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UPDATED Environmental Overview and Environmental Management + Rehabilitation Plan (EMRP) Report to Support RENEWAL of the Environmental Clearance Certificate for continuation of medium-scale quarrying and ongoing prospecting for marble dimension stone on mining claims 68194, 68195, 68196 and 68203 in Karibib Constituency, Erongo Region, Namibia

MEFT APPLICATION NO.:	**APP-003577**
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LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

DEAF	Department of Environmental Affairs and Forestry
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMRP	Environmental Management & Rehabilitation Plan
EMA	Environmental Management Act
ECC	Environmental Clearance Certificate
I&APs	Interested and Affected Parties
MAWLR	Ministry of Agriculture, Water & Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MLIEC	Ministry of Labour, Industrial Relations and Employment Creation
MME	Ministry of Mines and Energy
MWT:	Ministry of Works and Transport

1 INTRODUCTION

Mr. Sebastian van der Merwe (herein referred to as the Proponent) is the rightful holder of mining claims 68194, 68195, 68196 and 68203 and is in a contract mining agreement with Best Cheer Investments Namibia (Pty) Ltd. The latter entity provides the necessary technical and equipment capacity support to the claims holder to enable economical extraction and distribution of saleable white marble blocks from these license areas.

The proponent is obliged under the Environmental Management Act (Act no. 7 of 2007) and its Environmental Impact Assessment (EIA) Regulations of 2012, to renew the environmental clearance certification (ECC) to permit ongoing brownfield prospecting and medium-scale quarrying of white marble rock every three (3) years. The renewed ECC shall in turn be used to support the renewal of the registration of the mining claims under Mr. van der Merwe. The current ECC was granted by the then Department of Environmental Affairs on 4th March 2019, and expired on 4th March 2022.

In order to fulfil the ECC renewal process OMAVI Geotechnical and Geo-environmental Consultants (herein referred to as OMAVI) was appointed to carry out an Environmental Overview Assessment (EA) and update the previous Environmental Management Plan (EMP). The updated EMP (or the Environmental Management & Rehabilitation Plan, EMRP, as it is referred to in this report) documents the current conditions and activities on the concerned license areas as well as the various impact mitigation and enhancement measures which have been implemented or are planned for implementation to better manage significant impacts which may be triggered by ongoing and future marble prospecting and quarrying activities.

In identifying and assessing the risk levels of the various current and potential impacts, and developing suitable management measures, consideration was given to all stages of the project's value chain and/ or life cycle from brownfield prospecting, through quarry and support infrastructure construction to quarrying operations and ongoing site rehabilitation.

This document will be submitted the offices of the Environmental Commissioner in the Ministry of Environment, Forestry and Torusim (MEFT) as well as the Office of the Mining Commissioner under the Ministry of Mines and Energy (MME) to assist these competent authoties in making an informed, knowledge-based decision on the renewal of the Environmental Clearance Certificate (ECC) for the activities to continue over the next thre (3) years.

1.1 Objectives of this Report

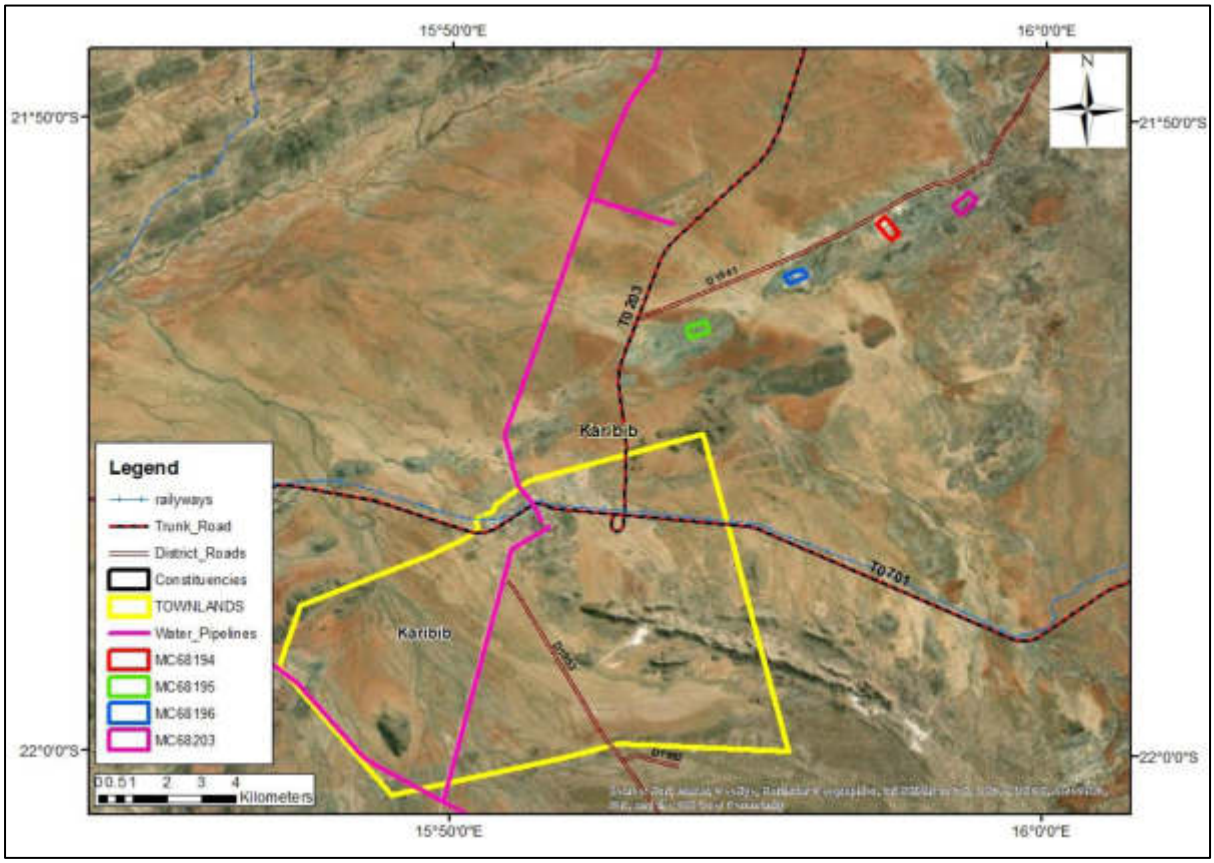
The objectives of this project can be summarised as follows:

- To document the scope of activities that will be covered under the new Environmental Clearance Certificate (ECC);
- To provide a background overview of current operations (on mining claims 68194 and 68196 where quarrying and block storage/ sorting operations are active or have temporarily ceased), current impact management practices; current conditions of the geological, topographical and visual landscape; current conditions of the socio-economic profile of the area; and the general condition of habitats, current land uses, and existing infrastructure;
- To document baseline conditions of the bio-physical, socio-economic, geological, geomorphological, water resources, and land-use situation in the project area;
- To document the current environmental impacts incurred so far in the area as well as those that could be triggered by future operations;
- To update the previous Environmental Management Plan (EMP) so that it remains relevant to ongoing and future marble prospecting and quarrying operations; and
- To support renewal of the ECC, taking into account current and potential operational triggers of the significant impacts.

1.2 Project Location

Mining claims 68194, 68195, 68196 and 68203 are located on Farm Okawayo in the Karibib Constituency, and their respective distances from the town of Karibib are provided in Table 1 below. The claims can be accessed via the C33 tarred road from Karibib to Omaruru, and the D1941 gravel roads. The approximate corner coordinates for the claims are provided in Table 1. The mining claims fall under private farm land as shown in **Figure 1-1**.

The coordinates of the two sites concerned are provided in **Table 1-1**.



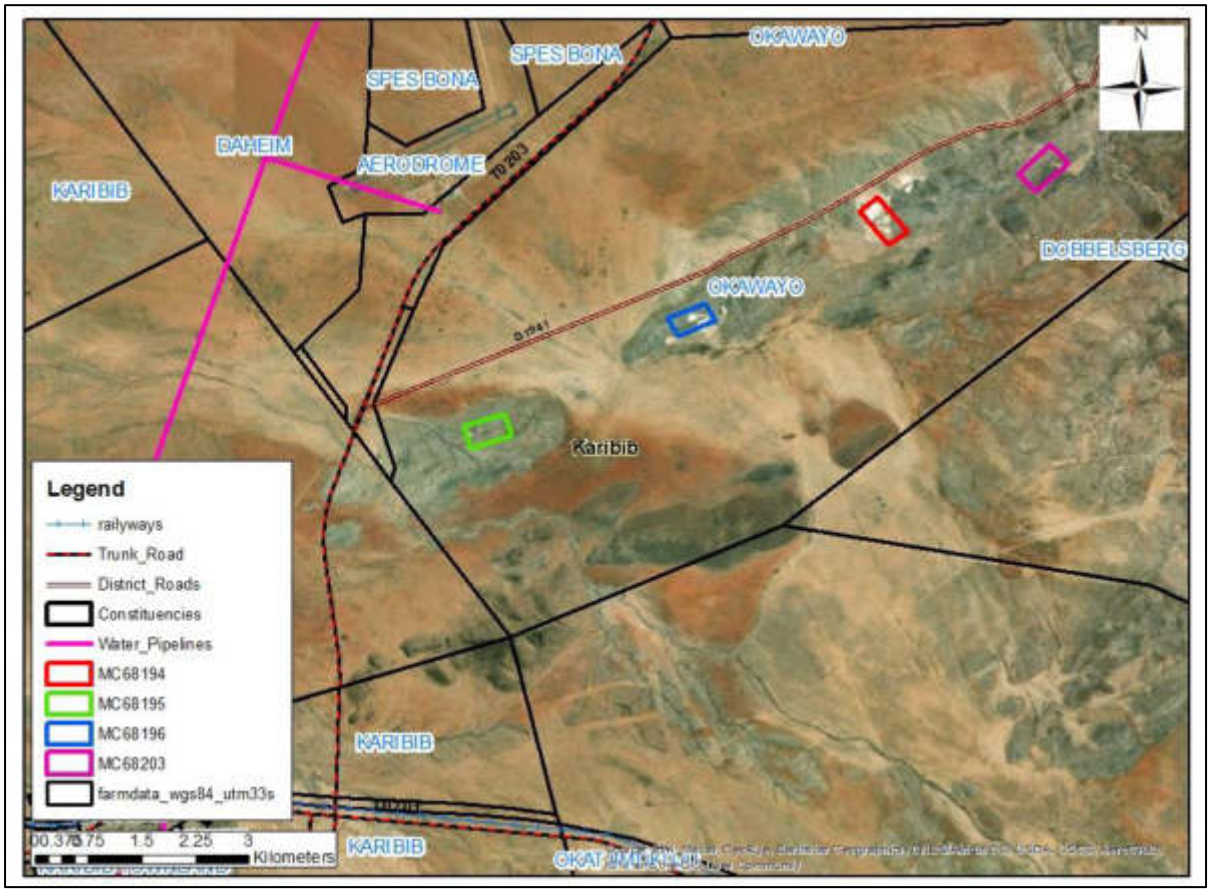


Figure 1-1. Locality maps of mining claims 68194, 68195, 68195 and 68203.

