drilling programme to prevent accidental damage.

#### **4.11. Fire Prevention**

After good rains, there can be enough grass to pose a risk of veld fires in dry grasslands. No open fires are to be left unattended.

#### **4.12. Borehole Water & Data Collection**

Any boreholes made for water abstraction will comply with the permitting requirements of the Ministry of Agriculture Water and Land Reform if applicable.

Abstraction will be managed at rates that do not exceed the sustainable yield of the borehole. Provide baseline data on groundwater record needs to be kept of the following parameters for each water abstraction borehole:

- Co-ordinates of the borehole;
- Total volume of water abstracted (m<sup>3</sup>/day);
- Water level (metres below surface) before pumping each day, and immediately after pumping; and,
- To test water quality, a water sample of 1 litre should be taken after pumping for a few hours. This procedure is only required once or twice during the exploration and mining period. The sample(s) should be sent to NamWater for analysis, and the results kept on record.

#### **4.13. Wildlife Poaching**

**NB: It is an offence to poach wildlife.**

No animal or bird is to be captured, killed or harmed in any way. Anyone caught violating this law will face suspension from the project, and could be liable for prosecution. In a likewise manner, domestic livestock on farms may also not be harmed.

#### **4.14. Archaeological Sites**

All archaeological remains are protected under the National Heritage Act (2004) and are not to be destroyed, disturbed or removed. The Act also requires that any archaeological

chance finds, be reported to the Heritage Council Windhoek (Tel. 061-244375). The same applies to rock art sites.

The ECO will be notified without delay of any archaeological findings, and where such finds are made operations are to be stopped immediately until the site has been cleared by registered personnel from the National Heritage Council.

#### **4.15. Occupational Health and Safety**

All company personnel will receive a detailed induction upon joining the project and on a regular basis thereafter.

**Dust:** All staff will receive dust masks to prevent inhalation of potentially radioactive dust while carrying out any dust-producing activities associated with the project. Eating, drinking and smoking while working with any materials that may contain radioactive or hazardous substances is forbidden. Good personal hygiene is encouraged (e.g. washing hands before eating) to prevent ingestion of potentially hazardous or radioactive materials.

**Snakes & Scorpions:** Poisonous snake and scorpion species may occur in the area. Therefore, precautions are required which include: -

- Exercising caution when picking up rocks or equipment from the ground;
- Looking at the ground when walking; and,
- Wearing closed shoes and not walking barefoot.

**Bees:** Bee stings are potentially dangerous to persons who are allergic to them. Bees are attracted to water, so water / liquid should not be left standing.

In case of emergency Aspivenin (suction syringe) should be permanently available at all work stations for the first aid treatment of snake bites, scorpion stings and bee stings. Antihistamine tablets should also be available for the first aid treatment of allergic reactions to bee stings.

#### **4.16. Work Stoppage**

The Site Manager and ECO will have the right to order work to stop in the event of environmental specification infringements which could result in damage to plants, wildlife or personnel. The same shall apply to any archaeological sites discovered. Work will continue once the situation is rectified and brought to a state of compliance.

#### **4.17. Compliance Monitoring**

During exploration and quarrying, the ECO will conduct site compliance inspections at least once a month. After each inspection the ECO will compile an EMP compliance report for regular submission to the MFO and biannually to the MEFT or as stipulated.



## 5. MANAGEMENT PLAN ACTIONS

The aim of the management actions of the EMP is to avoid potential impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts. Management actions recommended to manage the potential impacts rated in the environmental scoping report should be carried out for the proposed exploration and quarrying works as presented in Table 2 below.

