UPDATED ENVIRONMENTAL MANAGEMENT PLAN

Renewal of Environmental Clearance Certificate for Mining of Marble / Dimension Stone on Mining Claims 69320 and 69321 situated in the Karibib District, Erongo Region

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DOCUMENT INFORMATION AND APPROVAL		
Title	Renewal of Environmental Clearance Certificate for Mining of Marble / Dimension Stone on Mining Claims 69320 and 69321 situated in the Karibib District, Erongo Region	
ECC Application Reference number	APP – 002074	
Location	Situated about 45 km South-west of Karibib, Erongo Region	
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1. INTRODUCTION

1.1 PROJECT RATIONALE

Various mineral deposits of granites, marbles and pegmatites around the claim Areas and in particular around west and south-west of Karibib have been explored by various South African and International quarrying and exploration companies since the early 1950's and 1960's.

IPMM and partners, therefore sees the need to contribute towards the national development goals of job creation and revenue generation through capitalizing on use and value addition to natural resources for the benefit of local community. IPMM also understand and upholds their citizen's responsibility for undertaking any development activities with minimal negative impacts on the environment and the Namibian people through sustainable small-scale mining.

Based on the reports and in records available on geological studies undertaken by the Ministry of Mines and Energy in the vicinity of the claims, there is great potential of minerals deposit including base and rare metal, industrial minerals, dimension stones. Thus, there are possibilities of developing small but viable quarrying ventures that can sustain and add value to the development of the Erongo Region.

Inyenga Palissandro Marble Mine (IPMM), has been in the industry for more than five years now and operates a small-scale marble quarry operations specializing in semi-precious and dimension stone quarrying. The company holds Mining Claims (69320 and 69321) License and an Environmental Clearance Certificate for their operations on both Farms Etusis No. 75 and Gamikaub West 115 in the Karibib District.

1.2 CURRENT PROJECT ACTIVITIES

IPMM has been quarrying for on its Mining Claims (69320 and 69321) and intends on extending activities onto the new claims by replicating the current quarrying approach. The quarry adopts and undertakes the following activities:

- Overburden Striping (in this case mainly surface rock)
- Stockpiling of Waste Rock
- Drilling and Blasting, Extraction (Block cutting by wire-saw)
- Loading and Hauling

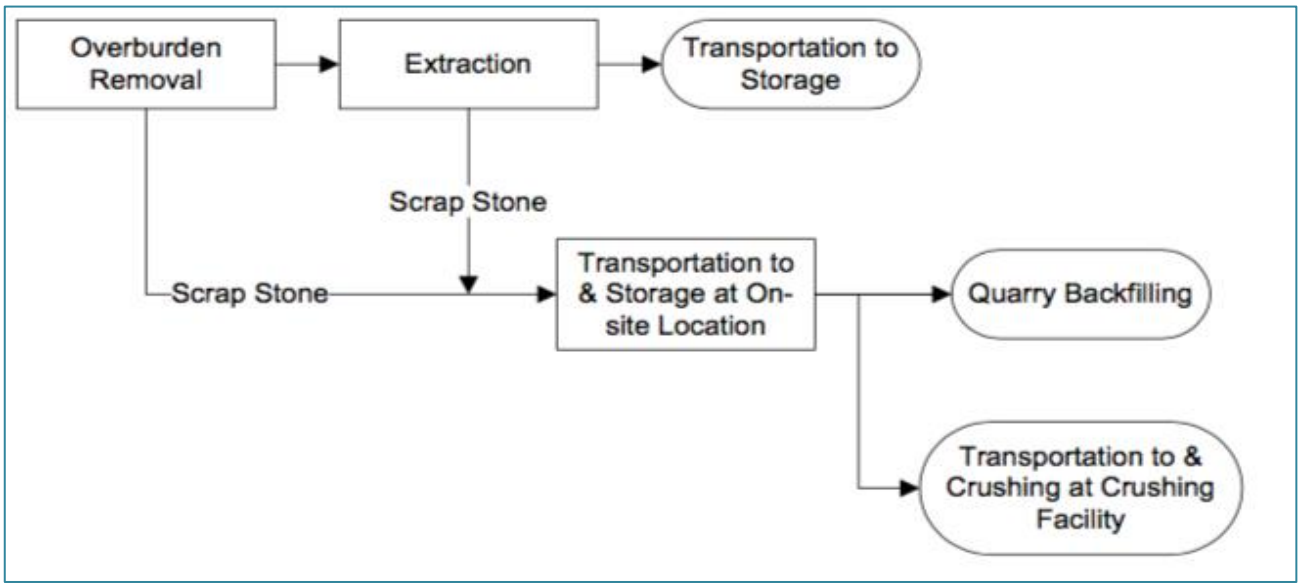

Fig 1: Proces Flow Diagram for dimension stone quarrying, IPMM engagses only in blocks quarrying for export market

Quarrying is a term used to describe a specialized open-pit quarrying technique wherein solid rock with a high degree of consolidation and density is extracted from localized deposits (see **Fig** 1, for the detailed process flow). Quarried materials are either crushed and broken to produce aggregate or building stone, such as dolomite and limestone, or combined with other chemicals to produce cement and lime.