Table 1-1. Approximate corner coordinates of the mining claims

Project Location

Approximate Site coordinates:

Mining claim 68194:

MC	Lat	Long
68194	-21.860505°	15.952334°
	-21.858703°	15.954908°
	-21.863075°	15.958845°
	-21.864689°	15.956386°

Mining claim 68195:

MC	Lat	Long
68195	-21.888004°	15.899081°
	-21.886468°	15.904489°
	-21.889211°	15.905420°
	-21.890786°	15.899927°

Mining claim 68196:

MC	Lat	Long
68196	-21.874111°	15.926579°
	-21.872395°	15.931541°
	-21.874385°	15.933001°
	-21.876396°	15.928025°

Mining claim 68203:

MC	Lat	Long
68203	-21.855702°	15.973783°
	-21.851893°	15.978169°
	-21.854248°	15.980543°
	-21.857888°	15.976274°

1.3 The Proponent

Mr. Jan van der Merwe is the holder of the four (4) mining claims concerned in this assessment. The mining claims were granted to Mr. van der Merwe in February 2009, and quarrying on claim 68194 commenced between 2011 and 2012. In recent years and at present active quarrying on claim numbers 68194 and 68196 is undertaken by Best Cheer Investments Namibia, which is in a contract mining agreement with the license holder, Mr. Jan van der Merwe.

1.4 The Environmental Consultant

Omavi Geo-technical and Geo-environmental consultants (hereinafter referred to as OMAVI) has been appointed by the proponent to act on their behalf as an independent environmental consultant to carry out an Environmental Overview, update the current Environmental Management Plan (EMP) and submit these documents to the Department of Environment Affairs and Forestry (DEAF) as part of the application for the renewal of the Environmental Clearance Certificate (ECC).

The Environmental Overview and the drafting of the Environmental Management & Rehabilitation Plan (EMRP) were conducted by a qualified and experienced environmental assessment practitioner, whose detailed curriculum Vitae (CV's) is provided in **Appendix C** of this document.

1.5 The Current Environmental Clearance Certificate (ECC)

Based on the previous EIA Report and Environmental Management Plan report prepared by the Centre for Geosciences Research cc, the scope of activities covered under the expired ECC range from greenfield prospecting, brownfield prospecting to permit ongoing expansion of quarrying operations, full-scale quarrying for the extraction of marble blocks, and once-off plus continuous development of quarry operation support infrastructure. At the time of this assessment there had been or still are mining activities undertaken on MC 68194 and MC 68196 after the ECC was issued in 2019. Some minor site clearing work, creation of small access roads and very limited test quarrying have been undertaken on MC 68195, and no significant work has been done on MC 68203. Quarrying activities on MC 68196 were paused in 2020 due to low market demand for products from this quarry, and the site is thus currently under care and maintenance. Full quarrying of marble together with stockpiling, sorting and transportation of marble blocks were in full swing at the time of this assessment on MC 68194. The ECC issued for the above activities has since expired. The copy of the current and expired ECC is attached hereto as **Appendix B**.

1.6 The Application for Renewal of the Current ECC

For the project to remain compliant with local environmental legislation and ensure sustainability, an ECC renewal application has been launched with the Competent Authoritiy (i.e., Ministry of Mines and Energy (MME)). This ECC renewal application has to be supported by an Environmental Overview and updated EMRP report which must be submitted to the Regulatory Authority, the Ministry of Environment, Forestry and Tourism (MEFT))'s Department of Environmental Affairs and Forestry (DEAF). The ECC Renewal Application was compiled and submitted to the MME on the 03rd of March 2022. The date stamped copy of the ECC Renewal applications is attached hereto as **Appendix A**.

The Environmental Overview and updated EMRP report shall be submitted to the DEAF for evaluation and consideration of issuing a new ECC. The updated EMP includes information of changes that have occurred to the claim areas between the date of issuance of the expired ECC to date, a brief summary of the current condition of the environment, and lastly, the environmental management and mitigation measures that are currently being implemented or are being recommended to form part of the conditions under which the new ECC must be granted if the Environmental Commissioner is satisfied.

1.7 Motivation for ECC renewal and continuation of project activities

The project is substantiated on the following merits:

- The majority of greyish white marble dimension stone blocks currently being processed at the Marmorwerke Karibib Stone Processing facility in Karibib are sourced from the quarries at MC 68194 and 68196. The processing facility is one of the largest employers in Karibib and is high value corporate contributor to revenue generation for the Karibib Town Council through rates, taxes and utility service levies.
- The continuation of prospecting and quarrying activities on these claims will ensure local business sustainability in the broader Erongo Region because of the following procurement opportunities:
    - Transportation of blocks from the quarries to the processing facility and to the port of Walvis Bay is carried out by contractor trucking companies.
    - An opportunity exists for local waste recycling companies to enter into offtake contracts for disposal of used oils, used tyres and scrap metals. This will be an effective waste management measure whilst providing business opportunity.
    - Ad hoc earthmoving plant hire and mechanical maintenance opportunities exist at present.
    - Empowerment of local farmer(s) through surface leave fees
- Direct job and skills development opportunities exist and will continue to present themselves as existing quarries expand and as new quarries open up.

- The payment of royalties and taxes to the relevant government institutions from the mining activities and operation of the Mining Claim.

If ongoing brownfield prospecting and quarrying ceases on these claims, the above opportunities will either be lost or would not be realised.

1.8 The proposed ECC Renewal Application Process

The approach proposed by OMAVI in renewing the ECC can be summarised as follows:

1. Compilation of Background Information Document (BID) as a requirement to register the application with the Regulatory Authority (MEFT) – **already completed and submitted to MEFT.**
2. Compilation of the ECC Renewal Application and submission to the Office of the Mining Commissioner in the Ministry of Mines and Energy (MME) (project Competent Authority) for notification and recommendations - **completed.**
3. Compilation of the Environmental Overview and Environmental Management and Rehabilitation Plan (EMRP). This document contains brief information of the project area's status, summary of the current and proposed project activities, and the updated management and mitigation measures.
4. Submission of the EMRP report to MEFT for evaluation and consideration for issuance of a new ECC.

2 PROJECT DESCRIPTION, ACTIVITIES AND PROCESSES

Current Project Activities, Infrastructure and Services

The current proejct activities can be summarised as follows:

- **On MC 68194** – full scale operation of two (2) large dimension stone marble open pit quarries plus a third upcoming one located to the south-east of the existing quarries. AT the time of compiling this report there were six (6) employees on site, 2 of whom are Safety Health and Environmental representatives. The quarries are operated under the supervision of Alwyn Bampton who is the Quarry Supervisor. The overall safety of the operations lies with the Group Safety Officer. No sub-contractor miners are used on these current operations. The activities on this claim include:
    - Quarrying and extraction of blocks up to 18 m^3 in size using a combination of diamond wire saw and blade cutting tools, front end loaders
    - Dewatering of the deep open pit quarry. Water in the quarry is rainwater and is regularly pumped to other active quarries where it is used for dust suppression and as a cooling agent in block cutting machines

- Block sorting, temporary storage and loading
- Stripping and stockpiling of overburden waste rock. Waste rock and overburden are typically used as fill for access roads
- Surface clearing and creation, expansion plus maintenance of existing and new access roads on site
- Ongoing prospecting (through RC drilling and visual field evaluation) and test quarrying on new sites within the claim area
- Regular offloading of quarry support supplies and spares
- Regular loading and trucking of blocks
- Regular mechanical maintenance of vehicles, machinery and earthmoving plant
- On site office/ administrative work and domestic activities (living, cooking, etc)
- On site storage and refilling of 20 000 – 40 000L diesel tanks.
- On site re-fueling of all mobile plant.
- Regular laying out and shifting of dewatering and water supply PVC pipelines to and from active quarries
- On site temporary storage of liquid and solid waste in the form of used oils, used grease, used tyres, scrap metals, marble dust, and domestic/ office waste. Used diesel and grease are temporarily stored in plastic 5000L tanks before be disbursed to recycling companies.
- Operation of heavy-duty diesel powered gensets. These gensets are placed and/ mounted on concrete lined bunds but the bunds are not of sufficient size, and for this reason there is evidence of diesel spillages and soil pollution in the vicinity of these generators.
- Marble dust from the quarrying processes is stockpiled temporarily, in the vicinity of the source quarries, and is ultimately blended with subsoils to make a good quality compactible medium that is used as a cover layer on access haul roads.
- No evidence of topsoil stockpiling was recorded at this site
- The main open pit quarry adjacent to the mechanical workshop was partly flooded with rain water following recent heavy rains at the time of the investigation
- Water to support quarrying operations is either harvested from the open pits during the rainy seasons and stored in tanks, or it is carted from the Marmorwerke Karibib site using water bowsers and is ultimately pumped into water storage tanks on site.

The main infrastructure, machinery and services currently at this site include:

- Access tracks/ roads

- Prefabricated structures for accommodation, ablution facilities and site office. These are powered by roof top solar panels. Approximately 15 – 20 people stay on site
- Two open pit quarries
- Tipper, flat deck and water bowser trucks
- Front-end loaders, blade cutters, wire saw cutters, heavy duty diesel generators on concrete bunds, excavators, pneumatic drilling rigs for blocks,
- A steel and corrugate sheet mechanical workshop and spares storage warehouse with concrete floors. These are powered by a combination of heavy duty diesel generators and roof top solar panels.
- Perimeter fences with reflectors around the active quarries
- Water tanks for temporary storage of water recovered from dewatering
- Water storage tanks for storing water used at the accommodation/ office/ maintenance block and quarries. Water used for domestic purposes is carted from the Marmorwerke Karibib stone processing facility in Karibib and is then pumped into these tanks. During the rainy seasons water for supporting quarry operations is harvested from active qaurries, while during dry seasons the water is carted from the same facility in Karibib.