**TABLE 2: ENVIRONMENTAL MANAGEMENT ACTIONS FOR THE DEVELOPMENT (CONSTRUCTION) AND OPERATIONAL PHASES OF THE PROJECT**

ENVIRONMENTAL ASPECT	MITIGATION ACTIONS/ ENHANCEMENT MEASURES	RESPONSIBILITIES
<p><b>AUTHORIZATIONS</b> Lack of Agreements, Permits/ Licenses</p>	<ul style="list-style-type: none"> <li>- All the necessary agreements between the proponent and the Witbooi traditional authority should be signed before commencement of work on the MCs</li> <li>- All the required licenses or permits should be applied for and aquired before commencement of work on the MCs. Such permits include water abstraction permits, permits for removal of endangered species if any, blasting permits, etc.</li> </ul>	<p>Proponent</p>
<p><b>ENVIRONMENTAL MANAGEMENT SYSTEMS</b> Legal non-compliance</p>	<ul style="list-style-type: none"> <li>- The Proponent should appoint an Environmental Control Officer to be responsible for managing the EMP implementation and monitoring.</li> <li>- Device an EMP non-compliance penalty system.</li> <li>- Management and facilitation of communication between the project team and Interested and Affected Parties (I&amp;APs) regarding this EMP, to increase transparency and maintain good public perception.</li> </ul>	<p>Proponent</p>

	<ul style="list-style-type: none"> <li>- A Comprehensive Health and Safety Plan for all key project activities should be compiled.</li> <li>- Undertaking an annual review of the impact management and mitigation measures, and recommending additions and/or changes to this document as more data and information is gathered</li> </ul>	ECO
<p><b>ECONOMIC IMPACTS, EMPLOYMENT and IMPROVEMENT IN LIVELIHOODS</b> Creation of employment opportunities and means of living</p>	<ul style="list-style-type: none"> <li>- Priority should be given to the local unemployed youth that resides in the surrounding settlement. Employment will result should the project be permitted. This can be achieved by working closely with the community before and during the project to identify and publicise skills and resources that the local community could provide</li> <li>- Implement livelihood restoration and compensation measures in areas where livelihood are impacted by the loss of agricultural lands.</li> <li>- Procure support services such as security and mechanical repair services from the local community</li> <li>- Develop a decommissioning and closure plan which is updated every five years increasing in detail as closure approaches, and actively engaging with a range of stakeholders throughout the life-of-project to discuss potential consequences of decommissioning and possible mitigation</li> </ul>	Proponent
<p><b>WATER RESOURCES</b> Deterioration of water resources and water quality</p>	<ul style="list-style-type: none"> <li>- Excavate and construct surface water cut-off and diversion trenches along the perimeter of all active quarries to minimise sediment erosion into adjacent tributaries and rivers, and to prevent contact water from the quarry from reaching nearby rivers before being treated</li> <li>- Minimize sediment influx into tributaries and rivers by (1) minimizing the disturbed footprint as far as</li> </ul>	

	<p>practically possible, (2) clearing vegetation in phases so that only those areas required for immediate development are cleared, and (3) revegetating and landscaping disturbed areas as soon as possible, to reflect the surrounding topography and vegetation</p> <ul style="list-style-type: none"> <li>- Equip all trucks and equipment carrying fuels or oil with spill response materials and train personnel in the use of such materials</li> <li>- Use oil &amp; silt traps to remove these types of contaminants from stormwater, and use designated areas for equipment servicing</li> <li>- Re-use water from the pollution control dam as a first resort. Only discharge after treatment and compliance with discharge limits can be demonstrated</li> <li>- Optimise water reuse and reclamation within the mining operations, to limit raw water abstraction</li> <li>- If the quarry extends below the water table undertake dewatering upgradient of the quarry to keep the pit dry and prevent water quality deterioration</li> <li>- Locate site office, container workshop, mobile plant and all associated infrastructure, material storage areas and quarry outside the floodline</li> <li>- If a borehole is drilled and used monitor groundwater levels to determine extent of dewatering impact</li> <li>- Monitor discharge water quality to ensure it is compliant with the specifications set out in Section 21 of the Water Act</li> <li>- Especially ensure the removal of nitrates from treated water</li> <li>- Where silt traps are installed undertake monthly</li> </ul>	
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	<p>monitoring up-gradient and down gradient of the discharge point</p>	
<p><b>ECOLOGY and BIODIVERSITY</b></p> <p>Loss of biodiversity (flora and Fauna) through site clearing, forced migration, collision with vehicles, illegal hunting and fire wood collection</p>	<ul style="list-style-type: none"> <li>- No fauna are to be hunted or destroyed by any project personnel</li> <li>- An environmental education training programme to be developed and implemented, including regular refresher sessions</li> <li>- Effective penalties (e.g. fines) must be imposed for the hunting or harm to fauna by any staff</li> <li>- Rehabilitation of the quarry should be progressive – i.e. it should be implemented as soon as a section is worked out</li> <li>- Areas immediately adjacent to important habitats (e.g. lacustrine wetlands, swamps, Gallery and Swamp Forest) must not be disturbed. Hence, maintain the recommended buffer distance of 200m from all such zones</li> <li>- A practical Rehabilitation Plan to be developed and implemented (overseen by an appropriately qualified botanist/ecologist), with different objectives and rehabilitation approaches established for each habitat/ecosystem. This is to be effected during the construction phase as more site specific data is collected. A budget commitment must be made at the signing of any agreements with the Witbooi traditional Authority</li> <li>- All proposed access haul roads should be constructed via an upgrade of existing roads, as opposed to the development of new roads</li> <li>- Re-shaping of slopes near river banks, in river channels and adjacent river forest to be avoided to</li> </ul>	<p>Proponent/ ECO</p>