In accordance with the provisions of the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 gazetted under the Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007), the Stone quarrying activities (Seal quarrying, processing and transportation) undertaken by IPMM is a Listed Activity and may not be undertaken without an Environmental Clearance Certificate (see **Table 1**).

Table 1: List of activities identified in the EIA Regulations (GG. 4878 R.29 of 2012) which apply to semi-precious and dimension stones quarrying activities in Namibia

EMA 2007 Legislation	Description of activity	Relevance to IPMM Pty Mine
Activity 3 (3.1 & 3.2) Quarrying and Quarrying Activities	3.1 The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Quarrying Act), 1992. 3.2 Other forms of quarrying or extraction of any natural resources whether regulated by law or not.	And the construction of facilities for the purpose of carrying out a listed activities The quarrying or extraction of any natural resources whether regulated by law or not.
Activity 4	4. The clearance of forest areas, deforestation, aforestation, timber harvesting or any other related activity that requires authorisation in term of the Forest Act, 2001 (Act No. 12 of 2001) or any other law.	The clearance of vegetation areas to allow the quarrying activity to take place

1.3 PROJECT LOCATION

The existing IPMM quarry is situated about 45 km South-west of Karibib central Namibia on mining claims 69320 and 69321 located on Farms Etusis No. 75 and Gamikaub West 115 respectively (see Fig 3), in the vicinity of Karibib Town in Erongo Region. The Mining Claims are within the southern Central Zone of the Damara Orogenic, a common geological formation of various topography in Namibia. From Windhoek (capital City), the site can be accessed through the B2 road connecting Okahandja and Swakopmund.

The new mining claims are all on Farms Etusis No. 75 and are not that far from the IPMM existing marble mine site with the Karibib district. (**Fig 2** Location of the site **and Table 4,** GPS coordinates). The exact site is located within distant proximity of two prominent marble quarrying operations namely the Omusati Mine and Purity operations to the North-eastern side and the Navachab Gold Mine to its North-western side.

Table 2: GPS coordinates of the IPMM and Partners Mining Claims

GPS POINTS	LATITUDE	LONGITUDE
Mr. Michael I. T. Petrus (Mining Claim's No. 69320 and 69321)	-22.241434°	15.644878°
	-22.239255°	15.642118°
	-22.241553°	15.638145°
	-22.242916°	15.638934°