Overall, this site is heavily disturbed and has been transformed from its natural state, which is typical in all mining operations.

- **On MC 68196** – Similarly to the active site on MC 68194 this site comprises two (2) large open pit quarries, a block sorting – storage and loading bay, a waste rock dump, and the accommodation/ office/ mechanical maintenance block comprising prefabricated structures on concrete raft foundations. As a result this area is heavily disturbed and has been transformed from its natural state, which is typical in all mining operations. This site is currently on care and maintenance and there are currently no significant activities taking at this site apart from normal domestic house-keeping at the accommodation/ office area by two full time security personnel on site. Key infrastructure, machinery and services presently at this site include:
  - Access tracks/ roads
  - Prefabricated structures for accommodation, ablution facilities and site office on concrete foundations. These are powered by roof top solar panels.
  - Two open pit quarries
  - Parked tipper, flat deck and water bowser trucks, front-end loaders
  - Scrap metals in the form of used blade cutters, buckets for earth moving plant
  - It is understood that other equipment and infrastructures such as diesel generators, diesel tanks, block cutting machniery, loaders, excavators and

trucks from these site have been temporarily moved to other active sites in the region. No evidence of topsoil stockpiling was recorded at this site. The clearing of vegetation at this site is largely confined to the previous working area, and the main open pit quarry adjacent to the accommodation site was partly flooded with rain water following recent heavy rains at the time of the investigation.

Water to support previous quarrying operations at this site was either harvested from the open pits during the rainy seasons and stored in tanks, or it was carted from the Marmorwerke Karibib site using water bowsers and was ulmately pumped into water storage tanks on site.

- **On MC 68195** – Very limited test quarrying at isolated spots had been conducted in this license area between 2009 and 2011. No other prosecting or quarrying work has taken place at this site since then, and the site remains an active habitat.
- **On MC 68203** – There has been no activities at this site since the granting of the previous ECC. For this reason, there has been no changes of note to the general terrain, landscape and/ or geology of the site. This area is therefore still an active habitat for wildlife as well as domestic animals such as cattle, sheep and goats.

The general layout of the active sites are shown in Figure 2-1 and Figure 2-2 below, while photographs in Figure 2-3 portray the various activities, infrastructures and mobile plant present at these sites.

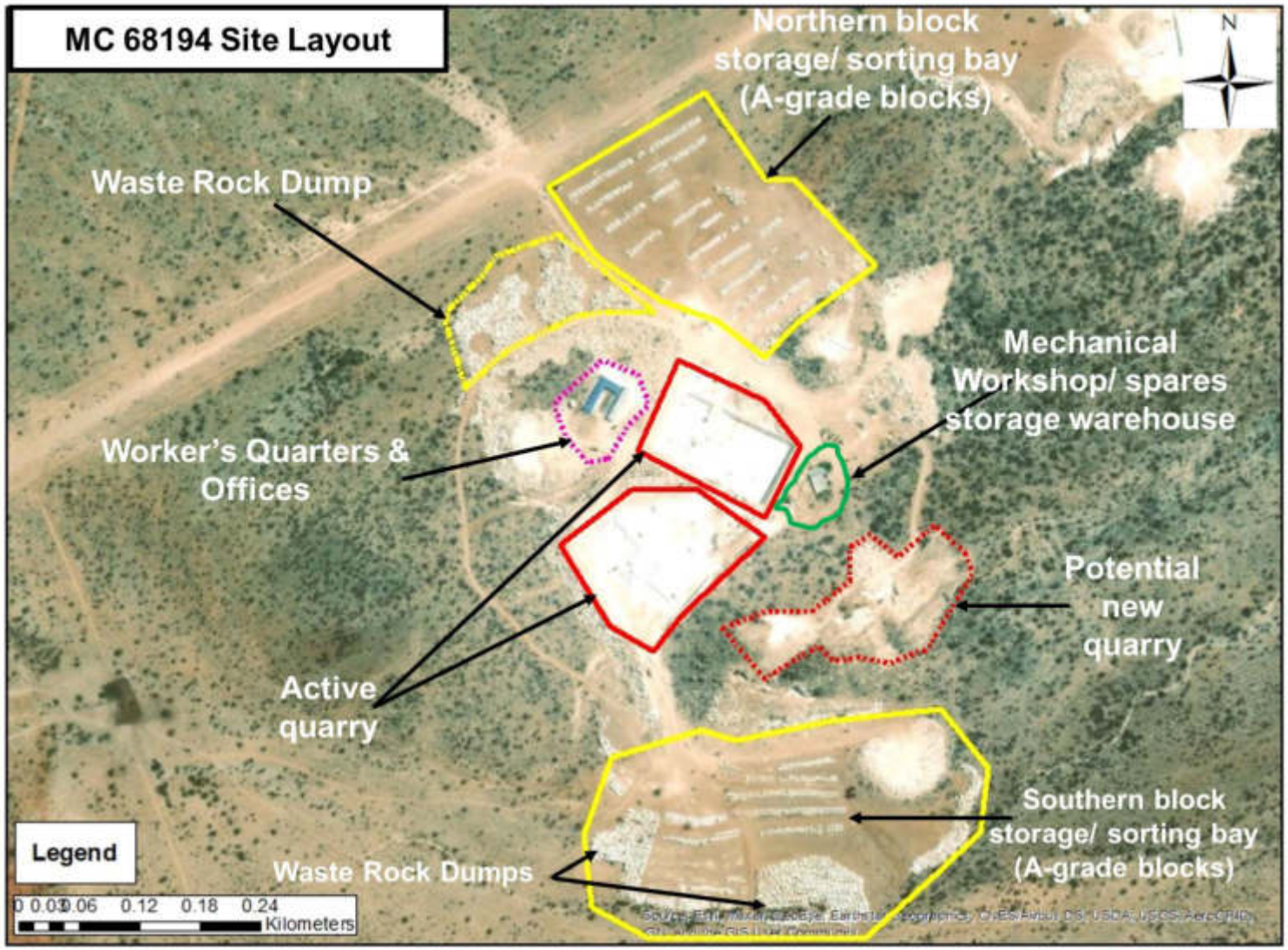


Figure 2-1. General site layout plan for open pit quarry operations at MC 68194.

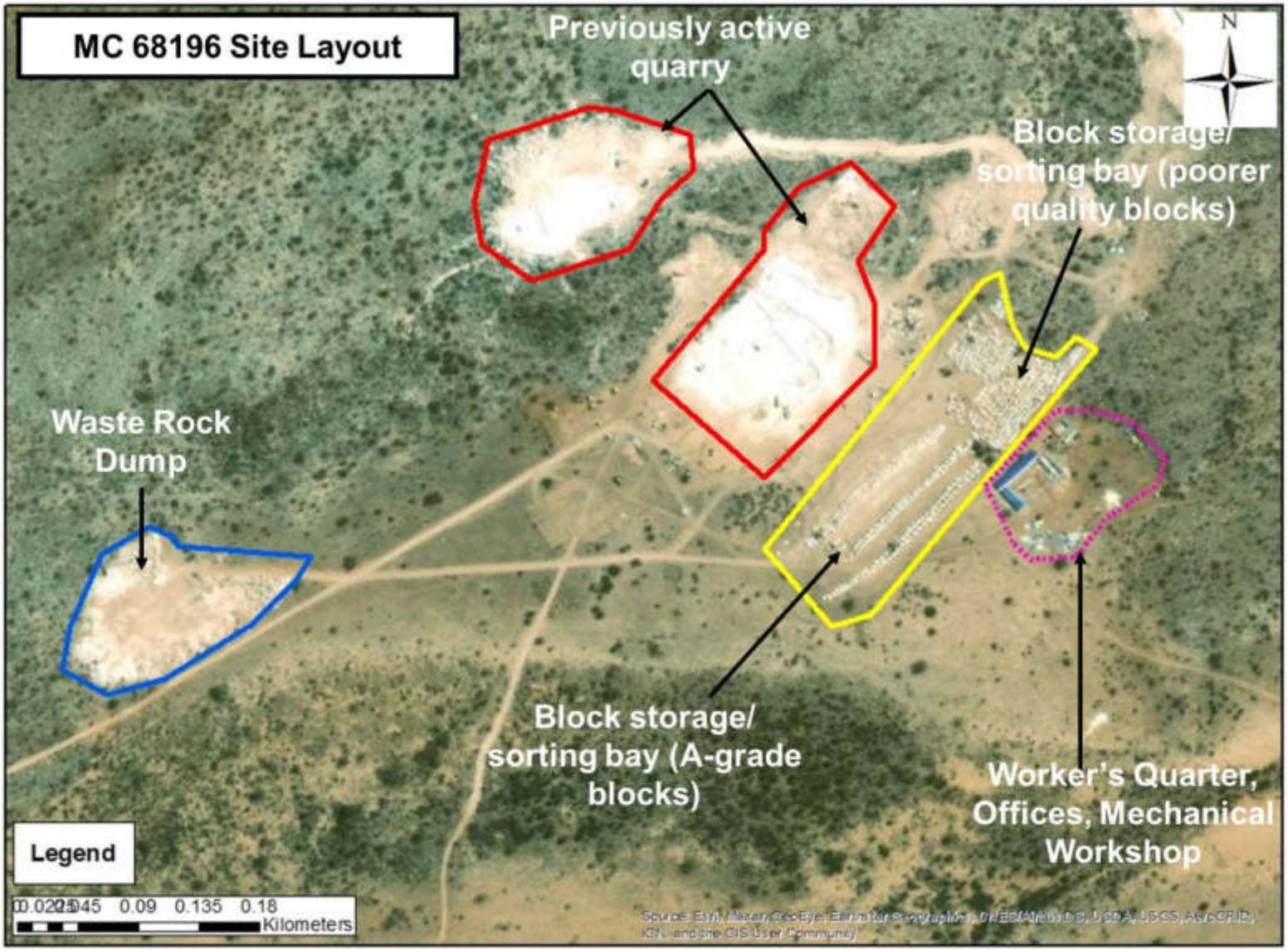


Figure 2-2. General site layout plan for open pit quarry operations at MC 68196.