	<p>the greatest practical extent possible</p> <ul style="list-style-type: none"> <li>- Vegetation must be cleared in phases</li> <li>- All waste and scrap to be stored in designated areas on site for some time and then removed to a designated waste dump in the Gibeon Village</li> </ul>	
<p><b>SOILS, LAND CAPABILITY, LAND USE and ENVIRONMENTAL POLLUTION</b> Pollution of soil and water due to hydrocarbon spills</p>	<ul style="list-style-type: none"> <li>- Warrant that enough drip trays are available on-site and are used at all times when vehicles, trucks are idle as well as under the diesel trailer to contain any potential spillages.</li> <li>- Provide appropriate secondary containment (to hold 110% of the stored volume) in areas where hydrocarbons, solvents and other potentially hazardous materials are stored.</li> <li>- SABS and SANS standards will be followed with regard to storage and handling of hazardous materials</li> <li>- Ensure that contaminated soils that may have resulted from leakage/spillage from vehicles or machinery are removed completely and treated or disposed of in accordance with the nearest village council waste disposal standards and the contaminated soils must be thereafter replaced with clean soil</li> <li>- The trailer with a diesel tank must have designated parking on site, which must be concrete lined and fitted with emergency spill trays to prevent or minimize pollutants from reaching the soil</li> <li>- Do daily inspections and monitor soil contamination on site on a weekly basis</li> <li>- Personnel must use the ablution facilities provided onsite to prevent potential faecal contamination of water resources</li> </ul>	<p>ECO/ Proponent/ Community</p>

<p><b>PHYSICAL DISTURBANCE</b> Soil disturbance; Soil Erosion; Loss of habitats through site clearing</p>	<ul style="list-style-type: none"> <li>- Selective site clearing coupled with specifically clearing small blocks of 200m by 200m;</li> <li>- Install surface water cut off trenches and silt traps along perimeter of proposed quarries to minimize soil erosion;</li> <li>- Enforce strict driving on the existing and created access roads and impose fines for off-road driving that could potentially destroy plant life.</li> <li>- Location of site office where necessary must be selected with ultimate consideration of the environment, while making it convenient for staff.</li> <li>- Stockpile the topsoil to have a seedbank for reclamation works to restore the environment to as close to its original state as possible. Topsoils must be stockpiled in designated and protected areas to avoid loss of seedbank through erosion, stripping, etc</li> </ul>	<p style="text-align: center;">ECO</p>
<p><b>AIR QUALITY</b> Dust emissions and Air Pollution</p>	<ul style="list-style-type: none"> <li>- Implement dust suppression measures such as covering trailers of vehicles carrying dusty materials to prevent materials being blown from the vehicles</li> <li>- Wear appropriate PPE in all working areas to limit exposure to dust</li> <li>- Maintenance of roads to minimize dust</li> <li>- Water must be used during drilling to suppress the dust generated.</li> <li>- Dust collectors or buckets must be used for monitoring purposes</li> <li>- Vehicles and trucks must not be left idling on site when not in use, to minimize gas emissions.</li> <li>- Equipment should be regularly maintained to ensure engine efficiency and so reduce emission of gases</li> <li>- Devise a dust monitoring programme and compile inhouse monthly air quality reports and quarterly ones</li> </ul>	<p style="text-align: center;">ECO</p>