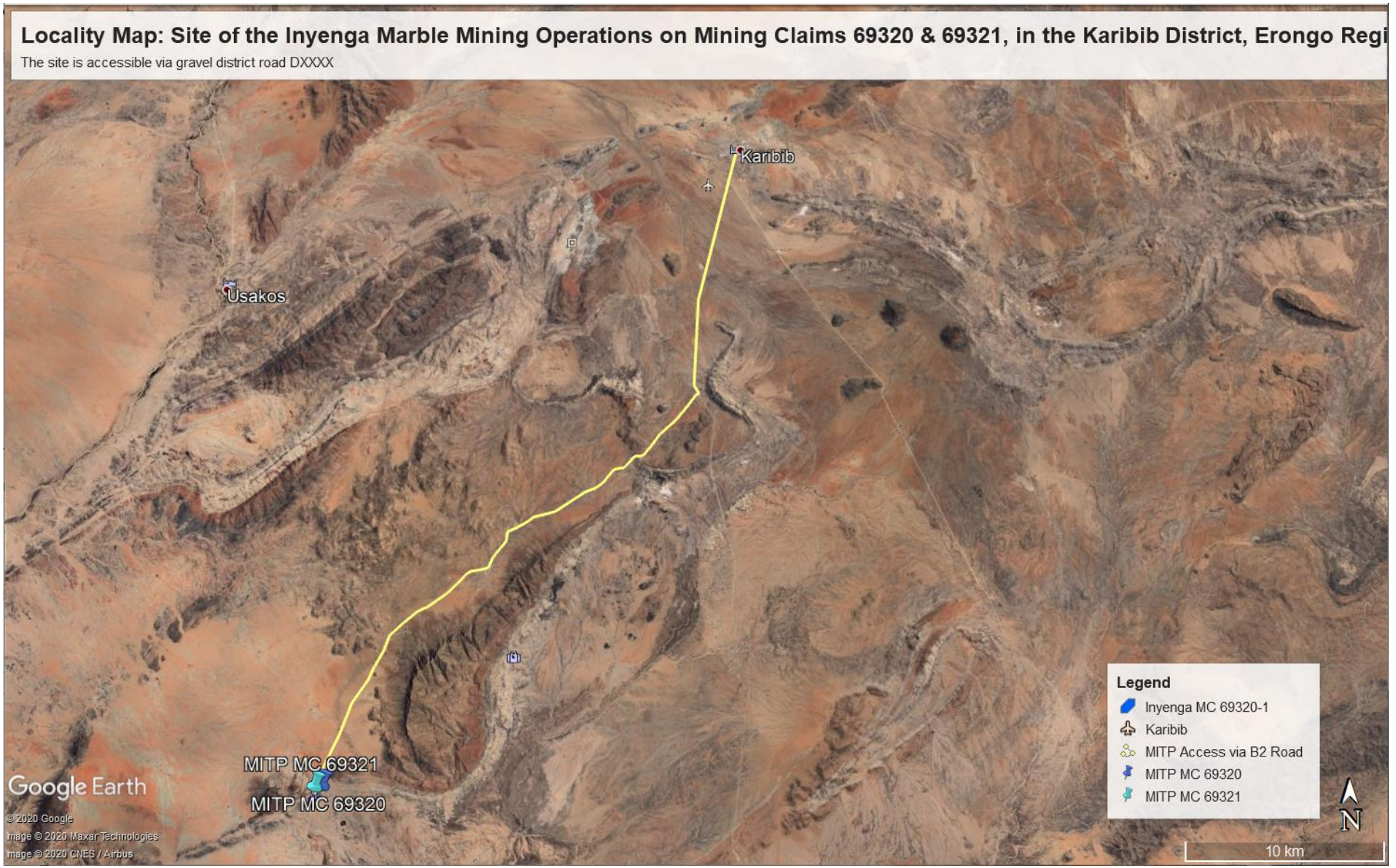

Fig 2: Locality Map of IPMM quarrying site on Farm Etusis No 75, also depicted is the alternate access routes area

2. ENVIRONMENTAL LAWS AND POLICIES

This section draws information from the legal sources in Namibia. The Republic of Namibia has five tiers of law and a number of policies relevant to uranium quarrying and these include:

- The Constitution.
- Statutory law.
- Common law.
- Customary law.
- International law.

Key policies currently in force include:

- Namibia's Environmental Assessment (EIA) Policy for Sustainable Development and Environmental Conservation (1995).
- The Minerals Policy of Namibia (2002).

As the main source of legislation, the Namibian constitution makes provision for the creation and enforcement of applicable legislation. In this context and in accordance with its constitution, Namibia has passed numerous laws intended to protect the natural environment and to mitigate against adverse environmental impacts.

Namibia's policies provide the framework to the applicable legislation. Whilst policies do not often carry the same legal recognition as official statutes, policies can be and are used in providing support to legal interpretation when deciding cases.

2.1 APPLICABLE LAWS AND POLICIES

In the context of uranium quarrying and related infrastructure in Namibia, there are several laws and policies currently applicable. Each of these is discussed in detail below.

2.1.1 The Constitution of the Republic of Namibia, 1990: ***Article 95*** of Namibia's constitution provides that:

"The State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at the following:

> *(l) Management of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future; in particular the Government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibian territory."*

This article recommends that a relatively high level of environmental protection is called for in respect of natural resources utilization, management, pollution control and waste management.

2.1.2 Namibia's Environmental Impact Assessment (EIA) Policy of 1995

This policy promotes accountability and informed decision making through the requirement of EIAs for listed programs and projects.

2.1.3 Environmental Management Act No. 7 of 2007

To enforce the policy on EIAs, the Environmental Management Act (EMA) (7 of 2007) has been compiled, but is yet to practically come into force because the required regulations are still in draft form. The EMA is expected to improve the management of impact assessments in Namibia through the establishment of an environmental commissioner, who will approve environmental plans and through requiring government agencies to work as a cohesive decision-making agents to ensure long term sustainable resource use.

2.1.4 The Environmental Investment Fund of Namibia No. 13 of 2001

The Environmental Investment Fund of Namibia Act (13 of 2001) provides for the creation of a fund that will be used to support sustainable environmental and natural resource management. The source of the funds will include penalties/fines paid and/or property forfeited in terms of non-compliance and/or crimes as set out in EMA.

2.1.5 The Water Act No. 54 of 1956

The Act "consolidate and amend the laws relating to the control, conservation and use of water for domestic, agricultural, urban and industrial purposes; to make provision for the control, in certain respects, of the use of sea water for certain purposes; for the control of certain activities on or in water in certain areas; for the control of activities which may alter the natural occurrence of certain types of atmospheric precipitation; for the control, in certain respects, of the establishment or the extension of townships in certain areas; and for incidental matters."