Figure 2-3. Site photographs from the active and temporarily decommissioned quarry sites on MC 68194 and MC 68196

3 APPLICABLE LEGAL FRAMEWORK, POLICIES AND GUIDELINES

3.1 National Legislation

In Namibia all aspects related to mining and extraction plus processing of mineral resources are vested in the state and are regulated by the Ministry of Mines and Energy (MME) whereas sustainable exploitation and management of the environment and use of natural resources is regulated by the Ministry of Environment, Forestry and Tourism (MEFT).

The Minerals Prospecting and Mining Act (Act No. 33) of 1992 is the principal act governing exploration, mining and beneficiation of mineral resources in the Republic of Namibia. From an environmental management viewpoint, this Act requires that an environmental impact assessment be undertaken prior to prospecting, mining/ quarrying and beneficiation operations, coupled with the development of implementable and measurable environmental management and monitoring plans where any changes to environmental conditions are anticipated. The Ministry of Mines and Energy is the custodian agency for the administration of the Mining Act.

Conversely, MEFT is the overseeing custodian agency for the administration and enforcement of the Environmental Management Act of 2007 (EMA), with the enforcement of the Environmental Impact Assessment Regulations of 2012 specifically being entrusted with the Department of Environmental Affairs and Forestry within MEFT. This Act stipulates that possession of an Environmental Clearance Certificate is a pre-requisite for the continuation of running or operating any activities that are listed under the Environmental Impact Assessment Regulations of 2012. The act further sets out under Section 58 and in the Government Notice No. 29 of 2012 a detailed framework and schedule for conducting Environmental Impact Assessments for mining and mineral processing companies or any entity that plans to undertake exploration, quarrying or mining, and/ or processing of mineral resources at any scale.

A review of the applicable and relevant local legislation, policies and guidelines to the existing operations and possible future activities is presented in this chapter. This review serves to inform the project Proponent, Interested and Affected Parties and the decision makers at MME and the DEAF of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled for the existing and proposed activities to continue or commence, respectively. The applicable local (national) and where necessary regional/ international legislation, policies and guidelines are given in **Table 3-1 and** Error! Reference source not found..

Table 3-1. Applicable legislation, policies and guidelines to the ongoing and proposed quarrying activities

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
The Constitution of the Republic of Namibia (1990)	Government of the Republic of Namibia	The Namibian government has adopted several policies that promote sustainable development. Most of these originate in clauses of the Constitution of the Republic of Namibia. In Article 95 (i), the State undertakes to actively promote and maintain the welfare of the people by adopting policies aimed at the utilisation of natural resources on a sustainable basis for the benefit of all Namibians. Articles 91(c) and 95(l) are also of relevance to sound environmental management practice. In summary, these refer to: • Guarding against over-utilisation of biological natural resources. • Pursuing sustainable natural resource use • Limiting over-exploitation of non-renewable resources. • Maintaining biological diversity • Ensuring ecosystem functionality. • Protecting Namibia's sense of place and character. Through implementation of the mitigation measures set out in this Environmental Overview and Environmental Management and Rehabilitation Plan (EMRP), the owner of the ECC shall be advocating for sound environmental management as set out in the Constitution.
Environmental Management Act No. 7 of 2007 and its 2012 EIA Regulations Government Notice 28-30 (Government Gazette 4878	MEFT: DEA	Part 2 of the Act sets out 12 principles of environmental management, summarized as follows: • Community involvement in natural resources management, must be promoted and facilitated. • The participation of all I&APs must be promoted and decisions must consider the interest, needs and values of I&APs. • Equitable access to environmental resources must be promoted and the functional integrity of

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		ecological systems must be considered to ensure sustainable systems. • Assessments must be undertaken for activities which may have significant effects on the environment or the use of natural resources. • Sustainable development must be promoted in all aspects relating to the environment. • Namibia's cultural and natural heritage including, its biological diversity, must be protected and respected. • The option that provides the most benefit or causes the least damage to the environment, at a cost acceptable to society must be adopted to reduce the generation of waste and polluting substances at source. • The reduction, re-use and recycling of waste must be promoted. • A person who causes damage to the environment must pay the costs associated with rehabilitation of damage to the environment and to human health caused by the pollution. • Where there is sufficient evidence which establishes that there are threats of serious or irreversible damage to the environment, lack of full scientific certainty may not be used as a reason for postponing cost-effective measures to prevent environmental degradation; and • Damage to the environment must be prevented and activities which cause such damage must be reduced, limited, or controlled. • In terms of the terms and conditions attached to the current ECC the proponent is required to renew the ECC after every 3 years. Such renewal process is expected to review the current conditions of the environment, document ongoing and planned activities, evaluate how the ongoing and planned activities will likely alter the current conditions of the environment, and formulate impact management measures that

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		speak to the current and future status quo of the affected project area. The proponent has the responsibility to ensure that the existing and proposed activities, as well as the proposed impact management measures, conform to the principles of this Act. In developing this EMRP, OMAVI has been cognizant of these requirements, and accordingly the process that was adopted has been undertaken in conformance with this Act and the EIA Regulations (2012). Several listed activities in terms of the Act, are triggered by the ongoing and possible future activities as set out in latter sections of the report.
Mineral Prospecting & Mining Act (Act no. 33 of 1992)	MME	Sections 50, 52, 54, 57 and 130 of this Act sets out provisions for environmental management for activities arising from mineral exploration, quarrying/ mining and beneficiation, as follows: • Operators of quarries are required to prepare an ESA or EIA and an EMP and make revision of such EMP every 3 years • That the Operator of a quarry is liable to pay compensation where in course of the mining operations; any damage is done to the surface of land, water source, cultivation, building or any other structure • That the Operator of a quarry cannot exercise any rights on a private land until the holder has entered into an agreement with the owner regarding payment of compensation • That the Operator of a quarry shall take all necessary remedial steps to reasonable satisfaction of the minister for any damage caused by quarry operations on closure of such operations. • That the minister is empowered to direct the Operator of a quarry for carrying out good reconnaissance, mining and prospecting practices for the protection of the environment, and conservation of natural resources payment

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		of liability fees and royalty and remedial steps for any damages and • That the Operator of a quarry shall report pollution in course of any operations and make remedial measures for such. The abovementioned provisions are all relevant to the ongoing and proposed additional activities and were thus considered in the Environmental Overview and EMRP updating process.
Charter for Sustainable and Broad-Based Economic and Social Transformation in the Namibian Mining Sector 2014 – 2020 (The Namibian Mining charter)	The Namibian Chamber of Mines of Namibia	This charter aims to facilitate meaningful participation of historically deprived Namibians in the mining and mineral beneficiation industry. It has effectively been developed as an instrument to effect transformation and sets specific targets for mineral license holders and Operators of mining operations in Namibia
The Minerals Policy of Namibia, 2003	Ministry of Mines and Energy	This policy sets out guiding principles and directions while communicating the values of the Namibian people in pursuit of the development of the mining and mineral resources beneficiation sector.
Pollution Control & Waste Management Bill	MEFT and others	This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management. The Bill repeals the Atmospheric Pollution Prevention Ordinance (11 of 1976). In terms of water pollution, it will be illegal to discharge of, or dispose of, pollutants into any watercourse without a Water Pollution Licence (apart from certain accepted discharges). Similarly, an Air Quality Licence will be required for any pollution discharged to air above a certain threshold. The Bill also provides for noise, dust or odour control that may be considered a nuisance. The Bill advocates for duty of care with respect to waste management affecting humans and the environment and calls for a waste management licence for any

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		activity relating to waste or hazardous waste management. The ongoing quarrying, storage and haulage of dimension stone blocks and associated activities will likely result in continuous discharge of significant quantities of gaseous pollutants into air as well as increased noise levels, dust generation, destruction of in situ soil structure during such operations.
Water Act (No. 54 of 1956)	MAWLR: Department of Water Affairs	Makes provision for several functions pertaining to the management, control and use of water resources, water supply and the protection of water resources. **The Proponent shall prevent any potential pollution of groundwater and surface water. Ground water in the area is known to be localized and typically occurs at depths in excess of 100m. The deepest quarries in the concerned areas are presently about 40-50m deep, and therefore seat above the water table. Due to the presence of loosened top soils and marble dust surface runoff is however susceptible to pollution.**
Water Resources Management Act (Act No. 11 of 2013)		This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water resources. Because water is continuously recycled to the extent practical, the intake of new water is generally low for these operations. Mitigations measures are included in the updated EMRP section of this report to reduce impacts on nearby watercourses that could not be avoided and to optimally manage water quality and water demands at these operations.
Forestry Act (Act No. 12 of 2001)	MEFT	The Act provides for the management and use of forests and forest products. Section 22. (1) provides: "Unless otherwise authorised by this Act, or by a licence issued under subsection (3), no

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		person shall on any land which is not part of a surveyed erven of a local authority area as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992) cut, destroy or remove - (a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully; or (b) any living tree, bush or shrub growing within 100 m of a river, stream or watercourse." The proponent will apply for the relevant permit under this Act if it becomes necessary, particularly when new access roads and quarries are to be developed on virgin ground.
Soil Conservation Act (Act No. 76 of 1969)	MAWLR	The Act makes provision for the prevention and control of soil erosion and the protection, improvement and conservation of soil, vegetation and water supply sources and resources, through directives declared by the Minister. This Act is applicable since stripping and disturbance of topsoil will take place during the creation, widening of quarries and access roads. Mitigation measures are included in the EMRP section to preserve topsoil and reduce impacts on topsoil where such soil has not yet been disturbed or removed.
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	MME: Petroleum Affairs Division	Regulation 3(2)(b) states that "No person shall possess or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area. **This law is applicable to this project because used diesel and other types of oils in excess of 600L are sometimes stored on the quarry sites in plastic tanks prior to being collected by a designated off-taker. These products are primarily stored in the vicinity of the mechanical workshop. Similarly, quantities in excess of 600L of**

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		unused diesel are kept on site any point in time to help power up mobile machinery.
National Heritage Act (Act No. 27 of 2004)	MEAC	The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits such as might be required in the event of damage to a protected site occurring as an inevitable result of development. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council. Section 51 (3) sets out the requirements for impact assessment. **No objects of heritage or archaeological relevance are known in the project area. It is likely that if any such resources were present at or near the active sites they have probably already been damaged or heavility disturbed. However, should any objects of heritage/ archaeological significance be identified during project activities, the work must cease immediately in the affected sites and the necessary steps taken to seek authorization from the Council**.
Public Health Act (Act No. 36 of 1919)	MoHSS: Occupational Health	The Act serves to protect the public from nuisance and 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. The proponent and contract miner must ensure that the quarries and associated activities continue to be operated in a way that is safe to both the employees and the general public. Noise and dust emissions which could be considered a nuisance and/ or a health risk ought to be kept to acceptable levels. This is applicable during the ongoing block quarrying, extraction, sorting, storage and haulage activities. Additionally, the block cutting, sawing,