	<p>for submission to MEFT</p> <ul style="list-style-type: none"> <li>– Set speed limits to 40km/hour to minimize the creation of fugitive dust within the project boundary</li> <li>– Avoid usage of access roads located close to the settlement</li> </ul>	
<p><b>NOISE</b> Impact of noise from working machinery (and possibly blasting) on the workers, and the surrounding community</p>	<ul style="list-style-type: none"> <li>– Restrict activities at the quarry to daytime hours 07:00 am to 07:00 pm.</li> <li>– Restrict blasting at the quarry to afternoon hours 14:00 to 17:00 pm, and ensure that the community is given notice of any planned blasting activities well in advance</li> <li>– Ensure that all earth moving machinery is fitted with sound proofing canopies to minimize noise generation and nuisance to the public</li> <li>– Ensure that workers performing noisy tasks equipped with personal protective equipment (PPE) such as earplugs to reduce noise exposure</li> <li>– Employ a regular rotation of workers (work on shifts) to avoid exposing them to excessive noise continuously</li> <li>– Vehicles and machinery must be well serviced and lubricated to reduce noise</li> <li>– Any blasting design must be implemented by an experienced blaster</li> </ul>	ECO
<p><b>VISUAL IMPACTS</b> Visual impact (Impact on Sense of Place)</p>	<ul style="list-style-type: none"> <li>– Awareness of proximity to any tourist attractions or homesteads, camps, watering points</li> <li>– Clear vegetation in phases so that only those areas required for immediate development are cleared.</li> <li>– Use directional lighting in areas operating at night, if communities are affected by lighting</li> <li>– Rock shading to temporarily reduce visual impact of quarry before rehabilitation</li> </ul>	Proponent/ ECO/ Workers

	<ul style="list-style-type: none"> <li>- Rehabilitation of the quarries should be progressive – i.e. it should be implemented as soon as a section is worked out to avoid cumulative visual impacts</li> </ul>	
<b>SOLID WASTE MANAGEMENT</b> Solid waste disposal	<ul style="list-style-type: none"> <li>- Designated waste bins must be readily available on site to minimize littering</li> <li>- Ablution facilities with septic tanks should be emptied regularly and the resultant waste disposed off in designated areas</li> </ul>	
<b>OCCUPATIONAL HEALTH &amp; SAFETY</b> Workers/ Community Health and safety	<ul style="list-style-type: none"> <li>- Workers must be equipped with personal protective equipment (PPE) such as coveralls, gloves, safety boots, safety glasses and hard hats always on work sites. This should also apply to persons visiting the site during operation hours.</li> <li>- Develop an MOU with the Local Healthcare Centres in Gibeon for service provision to the local workforce</li> <li>- Implement awareness campaigns in neighbouring communities with a focus on school children and mothers, about risks related to traffic</li> <li>- Enforcement of speed limits and sanctions for any personnel found in violation of speed limits, including senior staff and contractors' and sub-contractors' employees</li> <li>- All drivers to be given safety education focussing on speed and conflicts between pedestrians and cyclists</li> <li>- Proper screening of appointed security personnel to ensure they were not implicated in human rights abuses in the past</li> <li>- Arrange for trainings so that the workers are provided with sufficient training on how to handle different machinery and equipment.</li> <li>- Ensure that workers only operate within their</li> </ul>	ECO



	<p>designated areas and only operate machinery they have been trained to use</p> <ul style="list-style-type: none"> <li>- No workers should be allowed to consume alcohol or any other toxic substances during working hours.</li> <li>- No workers should be allowed on site if under the influence of alcohol.</li> <li>- To reduce the risk of injury during blasting the Project will conduct blasting in accordance with SANS/ SABS standards</li> <li>-</li> <li>- General vehicles should have designated parking, well away from the rigs so that it is safe</li> <li>- Employees should be sourced locally, to avoid transmission of infectious diseases.</li> <li>- An emergency preparedness plan should be compiled for every work site, and all personnel appropriately trained.</li> <li>- Equip site with firefighting equipment (such as fire extinguishers) so that they are readily available for use in case of a fire.</li> <li>- Worked out areas must be demarcated and fenced off to keep people out until they can be rehabilitated</li> <li>- All employees must be aware of the assembly point in case of emergency.</li> </ul>	
<p><b>ARCHAEOLOGY AND HERITAGE</b> Disturbance and destruction of archaeological and heritage sites</p>	<ul style="list-style-type: none"> <li>- Personnel should be informed not to destroy, damage, remove or throw away any unknown objects found/discovered on site during operations</li> <li>- Demarcate pre-identified sites of cultural or heritage importance prior to construction, facilitating preservation of such sites by avoidance</li> <li>- The work activities must be monitored to successfully mitigate any chance finds</li> <li>- If any archaeological materials or sites are found, the</li> </ul>	<p>ECO/ all staff members and Community</p>