It additionally controls the disposal of effluent and makes it a criminal offence to:

"*Pollute fresh or sea water in a way that makes the water less fit for any purpose for which it is or could be used by people, including use for the propagation of fish or other aquatic life, or use for recreational or other legitimate purpose*."

2.1.6 The Forest Act No. 12 of 2001

The Forest Act (12 of 2001) allows for the declaration of protected areas in terms of soils, water resources, plants and other elements of biodiversity. This includes the proclamation of protected species of plants and the conditions under which these plants can be disturbed, conserved, or cultivated.

2.1.7 Nature Conservation Ordinance No. 4 of 1975

The Nature Conservation Ordinance (4 of 1975) provides for the declaration of protected areas and protected species.

2.1.8 National Heritage Act No. 27 of 2004

The National Heritage Act (27 of 2004) provides protection and conservation of places and objectives of significance, as all archaeological and paleontological objects belong to the state.

To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters. The Act is aimed at protecting, conserving and registering places and objects of heritage significance. All protected heritage resources (e.g. human remains etc.) discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated.

2.1.9 Labor Act No. 11 of 2007

Construction safety is regulated under the Health and Safety Regulations under the Labour Act. The health and safety framework in Namibia regulates the following aspects:

- Construction safety;
- Electrical safety;
- Machinery safety;
- Hazardous substances;
- Physical hazards and general provisions;
- Medical examinations and emergency arrangements;
- Rights and duties of employees.

2.1.10 Water Resources Management Act (No. 24 of 2004) (Not implemented yet)

The purpose of this Act is to broadly control the use and conservation of water for domestic, agricultural, urban and industrial purposes; to control, in certain respects, the use of sea water; to control certain activities on or in water in certain areas; and to control activities which may alter the natural occurrence of certain types of atmospheric precipitation.

2.1.11 Pollution Control and Waste Management Bill (guideline only)

Part 7 states that any person who sells, stores, transports or uses any hazardous substances or products containing hazardous substances shall notify the competent authority, in accordance with sub-section (2), of the presence and quantity of those substances.

The competent authority for the purposes of section 74 shall maintain a register of substances notified in accordance with that section and the register shall be maintained in accordance with the provisions. Part 8 provides for emergency preparedness by the person handling hazardous substances, through emergency response plans.

2.1.12 Public Health Act No. 36 of 1919

Section 111 it is the duty of every local authority to take all lawful, necessary and reasonably practical measures for preventing the pollution so as to endanger health of any supply of water within its district and to take measures against any person so polluting any such supply.

Section 119 states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.

Section 132 empowers the Minister to make regulations regarding, inter alia, the drainage of land or premises, the disposal of liquids and the removal and disposal of rubbish, refuse, manure and waste matters as well as regarding the establishment and carrying on of factories or trade premises which are liable to cause offensive smells or effluvia or to discharge liquid or other material liable to cause such smells or effluvia or to pollute streams and prohibiting the establishment or carrying on of such factories in unsuitable localities.

2.1.13 Water Resources Management Act (No. 24 of 2004) (Not implemented yet)

The purpose of this Act is to broadly control the use and conservation of water for domestic, agricultural, urban and industrial purposes; to control, in certain respects, the use of sea water; to control certain activities on or in water in certain areas; and to control activities which may alter the natural occurrence of certain types of atmospheric precipitation.

3. PROJECT DESCRIPTION

3.1 CONSTRUCTION PHASE

The preconstruction and construction stages, i.e. site preparations of the proposed project will commence once the Environmental Clearance Certificate (ECC) has been obtained since and the other required legal approvals and permits such as the Mining Claim License and Surface Use Agreement contracts are obtained.

Local engineering companies will be employed to implement the infrastructure installation, design, civil, structural, and health and safety plan. Services of a suitably qualified firm will be sought to determine the quality of the marble to be mine at the site and results shall be used to guide operation and thus reduce the footprint.

Activities of the preconstruction and construction phases are summarized below:

- Existing access road regrading: To facilitate the ease of circulation for vehicles transporting employees, construction material, equipment and marble quarrying implements, the existing road that was created by the community will be upgraded by means of regrading it and compacting to be able to support the movement of mine vehicles to the site;
- Fencing: A fence will be erected during the preconstruction phase and this will remain in place after commission in order to regulate access to the marble quarrying sites and for health, safety/security purposes;
- Commissioning: The claims holders will commence the marble quarrying activities once the Environmental Clearance Certificate (ECC) has been granted.