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		and haulage processes entail usage of dangerous machinery as well as lifting operations that could cause severe injuries or even fatalities. Dust from the cutting and overburden stripping processes could pose severe respiratory health issues in the short and long term. Lastly, the deep quarries and their associated steep slope pose a significant safety risk to workers and visitors. Suitable risk management measures have been provided in the EMRP to help minimize these risks.
Labour Act, 2007	MLIEC	Sections 3, 4, 5, 11, 16, 23-27, 44 and 135 make provision for the following: • That a person may not employ a child under the age of 14years • That children are prohibited for employment in a mine and other dangerous circumstances • That forced employment of persons is prohibited • That an employee is entitled to monetary remuneration daily, weekly, fortnightly, or monthly in cash, cheque, and direct deposit into a bank account • That the work hours of an employee are 45 hours in a week, over and above which an employee is entitled to additional payment overtime wage • That employees are entitled to (a) annual leave on the basis of the average number of days worked over the year, (b) a day's sick leave for every 26days worked, (c) compassionate leave for a period of 5days in 12 months which is fully paid, and (d) leave on public holidays, • That female employees that have completed 6 months of employment are entitled to 12 weeks of maternity leave, which can be extended for a further period of one month • That the minister is empowered to make regulations in relation to safety, health, hygiene, sanitation, and welfare of persons employed in or about mines, including sea-bed operations

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		The proponent and their mining contractor are expected to be compliant with the above provisions and as such the above provisions were accounted for in this report.
Relevant Guidelines, Policies and Regulations		
Mine Health & Safety Regulations (under section 138A of the Mining Act, 1992)	MME: Mine Safety & Services Division MoHSS: Occupational Health Division	These set of regulations are aimed at ensuring that mines are operated in a safe manner to prevent fatalities, injuries, and long-term health hazards. The regulations make provision for: • Employee's right to leave unsafe working places • Obligation of a mine manager to provide for all safety measures in a mine or quarry • Reporting of accidents to the chief inspector and keeping a record of such accidents • Requirements for the mine manager to provide occupational health services at area of mining activity • Requirements for stability of excavations; provision of waiting areas; provision of fencing and gates; schemes for working in vicinity of water body. • Provision for mine dump or mine tailings facility • Ensuring that all parts of a mine are well ventilated with minimum standards of air quality • The mine manager's responsibility to formulate a scheme for safe movement of vehicles being use in the mine/ quarry • The mine manager's responsibility to formulate a scheme for identifying hazards at the area of mining activity and provision of appropriate protective equipment • Ensure that the mine manager provides first aid and firefighting equipment and procedures where exploration/ quarrying activities are being conducted All the above-mentioned provisions are relevant to this project and were thus considered in the EMRP section.
Hazardous Substance	MoHSS	The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
Ordinance, No. 14 of 1974		and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling. This Ordinance is relevant to the project under review as potentially toxic substances such as diesel and hydraulic oils which are stored stored at the workshop areas.
Karibib Town Council's Integrated Solid Waste Management Policy	Karibib Town Council (Local Economic Development, Environmental Health & Corporate Services)	Aims to ensure the Town Council, its staff, contractors and stakeholders that all waste are stored, collected, transported and disposed of safely and correctly without endangering human health or cause harm to the environment. This guidelines are relevant as domestic waste from these sites is regularly transported offsite for disposal at the municipal waste dump in Karibib.
National Solid Waste Management Strategy of Namibia	MEFT and Local Municipalities	The Vision of this Strategy is for Namibia to become the leading country in Africa in terms of standards of solid waste management by 2028. The **Specific Objectives** of the Strategy are: 1. To strengthen the institutional, organisational and legal framework for solid waste management, including capacity development. 2. To install a widespread culture of waste minimisation and to expand recycling systems. 3. To implement formalised solid waste collection and management systems in all populated areas, including under the administration of Regional Councils. 4. To enforce improvements in municipal waste disposal standards. 5. To plan and implement feasible options for hazardous waste management including healthcare waste management Various forms of solid wastes are generated at the active sites. These include office/ domestic litter, waste wood from pallets, marble dust, waste rock, scrap metals, used tyres, used diesel and oils, used containers, scrap pipes and cables, etc. According to the management of Best Cheer most of these waste are removed from site

LEGISLATION CONSIDERED	CUSTODIAN ORGAN OF STATE	ASPECT OF PROJECT
Relevant Acts		
		regularly by recycling companies. Marble dust is usually mixed with sub soils to make a good compactible medium for access road surface layer works.
The Mineral Beneficiation Strategy of Namibia	MME and Ministry of Industrialization and Trade (MIT)	This national strategy was developed and launched in 2021through collaboration between Ministry of Mines and Energy and the German Corporation for International Cooperation (GIZ), and aims to facilitate the realisation of full social and economic potential that can be derived from Namibia's minerals and to promote investment, trade and industrial development. This document provisionally identifies a selection from diamonds, coloured gemstones, zinc, industrial minerals (gypsum, dimension stone, limestone), iron and steel foundry products, battery minerals (lithium and graphite) and salt as pilot projects for mineral beneficiation in Namibia. The current quarry operator, Best Cheer Investment Namibia has demonstrated commitment and dedication to this strategy as it currently operates the 2 largest dimension stone processing facilities in Namibia. Marble blocks sourced from the active quarries on these claims are largely processed into finished products at these facilities before being dispatched to local and overseas markets via the port of Walvis Bay.
Phase 3 to 5 – Best Practice Guide - Environmental Principles for Mining in Namibia during construction, operation and closure	MEFT and MME	This best practice guide provides guidelines on integrated waste management for mining related processes during the construction, operation, maintenance of mining support infrastructure. The guidelines further consider closure of mining/ quarrying and mineral beneficiation projects, and is therefore relevant to this project

The current and proposed project activities are expected to trigger the listed activities summarised in Table 3-2.

Table 3-2. Summary of Listed Activities triggered by the ongoing and possible future operations as listed in the 2012 EIA Regulations

ACTIVITY	DESCRIPTION OF ACTIVITY	RELEVANCE OF LISTED ACTIVITY
Activity no. 2.1	The construction and operation of facilities for waste sites, treatment of waste and disposal of waste	The current quarry operations demand for the development of new waste rock dumps in the vicinity of the operational quarries Additionally, it is proposed that marble dust generated from quarrying operations must be stored at designed tailings storage ponds in the vicinity of active quarries. Such ponds should have containment walls and the dust must be disposed off inside such walls.
Activity No. 3.1	The construction of facilities for any process or activities which requires a license, right or other form of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting & Mining Act), 1992	The proposed project activities require a valid mining claim registered with the Mining Commissioner's office. The renewal of such license for the concerned claims has been launched but can only be finalized once the ECC has been approved and issued by the Environmental Commissioner's office.
Activity No. 3.2	Other forms of mining or extraction of any natural resources whether regulated by law or not	The current and proposed project activities would require surface clearing and excavation over the footprints of new access roads and quarries.
Activity No. 3.3	Resource extraction, manipulation, conservation & related activities	
Activity No. 9.4	The storage and handling of a dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 m^3 (30 000L) at any one location	Significant quantities of hydraulic oils, diesel are stored on site in sealed tanks Significant quantities of used diesel and grease are also stored on site
Activity No. 10.1 (b)	The construction of access roads	The proposed project activities will regularly include the creation and widening of access haul roads on site

4 DESCRIPTION OF THE RECEIVING ENVIRONMENT (BASELINE)

This section provides an overview of the current status quo of the climatic, biological, physical and socio-economic landscape of the concerned sites through the analysis of baseline data and information as deduced from field observations/ assessments, literature and engagements with representatives of the contract miner. In this respect, baseline information is provided on the following receptors:

- Infrastructure & utility services
- Land-use
- Climate
- Biodiversity
- Topography, soils and drainage
- Visual sense of place
- Air quality
- Socio-economic aspects (Health, Education, Employment, Business activities/ opportunities)

The aim of this section is to compare the current conditions of the concerned sites to conditions that prevailed when the previous Impact Assessment was conducted, and also provide a baseline against which changes that may occur as a result of the current and future project activities can be measured, gauged and monitored through time.

4.1 Relevant Aspects of the Current Physical & Biological Environment

4.1.1 Land use

The project area lies on commercial farm land dominated by cattle, game and small stock farming. The portions of Farm Okawayo which are overlain by the mining claims are either no longer or will no longer be available for farming activities as they form or will form part of the mining footprint.

Land use conditions for the currently active and previously active sites will remain as mining areas over the operational life of the quarries. Conversely, the land use conditions for the for the undeveloped mining claims will be altered from commercial livestock farming and grazing land to mining as soon as exploration test quarrying and full-scale quarrying commence. The site near claim 68195 is also partly utilized by telecommunications entities as hosting ground for telecommunication towers.

Currently, all four sites can be accessed by making access arrangements with the farm manager of Farm Okawayo and/ or the contract miner. The land use objectives of the sites has not changed since the previous impact assessment and will remain the same.

4.1.2 Climatic conditions

Typical climatic conditions of the Karibib area can be summarised as follows:

- Average annual temperatures of 32 degrees from October to December, with the coldest months in July with temperatures dropping to 9 degrees Celsius at night (Mendelsohn *et al.*, 2009).
- The average annual rainfall for the Karibib area is generally in the range of 200 to 300 mm, and is mainly experienced between December and March. The lowest rainfall may be expected in May, June, July and August with little to no rainfall anticipated during these months (Mendelsohn *et al.*, 2009).
- Relative humidity in the Karibib area ranges between 51 and 61% during the most humid months and between 21 and 28% during the least humid months.
- Average annual rates of evaporation in the Karibib area generally range between 3000 and 3400 mm per year.
- Overall classification of the area in terms of climate: semi-arid and water deficit area with mean annual evaporations exceeding the mean annual precipitation.

4.1.3 Biodiversity

4.1.3.1 Flora

The area around Karibib is referred to as the Western Highlands by Mendelsohn et al. (2002). This semi-desert and savannah transition zone is typified by shrubs on the plains and ridges, while larger woody species such as *Acacia erioloba* are confined to drainage lines. Vegetation in the area was found to be lush after a reasonable amount of rainfall in January and February 2022.