	<p>National Heritage Council's (NHC) Chance Find Procedures should be followed. Furthermore, the manager onsite should be notified, and all on-site activities stopped immediately until the site has been cleared by NHC personnel.</p> <ul style="list-style-type: none"> <li>- ECO must establish good relations with the National Heritage Council and familiarise themselves with procedure of reporting discovered heritage or archaeological sites.</li> <li>- The ECO should organize for an onsite training by the NHC, focussed on the nature and appearance of different types of archaeological/ religious and cultural features</li> </ul>	
<b>GRIEVANCES</b>	<ul style="list-style-type: none"> <li>- Develop a Grievance Procedure to capture and address grievances from community members, and one that ensures such grievances are addressed in an inclusive and transparent manner by holding grievances meetings (once a month)</li> </ul>	<p>Proponent/ Site Manager/ ECO and Community</p>

## 6. ENVIRONMENTAL MONITORING AND PERFORMANCE ASSESSMENT

To aid performance review of the recommended impact manage and mitigation measures, site monitoring measures need to be implemented. Table 3 below summarises the environmental and social monitoring plan for the development and operational phases of the project. It is stressed that implementation of the monitoring plan will require financial resource commitments from the project proponent through monthly and annual budgets. Such financial commitments should form part of the agreements to be entered into between the project proponent and the Witbooi Traditional Authority.

**TABLE 3: ENVIRONMENTAL AND SOCIAL MONITORING PLAN FOR THE DEVELOPMENT AND OPERATIONAL PHASES OF THE PROJECT**

ENVIRONMENTAL ASPECT	MONITORING PARAMETERS	MONITORING FREQUENCY & METHOD	IMPLEMENTING BODY	REGULATORY BODY
<b>WATER: Drinking Water Quality</b>	- Conductivity, pH, turbidity, calcium, magnesium, sodium nitrate and nitrite, potassium, zinc, fluoride, chloride, arsenic and total hardness, iron, manganese's, oil and grease, and free residual chlorine	- One sample on <b>weekly</b> basis, throughout the construction period. - Sample bottles must be sterilized for the coliform samples. - Free chlorine, pH and electrical conductivity must be measured on site - Calcium and Magnesium samples to be taken in borosilicate glass bottles	Proponent/ Site Manager and ECO	Namibian Department of Water Affairs
<b>WATER: Surface Water Management</b>	- Visual inspection for presence of surface water cut-off and diversion trenches along perimeters of active and un-rehabilitated quarries	- Continuous during operation	Proponent/ Site Manager and ECO	Namibian Departments of Environmenta l and Water Affairs
<b>WATER: Groundwater Quality</b>	- Temperature, oil and grease, pH, arsenic, lead, mercury,	<b>6-monthly from domestic borehole</b> - pH and electrical conductivity must be	Proponent/ Site Manager and ECO	