3.2 PROPOSED PROJECT ACTIVITIES

3.2.1 OPERATIONAL PHASE

Given the small-scale nature of operations, IPMM adopts the marble quarrying technique as the preferred quarrying method. Dimension stone / rock composed of calcium-magnesium carbonate, which forms due to the high pressure and heat resulting in recrystallized material. Often, dimension stones such as marble occurs in metamorphic rocks which can be mica schists, phyllites, gneisses, and granulites. Some marbles can consist of lime or magnesia silicates minerals, hence the use of rock explosives are limited due to the danger of breaking the rock. Therefore making cuts is regarded an easy way of splitting (See illustration in **Fig 8**).

The process is essentially continuous with extraction and haulage steps running in series, as discontinuous process of drilling and blasting is required prior to the loading and hauling stages. It uses a variety of different types of equipment including shovels, trucks, draglines, bucket wheel excavators and scrapers.

Fig 3: Shows general setup of a marble quarry where block are extracted and stored before being hauled to the habour town for shipping (this is the least radioactive quarry activity).

Drilling:
After the working trench and the face for frontal excavation have been done, horizontal and vertical holes are drilled. Vertical drill holes are drilled at a distance of 15 to 35cm depending on the characteristics of the block and the manner of initiation. The distance between vertical drill holes is a = 30 cm. This distance is not applied to rear drill holes that are of lesser number than the frontal. The distance between them should amount to 1/2 of the distance of the frontal drill holes.

The number of horizontal drill holes is the same as that of the vertical frontal ones. However, horizontal drill holes are drilled in the footwall at a zero angle of drilling (horizontal). The first horizontal drill hole should be spaced in the middle between the first and second vertical frontal drill hole. This pattern is done in order to eliminate possible overlapping of strikes of vertical and horizontal holes that may result in concentration of blasting material (explosive, detonating fuse and black powder) and excessive damage of the block. The drill holes pattern, the manner of connection and initiation are shown in fig. 1.

Extracting block through wire saw:
Dimension stones are often hard, hence it needs extracting through wire saw, chain saw or diamond wire saw. In this process, chain saw or wire saw leaves cut between the blocks. This machine can perform both vertical and horizontal cuts. Both dry and wet cutting also can be done, however due to the need to reduce the operational water demands, and conservation of water thereof IPMM adopted the dry cutting. IPMM is cognisant of the potential dust pollution associated with dry cutting and thus wind speed and direction are regularly monitored.

Transporting Blocks:
After quarrying the blocks, the backhoe loader and excavator lifting equipment are used for transporting the blocks. Plans are that mobile and stable cranes are acquired and used for lifting and loading the blocks as the business expands.

6.2.2 OPERATIONAL INFRASTRUCTURE
Onsite infrastructure at the site consist of a 19 ha Mining Claim area of which 1 ha (Although the actual Chalcedony Quartz pit's footprint is only 0.39 ha) is fenced off, necessary to exclude entry of both livestock, wildlife and unauthorised personnel to the site and thus ensuring good safety and security to all as (see in **Fig 9**).

Due to its small-scale nature of quarrying and with only man employed at the project, the current housing infrastructure consist of tented accommodation (which will be converted to corrugated iron sheet structures), boosting two Pit latrine toilets and bathing facility.

Fig 4: Mine site with the key infratsructure depicted in the backgroung i.e. site fence and entry gate, water supply truck

Water for both domestic and operational use is sourced from the main farm boreholes and supplied by truck on a weekly basis (1000 litres) and currently stored in an equivalent sized tank, however plans are to expand storage capacity to 5000 litres month supply. Energy is supplied by 5 Watt diesel powered generator, used mainly for food preservation and lighting at the lodging facility, while for cooking the energy needs are met use of gas. The diesel supply for the earthmoving equipment is stored in raised 4500 litres capacity tanks (**Fig 10**) and is also brought in by truck to the project site on pre-existing farm tracks.

Fig 5: Shows the Staff Accomondation and Current Office Facility (including ablutions), in foreground is the fleed collection (light vehicle and compressor equipment)

3.3 DECOMMISSIONING AND CLOSURE PHASE

3.3.1 MARBLE QUARRYING OPERATIONS LIFESPAN

The operational lifespan of the marble quarrying activities are at this stage not determined but could possibly extend to ten (10) years, however it influence by numerous factors such investment opportunity, demand for the exact product type, surface use agreement and market factors.

3.3.2 DECOMMISSIONING

The marble quarry is expected to be operational, initially for a 10 year period, and then depending on the ore sustainability assessment the mining claims holder will decide on whether to carry on with the activity or completely decommissioned. The provisions of the Environmental Management Act, 2007 it is necessary to take into account the impacts on the environment during the decommissioning phase of the project. Namibian legislation considers decommissioning as a separate activity and an EIA should therefore be carried out prior to its decommissioning.