From a floral understanding and documentation view point two zones of vegetation were defined for the broader project area of Okawayo. These are the plains, the marble ridges and the drainage channels. The concerned claims primarily cover the ridge zone and to a smaller extent the plains. Drainage channels in the vicinity of the claims are very marginal and small. The shrubs and trees found in these zones provide habitat or food for much of the fauna that is found in the area.

It is envisaged that the greatest amount of flora and fauna may be expected to occur on the undisturbed marble ridges and therefore greater habitat impacts will be incurred during the development of the undeveloped two (2) mining claims, namely 68195 and 68203. The currently and previously active sites have been extensively disturbed, and as a result there is generally little to no vegetation within the active zones of these sites which may be significantly affected or threatened by the current and/ or future activities.

Considering the fact that the footprints of disturbed areas will increase as a result of quarry expansions, development of new quarries, and creation/ expansion of waste rock dumps,

block storage bays and access roads, the overall footprint of disturbed ground is expected to increase over the next 3 years with increased disturbance to habitats.

Figure 4-1. Typical vegetation on the marble ridges and plains

4.1.3.2 Fauna

According to Mendelsohn et al. (2002), it is estimated that at least 74 species of reptile, 7 amphibian, 87 mammals and 216 birds occur in the general and immediate area of Karibib, with known high levels of endemism in reptiles and amphibians. These figures point towards a high probability for the occurrence of high biodiversity in the project area, especially on the pristine marble ridges. It is envisaged that the diverse geomorphological landscapes of the general project area, namely: the marble ridges, the plains and the drainage channels, provide habitats for different faunal species including reptiles, mammals and birds. This is especially to be expected in areas that are still relatively undisturbed.

In light of the above, it makes sense to argue that fauna which may be adversely affected by the current and proposed activities shall include roaming livestock and wildlife.

4.1.4 Topography, Soils and Drainage

The project sites are characterized by high releif marble ridges which are surrounded to the south and north by flat plains and are occasionally truncated by small drainage channels. The topographically high relief ridges are made up of competent white marble which are occasionally interlayered with greyish calc-silicates and are the primary targets for exploitation and quarrying on these claims. These ridges have steep side slopes which are characterised by large loose boulders and shrubs, and consequently only comprise a very thin soil cover. The surrounding flat plains are dominated by a mixture of loose superficial calcrete gravels and cobbles and non-calcareous dark reddish-brown aeolian sands which overlay hardpan calcrete. These surficial soils are generally loose, but excavation is expected to refuse at

shallow depths on the hardpan calcrete. The small drainage channels leading from the side slopes of the ridges flow as shallow sheetwash onto the flat plains, and sometimes carry the exposed white marble dust onto these plains as shown in Figure 4-2 below.

In terms of surface drainage small streams also flow southwards off the marble ridge into a stream that flow parallel to the marble ridges, before turning north-westwards to dissipate the flow over the flat plains south of the military airfield.

It is worth noting that at either of the active and temporarily decommissioned sites, evidence of soil contamination due to hydrocarbon spillages is evident, primarily in the vicinity of the mechanical workshops, the re-fueling diesel tanks and the power gensets. Such spillages have been facilitated by the following shortfalls:

- Lack of accountability and commitment to taking remediation action by the Safety, Health and Environmental Officer on site
- Lack of commitment to enforcing the usage of emergency spillage skips under working machinery
- Inadequate concrete flooring or lining below the diesel power gensets and in the surrounds of the mechanical workshop

Figure 4-2. Surface drainage lines over the project area (upper photo) and evidence of white marble plumes from the active quarries (lower photo).

4.1.5 Visual sense of place

The sense of pace of the previously active and currently actibve quarry sites has already been disturbed by the following activities:

- Vegetation clearing and overburden stripping
- Ongoing quarrying of marble, on-site storage of marble blocks and marble waste rock, and exposure of white highly reflective marble rock mass faces
- Creation and expansion of access haul roads
- Site support infrastructure such as accommodation quarters, workshops and presence of stagnant and mobile earthmoving plant and trucks

The quarry operations at MC 68196 are only marginally visible from the D1941 and the C33 as the operations largely lie on the southern slopes of the marble ridge. Conversely, the active operations at MC 68194 are highly visible from the D1941 gravel road and even from the distant C33 tarred road. Overall, the visiual sense of place of the active sites has been altered significantly due to the highly reflective white colour of the marble which stands out prominently.

In cognisance of the above, it makes sense to argue that adverse visual impacts currently exist at the active sites. Additionally, adverse visual impacts will arise at the proposed marble quarries on the other claims. Possible adverse visual impacts from the proposed quarries may be minimized if the new quarries are developed on the back slopes of the ridges such that they will not be visiable from the D1941 and the national C33 tarred road.

Overall, adverse impacts on the sense of place and visual appearance of the area is expected to increase considering the fact that more quarries and associated support infrastructures such as roads will be developed over the next 3 years. The sense of place of the concerned area and surroundings is further is expected to deteriorate as a result of the upcoming Twin Hills Gold Mine infrastructure.

4.2 Air Quality

It is expected that ambient air quality in the vicinity of the active sites has been altered due to the generation of dust particulates from the stripping, block cutting and block haulage activities. At the time of the site assessment there were no active dust monitoring stations observed at any of the sites. It is however the opinion of the author that air quality is possibly one of the most critical receptors for this project. This is largely due to the fact that significant amount of marble dust is generated during the block extraction processes. For this reason, depositional dust monitoring stations are strongly recommended in the vicinity of the active and planned quarries in order to help establish current levels of dust particulates near active sites as well as ambient dust levels near possible future quarry sites, respectively.

A cost-effective means to achieve this would be to make use of dust fallout buckets, record and monitor the data monthly, and benchmark these against accepted threshold values. At this stage the baseline dust fallout levels for the concerned sites are unknown.

4.3 Socio-Economic Aspects

4.3.1 Governance

Namibia has been an independent and democratic state since 1990, and as a result it has sound governance and stable social, economic and legal frameworks. The concerned project is located in the Karibib District which falls under the Erongo Regional Council. The Erongo Regional Council is responsible for the planning and development of the region for the benefit of its inhabitants by establishing, managing, and controlling towns and settlement areas. In the context of this project the relevant mandate of the Karibib Constituency and Erongo Regional Council management are:

- to provide and maintain an enabling and supportive governance framework that would allow local development enterprises such as this to operate efficiently and without unnecessary burdens
- enforce the implementation of labour and environmental management laws and regulations to prevent exploitation of workers, destruction of the natural environment, and together with the custodian ministry (the Ministry of Environment, Forestry and Tourism) hold quarry/ mine operators and mining claim holders accountable towards land rehabilitation and restoration post closure of their operations.

4.3.2 Healthcare & Education

The constituency of Karibib comprises 1 district hospital and 3 clinics. In addition, the constituency is host to 2 government secondary schools, 2 government primary schools, 1 private primary and secondary school. Considering an estimated population of approximately 15 000 people, these facilities are deemed adequate to accomodate the educational and healthcare needs of the people living in this constituency. Despite this however, low levels of formal tertiary education prevent majority of households from earning a decent income.

If the nearby Twin Hills Gold project materialises into an operational mine, and considering the planned expansion of the Best Cheer Investments Namibia contract mining operations on these claims, a population influx can be expected in the general areas of Karibib and Omaruru. Such an influx may in turn put strain on the existing healthcare and educational facilities due to the anticipated increased demand for these services. Hence, opportunities to develop more of these facilities are expected to arise over the next 3 years.

4.3.3 Employment & Business activities/ opportunities

The Erongo Region is one of the most affluent regions in Namibia due to the presence of the harbour and a number of active and upcoming mines. For this reason, it comprises an economically active population. The majority of the workforce in the region is employed in the mining and fishing sectors, and for the area of Karibib majority of the working-class population are employed at the Navachab Gold Mine, active exploration companies such as Osino and

Lepidico, and numerous natural stone quarrying and stone processing operations. For the area of Karibib specifically, the dimension stone industry is a key player in terms of employment creation, and provision of procurement business opportunities to small and medium enterprises.

It is anticipated that as a result of the planned expansion of marble quarrying operations, the possible development of the Twin Hills Gold Project, and Lepidico's lithium project, more employment and procurement business opportunities will become available in the general areas of Karibib and Omaruru over the next few years.

5 ENVIRONMENTAL MANAGEMENT AND REHABILITATION PLAN

5.1 Purpose of the Environmental Management & Rehabilitation Plan (EMRP)

Regulation 8 of the Environmental Management Act's (EMA) (7 of 2007) Environmental Impact Assessment Regulations (2012) requires that an Environmental Management Plan (EMP) be updated regularly to ensure that at any given point in time it reflects a project's current state, and also to support any renewals for Environmental Clearance. The "draft" term has context in this regard to emphasize that the document (i.e. the EMRP) remains a working document which is to be updated continuously during the operational phase of the project to account for variations in site specific environmental conditions, technologies and methods being applied, business relationships between affected farmers and project undertakers (i.e. the license holder and contractor miner), and the market's demands as well as to accommodate feedback or results from the recommended monitoring programs. A 'management plan' is defined as:

"…*a plan that describes how activities that may have significant environments effects on the environment are to be managed, mitigated, controlled and monitored.*"

The **EMRP is a legally binding document to the project proponent (Mr. Sebastian van der Merwe)** and is one of the most important outputs of the EA process as it synthesises all the proposed impact mitigation or enhancement actions, as well as monitoring actions, set to a timeline and with specific assigned responsibilities. It provides a link between the impacts anticipated from the current and planned project activities, and the required environmental management actions on the ground during project inception and subsequent day-to-day operations. **It is important to note that the custodian person or entity who contravenes the provisions of this EMRP may face imprisonment and/or a fine.**

In the context of this project the purpose of this document is therefore to guide environmental management throughout the following phases of the project:

- **Construction of new quarries and support infrastructure** - the period during which new quarry sites are cleared of vegetation, topsoil and sub-surface overburden is stripped and stockpiled in designated areas, barricading and fencing of existing quarries, construction and installation of support infrastructure and services are undertaken.
- **Operational phase** – this phase involves: full-scale operation of existing and new quarries, sorting and storage of blocks, haulage of extracted blocks and waste rock, maintenance of mobile earthmoving plant, power gensets and cutting machinery, re-fueling of diesel storage tanks on site, operation of power supply gensets, partial stockpiling of marble dust generated from the extraction of blocks.
- **Decommissioning and rehabilitation** – decommissioning will take place once the marble rock resource is either depleted, or when the open pit quarries become too deep to mine economically. It is unlikely that the existing quarries will be decommissioned within the next 3 years (i.e., the validity period of the ECC that is being applied for). However, it is necessary to incorporate management measures that need to be implemented during decommissioning and post closure in case of sudden closure of the operations due to other factors such as prolonged dips in commodity prices. The decommissioning phase represents the stage when quarrying of the marble will cease and the area shall be rehabilitated to restore the environment to a state that is as close as possible to the surrounding natural environment.