	nickel, zinc and total petroleum. calcium, magnesium, sodium, potassium, aluminum, chromium, zinc, sulfate, phosphate, chloride, nitrate and fluoride Full analysis for first year there after one can reduce the number of metals depending on what the first year results is shown	measured on site - Calcium and Magnesium samples to be taken in borosilicate glass bottles - If not using a commercially purchased pre-acidified container for the dissolved metals in water, filtered metals-in-water samples should be preserved - Holding times for acid preserved samples is six months except for mercury which is 28 days. - After collecting the sample and adding the preservative, the container must be placed back in a plastic bag for shipping.		Namibian Department of Water Affairs
<b>WATER:</b> <b>Groundwater Quantity</b>	- Flow rate in m <sup>3</sup> /s	- Boreholes to be equipped with flow meters	Proponent/ Site Manager and ECO	Namibian Department of Water Affairs
<b>ECOLOGY:</b> rehabilitation of disturbed habitats	- % vegetative cover - Vertical structure of vegetation - Plant health, richness and abundance of indicator species - Type and extent of erosion, - Presence and extent of invasive alien plants	- Continuously	Proponent/ Site Manager and ECO	Namibian Departments of Environmental Affairs and Forestry
<b>ECOLOGY:</b> Inventory of species in area and Rehabilitation of spoil areas	- Draw up a flora and fauna inventory, including their sensitivity and status of endemism	- Continuously	Proponent/ Site Manager and ECO	Namibian Departments of Environmental Affairs

	<ul style="list-style-type: none"> <li>- Rehabilitation of quarries, spoil and topsoil deposited sites or back fill sites.</li> </ul>			
<b>WASTE MANAGEMENT</b>	<ul style="list-style-type: none"> <li>- Ensure waste is disposed off according to the Internationally accepted good practices</li> <li>- Keep records of all waste generated on site</li> </ul>	<ul style="list-style-type: none"> <li>- Continuously</li> </ul>	<p>Proponent/ Site Manager and ECO</p>	<p>Namibian Departments of Environmenta l Affairs and Solid Waste Management</p>
<b>AIR QUALITY</b>	<ul style="list-style-type: none"> <li>- PM<sub>10</sub> and Dust Quantities by setting up a dust monitoring network (dust collection buckets), focusing on areas that potentially generate dust (e.g. access roads, quarry areas and areas of drilling and cutting)</li> </ul>	<ul style="list-style-type: none"> <li>- Continuous monitoring for PM<sub>10</sub> and Dust</li> </ul>	<p>Proponent/ Site Manager and ECO</p>	<p>Namibian Department of Occupational Health</p>
<b>NOISE:</b> ambient continuous noise	<ul style="list-style-type: none"> <li>- LAeq (A-weighted equivalent continuous sound pressure level)</li> <li>- Monitor daytime and night-time levels, focusing on worst-case levels expected at night</li> <li>- Log noise in 30-minute</li> </ul>	<ul style="list-style-type: none"> <li>- Monitoring survey covering at least <b>one 24-hour period per month</b></li> <li>- Additional 24-hour surveys during all plant maintenance shut-downs to verify background levels in the absence of plant noise</li> </ul>	<p>Proponent/ Site Manager and ECO</p>	<p>Namibian Department of Occupational Health</p>

	averaging intervals (LAeq, 30 min)			
<b>TRAFFIC</b>	<ul style="list-style-type: none"> <li>- Monitor roadworthiness of all vehicles entering or leaving the site</li> <li>- Monitor speed limits on all mine related traffic.</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Daily</b> (random inspections of a portion of vehicles)</li> <li>- Continuous</li> </ul>	Proponent/ Site Manager and ECO	Roads Authority (NATIS)
<b>SOILS:</b> Contamination and erosion	<ul style="list-style-type: none"> <li>- Visual inspection</li> <li>- Monitoring criteria should be established based on reference areas and the post-mining land use being re-established.</li> </ul>	<p><b>Monthly</b></p> <ul style="list-style-type: none"> <li>- Inspect activities for the implementation of mitigation measures including soil salvage/management, storm water controls, etc. Keep record of inspections and areas visited; and</li> <li>- Inspect chemical and material storage area areas and report in the form of photographs</li> </ul> <p><b>Annual</b></p> <ul style="list-style-type: none"> <li>- Record total and new areas disturbed, volume of soil salvaged, and areas where reclamation is complete;</li> <li>- Site wide evaluation on the effectiveness of erosion control efforts including erosion control structures and measures implemented;</li> <li>- Evaluation on the effectiveness of the spill response plan, including a review of significant spill incidents and mitigation measures; and</li> </ul>	Proponent/ Site Manager and ECO	Namibia Departments of Environmental Affairs and Soil Conservation