- Considerations for to decommissioning is that: A closure plan should be developed by the proponent at least 2 years prior to the expected date of decommissioning. This closure plan must identify targets and objectives for decommissioning and operations working towards this end. Consultations from specialists must be conducted by the proponent in order to ensure that the decommissioning phase is in line with the prevailing best practice trends, to reduce the potential risks and economic costs to carry out this process. Stakeholder engagement is vital to ensure that the communities' interests are known and their obligations from the beginning of the project are addressed.

4. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 OVERALL OBJECTIVES OF THE EMP

The following overall environmental objectives have been set for the IPMMs and Partners small-scale quarrying project:

- To comply with national legislation and standards for the protection of the environment.
- To limit potential impacts on biodiversity through the minimisation of the footprint (as far as practically possible) and the conservation of residual habitat within the mine area.
- To keep surrounding communities informed of farming activities through the implementation of forums for communication and constructive dialogue.
- To ensure the legal and appropriate management and disposal of general and hazardous waste, through the implementation of a strategy for the minimisation, recycling, management, temporary storage and removal of waste.
- To develop, implement and manage monitoring systems to ensure good environmental performance in respect of the following: ground and surface water, air quality, noise and vibration, biodiversity and rehabilitation.

4.2 METHODS OF IMPACT SCOPING / ASSESSMENT

As part of the Scoping and EMP processes for the marble quarry, environmental aspects and potential environmental impacts associated with the activities and facilities were identified. Detailed mining claim's activities associated with the operation shall be described in section of this EMP. Table 4 provides a description of the environmental aspects that are associated with the marble quarry operations and how they impact the biophysical and human environments, respectively.

Both the criteria used to assess the impacts and the method of determining the significance of the impacts is outlined in **Table** 5. This method complies with the method provided in the Namibian EIA Policy document and the draft EIA regulations. Part A provides the approach for determining impact consequence (combining severity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D. Both mitigated and unmitigated scenarios are considered for each impact.

Table 3: Criteria for Assessing Impacts

PART A: DEFINITION AND CRITERIA		
Definition of SIGNIFICANCE		**Significance = consequence x probability**
Definition of CONSEQUENCE		**Consequence is a function of severity, spatial extent and duration**
Criteria for ranking of the SEVERITY/NATURE of environmental impacts	**H**	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action. Irreplaceable loss of resources.
	M	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints. Noticeable loss of resources.
	L	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints. Limited loss of resources.
	L+	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.
	M+	Moderate improvement. Will be within or better than the recommended level. No observed reaction.
	H+	Substantial improvement. Will be within or better than the recommended level. Favorable publicity.
Criteria for ranking the DURATION of impacts	**L**	Quickly reversible. Less than the project life. Short term
	M	Reversible over time. Life of the project. Medium term
	H	Permanent. Beyond closure. Long term.
Criteria for ranking the SPATIAL SCALE of Impacts	**L**	Localized - Within the site boundary.
	M	Fairly widespread – Beyond the site boundary. Local
	H	Widespread – Far beyond site boundary. Regional/ national

PART B: DETERMINING CONSEQUENCE					
		SEVERITY = L			
DURATION	Long term	H	Medium	Medium	Medium
	Medium term	M	Low	Low	Medium
	Short term	L	Low	Low	Medium
		SEVERITY = M			
DURATION	Long term	H	Medium	High	High
	Medium term	M	Medium	Medium	High
	Short term	L	Low	Medium	Medium
		SEVERITY = H			
DURATION	Long term	H	High	High	High
	Medium term	M	Medium	Medium	High
	Short term	L	Medium	Medium	High
			L	M	H
			Localized Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national
			SPATIAL SCALE		

PART C: DETERMINING SIGNIFICANCE					
PROBABILITY (of exposure to impacts)	Definite/ Continuous	H	Medium	Medium	High
	Possible/ frequent	M	Medium	Medium	High
	Unlikely/ seldom	L	Low	Low	Medium
			L	M	H
			CONSEQUENCE		

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	**Decision guideline**
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

***H = high, M= medium and L= low and + denotes a positive impact.**

4.3 STAKEHOLDER MANAGEMENT AND MITIGATION

It is important that channels of communication are maintained over the life of the project for surrounding landowners, the general public members, as well as the local and traditional authorities, table 4 shows the stakeholders communication Management and Mitigation Plan.

Table 4: Actions relating to stakeholder communication

Issue	Management commitment	Phase
Understanding who the stakeholders are	Maintain and update the claim holders stakeholder register, including stakeholders' needs and expectations. Ensure that all relevant stakeholder groups are included.	**All**
	A representative database would include government, employees, service providers, contractors, indigenous populations, local communities, traditional authorities, NGOs, shareholders, customers, the investment sector, community-based organizations, suppliers and the media.	**All**
	Ensure that marginalized and vulnerable groups are also considered in the stakeholder communication process.	**All**
	Record partnerships as well as their roles, responsibilities, capacity and contribution to development.	**All**
Liaising with interested and affected parties at all phases in the mine life	Devise and implement a stakeholder communication and engagement strategy.	**All**
Responsibility		

5. SUMMARY OF ENVIRONMENTAL IMPACT S AND THE MANAGEMENT PLAN

The vegetation in the proposed area ear-marked for the proposed mining claims is sparsely distributed with a few shrub and deserted adapted species distributed within the vicinity. The impact of the project to the vegetation in the area can be rated low since the area is sporadically vegetated.