5.2 Limitations of this Draft EMRP

The following limitations apply to this EMRP:

- OMAVI Consultants assumes that all the project related 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 EMRP.
- It is also assumed that the relevant information obtained from different local literature consulted is accurate and;
- This EMRP has been compiled on an assumption that there will be no significant changes to the ongoing and future project activities or the affected biophysical and social environment between the time of compiling this EMRP and the time of implementing this EMRP.

6 EMRP IMPLEMENTATION AND RESPONSIBILITIES

It is of paramount importance that suitably qualified and experienced human resources are appointed and given responsibilities to ensure the effective implementation and enforcement of the EMRP. This EMRP has identified the Quarry Manager; Safety, Health and Environment (SHE) Officer; Public Relation Officer (PRO), the Farm Owner; and License Holder as important roles to implement the environmental management and rehabilitation plan for the ongoing and proposed activities. It should be noted that in practice, however, the first three roles may be assigned to and performed by one person.

A list of specific responsibilities to be undertaken under each position are provided below. It should also be noted that the above-mentioned roles are delegated roles and therefore the License Holder (Mr. Sebastian van der Merwe) and the contractor miner (Best Cheer Investments Namibia (Pty) Ltd) are ultimately responsible and legally compelled to implementing the EMRP. Key responsibilities for other stakeholders are also listed below.

6.1 The Group Safety Manager

It is noteworthy to mention that since the quarrying operations on the concerned claims are operated by a contract miner, Best Cheer Investments Namibia, the role of a Group Safety Manager becomes relevant. The Group Safety Manager shall be responsible for the following:

- Continuously improve the health and safety performance at upcoming and operational quarries by developing, implementing and enforcing effective risk management and incident prevention strategies such as site inspections, assessments, investigation of incidents and complaints, application of compliance powers, training and awareness raising.
- Participate in announced and unannounced inspections and assessment activities at quarry sites. Prepare and record assessment and inspection reports and inform operators of their compliance status in writing.
- Maintaining the necessary levels of knowledge in best practice, given the variety of legislative requirements and rapid changes in technology and anticipating the health and safety issues arising from new technology.
- Managing prescribed emergency procedures, such as fire drills and scope specific emergency tests.
- Identifying appropriate health and safety training for different hierarchical levels and ensuring all employees have adequate training for the job at hand.
- Develop safety, health and environmental criteria for contractor selection and monitoring contractor compliance and management.
- Approving and arranging for the purchase of safety equipment.

- Prepare regulatory enforcement and compliance notices to quarry SHE officers, assist in Creating, circulating, and enforcing a hazard assessment process, accident investigation procedures, as well as other health and safety policies, practices, and procedures.
- Leading or participating in the investigation of workplace accidents and non-compliance.
- Carry out enforcement activities to ensure quarry operations comply with health and safety standards. This includes issuing of written advice, improvement and prohibition notices.

6.2 The Quarry Supervisor

The Quarry Supervisor shall be responsible for the following:

- Enforce, manage and oversee the implementation of this EMRP and ensuring that the EMRP is updated regularly as more or new data and information is collected, as well as when significant changes are made to the operations.
- Issuing fines to or formally disciplining individuals who contravene EMRP provisions and if necessary, removing such individuals from sites completely.
- Setting up and managing the schedule for the day-to-day activities; taking into account that daily safely briefs should be held and recorded.
- Liaison with all relevant interested and affected parties/stakeholders.
- Ensuring all incidents are recorded, documented and reported to the relevant authorities.
- Gaining the confidence of quarry workers, through the development of cooperative and open relationships.
- Dealing with quarry wrokers/ personnel who may have a limited understanding of their legal obligations, or who may be concerned at the possible implications of compliance action.
- Undertaking a bi-annual review of the EMRP and amending the document when necessary.
- Draw up waste disposal schedules and procedures.
- Ensuring that all permits required for the operation are obtained timeously and are available on site at all times. Such permits include the ECC, SHE related files, Oil storage certificate, and Export Permits.
- Take action on all immediate remediation measures recommended in this report.
- Overall safety and security of personnel on site
- Manage and resolve conflicts with employees

6.3 Safety, Health and Environmental (SHE) Officer/ Representatives

The SHE Officer will be responsible for the following activities:

- Planning, conducting and signing off site inductions to the workers on-site and visitors to the worksite(s).
- Providing first aid to injured employees and managing emergency response when an employee's injury severity exceeds first aid.
- Developing area-specific reference safety, health and environmental manuals for all work sites, as well as quick SHE checklists that workers and visitors/ contractors may use for quick specific job risk assessments. Key work areas of significance include:
    - Active quarries
    - Decommissioned quarries
    - Workshop area
    - Block sorting, storage and loading bay/ yard
    - Power supply genset area
    - Re-fueling station(s)
    - Haul roads
    - Accommodation and offices area
- Recording all SHE related incidences on site.
- Ensure availability of all PPE for employees and visitors
- Ensuring that the requirements of the EMRP are carried out during applicable activities throughout the project life span.
- Continuously implement the monitoring programs outlined in the EMRP and regularly give feedback on these.

6.4 Public Relations Officer (PRO)

The Public Relation Officer will be responsible for the following tasks:

- Liaising between the quarry operators, the farmer and any officials from relevant Competent Authorities.
- Ensure effective and timeously communication with stakeholders, media (if necessary) and the public.
- Managing public relations and dispute issues.
- Preparing and submitting public relations, labour issues reports, if required.
- Collaborating with personnel and maintaining project-related open communication among personnel.
- Ensuring timely communication or notices of any special planned activities to interested and affected parties
- Assist the Quarry Manager in resolving work related desputes

6.5 The Farm Owner

- Review monitoring data and take decisions on any desired remediation measures necessary to circumvent aggravated circumstances
- Actively participate in stakeholder forums
- Make use of the grievances mechanisms to communicate issues to the Proponent and/ or to relevant authorities
- Monitor legal compliance
- Review bi-annual environmental performance reports
- Sanction poor performance and non-compliance where appropriate through directives, penalties and fines
- Provide necessary administrative and permitting support to the project proponent where necessary

6.6 The License Holder

The license holder together with their contractor miner are ultimately responsible for implementing and enforcing the EMRP. His/ her key roles shall include but not limited to:

- Review monitoring data and take decisions on any desired remediation measures
- Request the contract miner to cease operations to remedy any aspects that do not conform to the requirements of the EMRP
- Review and enforce implementation of the impact management measures proposed in this EMRP
- Ensure compliance to the Mineral Prospecting and Mining Act of 1992 as well as the Environmental Management Act of 2007 by ensuring that claim registrations and environmental clearance certificates are valid at all times

6.7 Ministry of Mines & Energy, Ministry of Environment, Forestry & Tourism and other relevant Organs of State

- Conduct Audits of the Environmental conditions of the sites from time to time and advise on any changes required or actions to be taken against operators, etc\
- Terminate any expired permits such as the ECC and/ or claim registrations
- Validate data and information provided in the EMRP and bio-annual environmental reports, as well as monitoring data

6.8 Technical Staff and Consultants

- To safely and effectively monitor various technical parameters related to soil preservation/ protection; ground stability of quarry slopes/ sidewalls; employee/ contractor health; water resources management; waste management; and mechanical designs of various equipment on site.

The Proponent and contract miner should familiarise themselves with these commitments in detail and should acknowledge their obligation to the specific management actions detailed in Tables contained in the following sections.

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN ACTIONS

This chapter presents a list of impact enhancement and/ or mitigation measures (management plan actions) for this project.

The aim of the management plan actions presented in Tables below is to enhance potential benefits and prevent potential adverse impacts to the extent possible. Where adverse impacts cannot be avoided, measures are provided to reduce, minimize or manage the significance of these impacts to the extent practical.

These management plan actions are a ''translation'' of mitigation measures recommended to manage the potential impacts identified for the ongoing and possible future operations on these sites.

7.1 Impact Enhancement/ Mitigation Actions AND Monitoring

The management plan actions for the enhancement of potential benefits and mitigation of potential adverse impacts are presented in Table 7-1 below. This table covers the following aspects:

- Project activities for which management actions are required. These activities include both ongoing ones as well as those that are planned for future operations.
- Proposed impact enhancement/ mitigation measures;
- Key performance indicators for monitoring success levels of management actions;
- Responsible person(s) for implementing the proposed impact management actions;
- Resources (physical, knowledge/ skills as well as time) required to effectively implement management actions and monitoring programs, and
- Implementation timeframes for the proposed management actions.