		- Establishment of program for the monitoring of closure plots to determine the effectiveness of rehabilitation activities		
<b>CULTURAL HERITAGE/ ARCHAEOLOGICAL</b>	- Visual inspection (by a person trained in heritage resource identification)	- Regularly during all earth moving activities, especially during the initial soil removal and subsequent earthworks during construction and quarrying	Proponent/ Site Manager and ECO and all staff	Namibian Heritage Council (NHC)
<b>GRIEVANCES</b>	- Monitor community grievances and provide feedback	- As and when grievances are registered	Proponent/ Site Manager and ECO	Office of Ombushman
<b>COMMUNITY AND HEALTH AND SAFETY</b>	- Formal and regular communication to affected communities  - Record number of grievances received from communities  - Determine baselines for selected individuals and monitor community health to assess if it is deteriorating with time or not. Include screening and examination for potential health impacts arising from dust and noise	- For community members- <b>before construction and annually afterwards</b>	Proponent/ Site Manager and ECO	Namibian Department of Occupational Health
<b>OCCUPATIONAL HEALTH AND SAFETY</b>	- Monitor employee health to assess	- For all employees – <b>during induction and annually afterwards</b>	Proponent/ Site Manager and ECO	

	if it is deteriorating with time or not. Include monitoring (Screening and Examination) for potential health impacts arising from dust and noise	- Record of formally lodged employee complaints, and actions taken to correct these		Namibian Department of Occupational Health
<b>EMPLOYMENT</b>	<ul style="list-style-type: none"> <li>- Regular and accessible dissemination of the human resources and employment policy to interested and affected communities</li> <li>- Complaints of inequality and discrimination in job selection</li> </ul>	- <b>Monthly</b> feedback to community structures	Proponent/ Site Manager and ECO	Labour Commission and Witbooi Traditional Authority
<b>SKILLS DEVELOPMENT</b>	<ul style="list-style-type: none"> <li>- Planning for structured skills development and counselling prior to closure</li> <li>- Engagement with the workforce to determine the skills deficit</li> <li>- Open communication channel between Site Manager and its workforce</li> <li>- Contractors incorporating the ideals of skilling and counselling prior to closure, into their labour workplans</li> </ul>	<b>6-monthly</b> <ul style="list-style-type: none"> <li>- Feedback to community through development forum</li> </ul>	Proponent/ Site Manager and ECO	Labour Commission and Witbooi Traditional Authority



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## 7. EMERGENCY MANAGEMENT AND RESPONSE PLAN

Prior to commencement of construction and operation of any quarry in the proposed areas a comprehensive emergency management and response action plan must be drafted by the proponent. The purpose of such a plan is to have an effective emergency response action plan which would ensure preparedness and outline procedures in case of an emergency at any of the proposed work sites. For the proposed project such a plan should outline clear procedures to be followed in case of the following emergencies:

- Fire
- Chemical (hydrocarbons or explosives) spills and leaks
- Extreme weather conditions (storms, excessive winds, etc)
- Uncontrolled/ erroneous blasting
- Electrical emergencies
- Quarry flooding
- Slope or rockface failure in quarry
- Collision between mobile equipment or between such equipment and personnel
- Working in confined spaces
- Working at heights
- Widespread illness or pandemic (e.g. Covid-19)

Collectively, the emergency management and response action plan is needed for the following reasons:

- It helps to preserve human, fauna and flora in case of an emergency
- In the event of a disaster it would be difficult to prove "due diligence" without proof of the prior existence of an emergency response plan and the equipment and training required
- An emergency response plan is intended to control losses to people, equipment, materials and environment
- Having an emergency response plan and procedures can reduce a company's exposure to civil or criminal liability in the event of an incident and may reduce insurance premiums.

## **8. CONCLUSION**

This Environmental Management Plan highlights the management measures that will be implemented to manage and mitigate the potential environmental impacts expected from the proposed activities. Additionally, it highlights the need / requirements for the Environmental Emergency Preparedness and Response plan to be followed in case of an emergency.

The EMP is a legally binding document, which commits the applicant to comply with all management measures, monitoring programmes and other plans as presented herein. As part of the EMP, monitoring programmes have been provided to manage and control critical components of the environment. This is a live document which may be amended if project activities alter and as the project evolves through the various phases.