Table 5: Summary of potential cumulative impacts associated with the proposed project

Section	Potential impact	Significance of the impact (the ratings are negative unless otherwise specified)	
		Unmitigated	Mitigated
Soils and land capability	Loss of soil resources from pollution	H	M-L
	Loss of soil resources from physical disturbance	H	M-L
Biodiversity	Physical destruction of biodiversity from clearing land and placing infrastructure	H	L
	Loss of biodiversity from the loss of subsurface water resources	H	L
	General disturbance of biodiversity	H	L
Water resources	Pollution of surface and groundwater	H	L
Air quality	Air pollution from dust and use of vehicle and diesel generator	H	H
Socio-economic impacts	Injury to third parties, risk of HIV/AIDS and Gender issues	M	L

5.1 OVERALL OBJECTIVES OF THE EMP

The following overall environmental objectives have been set for the Inyenga Palissandro Marble Mine (IPMM) mining claims:

- To comply with national legislation and standards for the protection of the environment.
- To limit potential impacts on biodiversity through the minimisation of the footprint (as far as practically possible) and the conservation of residual habitat within the mine area.
- To keep surrounding communities informed of farming activities through the implementation of forums for communication and constructive dialogue.
- To ensure the legal and appropriate management and disposal of general and hazardous waste, through the implementation of a strategy for the minimisation, recycling, management, temporary storage and removal of waste.
- To develop, implement and manage monitoring systems to ensure good environmental performance in respect of the following: ground and surface water, air quality, noise and vibration, biodiversity and rehabilitation.

The Management and Mitigation Plans (MMPs), listed in the table below, are applicable to all the relevant activities and facilities of the IPMM quarrying activities. (The MMPs follow in the subsequent sections).

5.2 STAKEHOLDER MANAGEMENT AND MITIGATION

It is important that channels of communication are maintained over the life of the project for surrounding landowners, the general public members, as well as the local and traditional authorities, table 4 shows the stakeholders communication Management and Mitigation Plan.

Table 6: Actions relating to stakeholder communication

Issue	Management commitment	Phase
Understanding who the stakeholders are	Maintain and update the IPMM stakeholder register, including stakeholders' needs and expectations. Ensure that all relevant stakeholder groups are included.	**All**
	A representative database would include government, employees, service providers, contractors, indigenous populations, local communities, traditional authorities, NGOs, shareholders, customers, the investment sector, community-based organizations, suppliers and the media.	**All**
	Ensure that marginalized and vulnerable groups are also considered in the stakeholder communication process.	**All**
	Record partnerships as well as their roles, responsibilities, capacity and contribution to development.	**All**
Liaising with interested and affected parties at all phases in the mine life	Devise and implement a stakeholder communication and engagement strategy.	**All**
Responsibility		

5.3 TOPOGRAPHY MANAGEMENT AND MITIGATION

5.3.1 ISSUE: SECURITY AND SAFETY IMPACT

Impacts relating to the welfare, health and safety of the local communities may arise as a result of traffic, noise, air quality, pollution issues, etc. During the construction phase IPMM may at a minimal provide job opportunities to the local community.

Hazardous excavations and infrastructure include all structures into or off which third parties and animals can collide, fall and be harmed. In the construction and decommissioning phases these hazardous excavations and infrastructure are usually temporary in nature, usually existing for a few weeks to a few months. The operational phase will present more long-term hazardous infrastructure. It is essential that safety and security measures are defined and implemented to adequately protect the mine site from being accessed by unauthorized people.

Table 7: Hazardous excavations & infrastructure - link to phase & activities

Issue	Management commitment	Phase
Hazardous excavations	All staff will be trained to attend to third parties and animals so as to avoid situations where people and animals can enter safety risk areas.	All
Safety and Security Risks	At closure, permanent warning signs will be in place at appropriate intervals, in appropriate languages with danger pictures to warn people of any potential dangerous farm areas / equipment	All
Access to the site by unauthorized persons to the Operation site	Any person entering the mining / exploration and other operation areas (fields and packaging) will only be allowed after formal approval.	All
Emergency	Develop and implement an emergency response plan for third parties falling into or off hazardous excavations and causing injury.	Operational
Responsibility		

5.4 BIODIVERSITY MANAGEMENT AND MITIGATION

5.4.1 ISSUE: GENERAL PHYSICAL DISTURBANCE OF BIODIVERSITY

The section is a high level assessment of biodiversity impacts in line with the content of the baseline description (Section 4), and the content of this EMP. The assessment covers the following broad topics: physical destruction of biodiversity and related functions, impacts on surface water resources as an ecological driver, and general disturbances to biodiversity.

Table 8: Physical desruption of biodiversity - link to phase and activities

Issue	Management commitment	Phase
Physical disruption to biodiversity by Staff	The Principle of zero tolerance to killing and collecting of biodiversity i.e. no poaching (including collection firewood) will be allowed and poaching offenders will be prosecuted.	All
	All species with a conservation and or protection status should be identified, clearly marked and preserved (by at least 50%)	Construction
Physical disruption to biodiversity by infrastructures	Erect a game-proof fence around the pit and quarrying operations to ensure that animals have no access to operation areas, which may be contaminated by mining chemicals.	All
	Upon completing construction, initiate restoration of all infrastructure including roads areas that were only impacted during construction and will not be required for farming operation	Operation, decommissionin g and closure
Emergency	Certain instances of injury to animals may be considered emergency situations. These will be managed in accordance with the IPMM Investment emergency response procedure.	All
Responsibility		

5.5 WATER RESOURCES MANAGEMENT AND MITIGATION

5.5.1 ISSUE: ALTERING AND POLLUTION OF SURFACE AND GROUNDWATER

The altering and obstructing of surface water drainage (change in water flow and gully erosion of the river beds from channeling of water) is identified as a potential impact associated with the proposed activities, as well as water pollution i.e. through the change to surface water and nutrient flow.

There are a number of pollution sources in all project phases that have the potential to pollute surface and groundwater, particularly in the unmitigated scenario. In the construction and decommissioning phases these potential pollution sources are temporary in nature, usually existing for a few weeks to a few months. Although these sources may be temporary, the potential pollution may be long term. The operational phase will present more long-term potential sources.

Table 9: Altering surface drainage patterns –link to operation phases and activities

Issue	Management commitment	Phase
Blocking or deviation of water flow	Minimize infrastructure footprint and construction footprint	Operation
	Avoid placing any infrastructure or waste material across drainage lines. Where unavoidable ensure uninterrupted drainage by constructing bypass channels.	Operation
Loss of surface water, and change of drainage patterns	Do not place service infrastructure in ecologically sensitive areas, or in areas identified as corridors of animal movement.	Operation
Natural flow of storm water (clean and dirty)	Design all storm water interventions in such a way that storm water can bypass the major structures.	Operation
	Ensure that these facilitates are designed, constructed and operated that flood protection is provided.	Operation
Responsibility		

5.6 AIR AND NOISE MANAGEMENT AND MITIGATION

5.6.1 ISSUE: AIR AND NOISE POLLUTION

Quarrying, processing and transportation equipment (soil tillage) on site is likely to create very little dust and noise that may contribute although little to air and noise pollution. This may be an unwanted change to the community of the area.

Table 10: Air pollution – link to phase and activities

Issue	Management commitment	Phase
Air pollution impact to Biodiversity and nearby Human community	All design mitigation measures to be implemented (including water sprays on all roads and temporary unpaved farm roads, waters sprays at highly polluting areas (activity sites)	All
	All diesel powered equipment and plant vehicles should be kept at a high level of maintenance. Any change in the noise emission characteristics of equipment should serve as trigger for withdrawing it for maintenance.	All
Impact of noise on the environment/ sensitive receptors	Document and investigate all registered complaints and make efforts to address the area of concern where possible. A mechanism to monitor noise levels, record and respond complaints and mitigate impacts should be developed.	All
Responsibility		

5.7 SOCIO-ECONOMIC MANAGEMENT AND MITIGATION

5.7.1 ISSUE: ECONOMIC IMPACTS ON LOCAL NON-FARMING LIVELIHOODS

The activities associated with the IPMM marble quarrying have socio-economic impacts in all phases – some positive and some negative. These impacts related to amongst others employment/job creation, local and regional economies, land use and surrounding landowners and community safety and security. During the construction phase IPMM may at a minimal provide job opportunities to the local community. This EMP aims to provide measures to enhance the positive impacts and limit the negatives impacts.

Table 11: Health and safety – link to phase and activities/infrastructure

Issue	Management commitment	Phase
Impacts on livelihood resettlement	Engage with the affected communities through a process of informed consultation and participation to reach consensus on any activities that affect them.	A All
	Provide affected people with necessary transitional support (such as short-term employment, subsistence support, or salary maintenance).	Construction
Impacts on HIV / AIDS	Preparation of a health and safety plan for workers and impacted communities addressing issues including education on measures to prevent the spread of HIV/AIDS through awareness campaigns, provision of safety equipment for workers, child labor prohibited	
Responsibility		