Table 7-1. Management Plan Actions for Developmental, Operational, and Decommissioning/ Closure Phases of the Project

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
ADVERSE IMPACTS						
Presence of quarry wall slopes, side slopes of haul roads, and loose waste rock on waste rock dumps + haul roads	- Potential slope instability of the operational quarry walls and side slopes of haul roads following heavy rains - Possible rock falls from upper sections of quarry walls, and mobilization of loose waste rocks from sides of haul roads and waste rock dump slopes	-Monthly site inspections by a geotechnical engineer or engineering geologist to assess stability or distress of pit walls, haul road side slopes and thereafter recommend and oversee implementation of stabilization measures where necessary	-Presence, frequency and extent of ground cracks, evidence of sloughing & distress in the side slopes, evidence of loose rocks -General condition of walls and side slopes (is there evidence of slumping, loose material at base on slope, over-hanging material, excess seepage from walls and side slopes)	-Group Safety Officer (holds overall responsibility) - Quarry Supervisor - SHE Officer -Geotechnical Engineer/ Geotechnical Consultant	Technical Staff (Geotechnical Engineer, geotechnical contractors) Excavator or TLB to flatten out over-steepened slopes Funds to implement the above	Once every quarter and as and when signs of ground instability or distress are detected/ observed
Soils	- Potential loss of topsoil during clearing, grabbing and stripping works if top soil is not stockpiled & subsequently protected -Destruction of soil structure through excavation works, compaction works &	-Top soil overburden should be stockpiled in designated areas during clearing, grabbing and stripping operations. Currently, there is no evidence on any of these sites for such practice being enforced. -Use subsoils for placement of surface	-Record any evidence of new traffic tracks outside of designated access roads by means of photographs -Record evidence of new erosion gullies or channels on slopes or road shoulders (photographs)	-Health and Safety Officer (to seek input from Consultants with Soil Conservation knowledge) -Hired soil conservation scientist	-Technical Staff (Soil Conservation Scientist to offer training and monitor depth profiles as well as contamination levels) - Budgets to seek services of such specialists, to effect monitoring, to extend concrete bunds of oil storage tanks, and to	-Throughout the operational phase -Once every 6 months for monitoring depth of soil profile and contamination levels

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
	traffic compaction along access roads -Soil Erosion due to increased runoff along access road and over block stockpiling bays where soils have been hardened as a result of traffic compaction -Soil Contamination and Pollution from hydrocarbon spillages. Significant evidence of hydrocarbon spillages and soil contamination have been observed near the workshop site and around oil storage tanks. This is partly due to the inadequate size of the concrete pads and bunds around these facilities - Possible increase in in situ soil cementation due to spillage of CaCO3 rick dust – cementation has the	covers on new and/ or expanded access roads. Place fertile topsoil as top cover during decommissioning of the borrow pit - As a matter of urgency all soils contaminated by oil spillages should be scooped out to their entire depth and safely disposed off at designated landfills either in Walvis Bay or Windhoek. Thereafter, the concrete pads and bunds around all oil storage tanks should be expanded in size and height, respectively to limit any spillages onto surrounding soils. It is further highly recommended that a concrete pad extending at least 10m around the mechanical work should be constructed to minimize risk of soil contamination	-Record evidence of soil contamination - Monitor depth of soil profile and contamination levels every 6 months in areas on runoff & submit such with bi-annual environmental reports		scoop up and dispose off contaminated soils	

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
	effect of increasing runoff & therefore risk of flooding, as well as increasing hardness of soils during future excavation works	- Minimize disturbed footprints as much as practically possible at any given time over the sites by, for instance, ensuring that vehicles only drive within the existing and new road reserves, raising heights of waste rock dumps to optimal levels to minimize areal footprints, stockpiling blocks on top of each other the storage bays instead of establishing spatially extensive storage bays across the sites. -On MC 68194 and 68196 clear evidence of hydrocarbon spillages and soil contamination in the vicinity of mechanical workshops, re-fueling stations and used oil storage tanks were recorded during the site assessment. As an immediate action all contaminated soils				

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		should be scooped up and transported to designated waste disposal sites in Karibib. The concrete bunds for used oil storage tanks and re-fueling stations must be expanded and should comprise elevated periphery bunds for spillage containment -Enforce punishment for non-compliance in the form of disciplinary hearing - Provide soil conservation training to relevant staff such as operators of trucks & other earthmoving machinery - Create designated containment dams for the storage of marble dust generated from the quarrying operations. **To prevent excessive migration of the fine marble/ granite dust particles into the in situ**				

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		soils, a compacted layer of silt sand mixtures or finer must be placed at the bottom and along the slopes of such dam facilities during the construction phase.				
Land Use	- Specifically for the undeveloped claims, MC 68195 and 68203, these sites are currently habitats for wildlife and also serve as grazing land for cattle, goat and sheep. Once developed into quarrying operations these sites will fenced off and become inaccessible to the fauna, which in turn may interferer with migration/ movement patterns of these animals, and initially trigger conflict between workers and wildlife due to invasion of their territories. This will alter the land-use dynamics of these areas	-Fence off new quarry sites to minimize risk of vehicle-animal collisions, and to prevent animals from falling into quarries - Impose strict speed limits of 40km/hr across operational sites	- Quarry sites effectively fenced off with access control gates - Evidence of collision incidences in the form of photographs - During each site assessment when bi-annual audits are being conducted, an array of photographs from each mining claim site operations must be included in the bi-annual report to help build a record of land-use changes over time	-Quarry Site Supervior (holds overall responsibility) -SHE & PR Officers	-Funds to acquire fencing material & install the fence -Labour force to fence off sites	-A record of land-uses through time included in the form of photographs in the bi-annual reports -All operational and temporarily decommissioned pit sites are fenced off

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
	- Increased movement of trucks within the operational quarrying sites, along the D1941 gravel & the general area of Okawayo will conflict with current land use of small and large stock grazing and may increase vehicle-animal collisions. Such collisions may in turn trigger disputes between the contract miner, the license holder and the land owners					
	- Changes to landscape due to creation and expansion of access roads and quarries - Current practice of blending white marble dust with in situ soils on roads has the adverse impact of changing	- Minimize the spatial extent of disturbed footprint at any given time by limiting cleared ground which is required for widening the current access roads. Make quarries as deep as possible to the extent practical to limit spatial footprint of disturbed ground	- Evidence for minimal disturbance of terrain by means of satellite images	-Quarry Site Supervisor (holds overall responsibility) - SHE - Farmer	- Funds for monitoring	-Ongoing throughout the operational phase of the quarrying operations

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
Landscape & Sense of Place	whitening the landscape	- Re-use existing access roads as much as possible and avoid creation of new ones to the extent possible - Limit the height of waste rock dumps and stockpiled blocks so that they are not excessively visible from the C33 tarred road				
Vegetation	- Limit removal of vegetation by optimally using existing access roads, waste rock dumps and block stockpiling bays. - The ongoing and proposed quarrying activities will take place on the marble ridges which are perceived to be important habitats with rich biodiversity.	- Minimize disturbed footprint as much as practically possible by utilizing existing roads, waste rock dumps, storage bays -Restrict movement of vehicle and machinery to existing roads and tracks to prevent unnecessary damage to vegetation	-Monitor the following parameters post reclamation & rehabilitation works: vegetation re-establishment over the site; % 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	-Quarry Site Supervisor (holds overall responsibility) -Environmental Health and Safety Officer - The Farmer & License Holder	-Funds for flora restoration program -Technical Consultants to help with monitoring restoration progress - Funds to implement vegetation restoration earthworks	-Ongoing throughout the project's life cycle. It is preferred that restoration plans be implemented on an ongoing basis new roads, storage bays and quarries are decommissioned

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		-Develop and implement a site - specific vegetation restoration plan for the block storage bays and access roads, with input from a botanist who is familiar with the vegetation landscape of the area				
	-Solid waste pollution due to littering and storage of domestic and industrial (scrap metal, empty containers, waste wood, used tyres, waste concrete & construction) waste at or near the quarry, workshop and accommodation/ office sites -Soil pollution due to stockpiling & subsequent blending of marble dust with in situ soils for usage on roads	- Office & domestic waste is currently collected in different skips on site & is disposed off at the Karibib municipal dump site regularly, as and when the need arises. This practice will continue - Scrap metals, used tyres, used containers & used oils/ grease & lubricants are currently collected from the site on a regular basis and taken to the Marmorwerke Karibib processing facility from where they are taken collected by a local off-taker recycling	- Site wide evaluation of the general condition of all waste storage sites must be conducted as part of the bi-annual environmental audits - A register of all waste generated on site is kept - All waste disposal agreements & permits are available on site - Monitor process water quality	- Group Safety Manager & Quarry Site Supervisor - SHE Officer - The Farmer & License Holder	-Funds to acquire waste storage bins/ drums; move & store waste; to acquire waste moving machinery -Funds to hire an independent environmental consultant to conduct bi-annual environmental audits - Funds to crush waste rock and spread those over all access roads, and to bag them for re-sale	Ongoing throughout the life of the quarrying operations

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
Waste (used oils + lubricants, marble dust, waste rock, sewage, scrap metals, used pipes, used cables, domestic & office waste, used broken containers/ tanks, waste water from recycling process, used spares, used tyres)	-Waste pollution due to usage & on-site storage of used oils, grease, lubricants, used broken containers, pipes and cables, & scrap metals - Landscape pollution due to the construction and raising of waste rock dumps - Possible leakage of sewer water from broken septic tanks - Possible contamination of water used in the block extraction process by hydrocarbons.	contractor. This practice will continue - Process water from the stone cutting & bock extraction process is recycled, temporarily stored in on-site tanks & reused in the stone cutting process. This practice will continue - This EMRP recommends that going forward marble dust must be disposed off either in abandoned quarries or within designated lined containment earth dams constructed near active quarries -A record of all waste generated at the quarries shall be kept on site. Such record shall show daily records of quantity of slurry/ dust trucked to abandoned quarries or to the proposed containment dams, and a report shall	- All access roads have an surfacing layer of crushed aggregates instead of in-situ soil blended with marble dust - Containment earth dams for storage of marble dust are constructed and commissioned immediately - A record of all solid and liquid waste transported to the Marmorwerke Karibib site for recycling purposes by offtake contractors is kept on site - Waste off-take agreements are available on site for presentation to MME and MEFT inspectors		- Funds for constructing earth dams for disposal of marble/ dust waste	

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		be submitted bi-annually as part of the bi-annual environmental reporting of such records -Used tyres may also be painted in reflective colours & used to mark the edges of access roads, bends s - Waste marble rock could be run through primary and secondary crushers to produce white aggregates that can be sold to landscaping contractors -Waste separation at source will be enforced by availing clearly labelled or differently coloured general waste (paper, plastic, metals, organic waste) rubbish bins near active sites. These must be emptied				

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		weekly at the Karibib municipal waste dumpsite -All hazardous waste such as oil drums, and grease should be stored in secure demarcated off and overhead covered areas. Such areas must also have a concrete floor for spillage containment purposes. - Some of the stone offcuts or breakoffs must be crushed to 9 to 13mm aggregates and placed over all access roads as wearing/ surfacing layer to help suppress dust & to make slippery gravel roads safer during the wet seasons				
	-Dust generated from bulk excavation work during stripping, current permanent stockpiling and	-Apply a thin (150 – 300 mm thickness) layer of crushed marble aggregates as cover on access roads to	-Monthly dust level monitoring by installing dust buckets around the active sites	- Quarry Site Supervisor -SHE Officer	-Funds to implement the dust and air quality monitoring program, including the bi-annual	Ongoing throughout the life of the operations

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
Air Quality	subsequent blending of fine marble particulate on operational quarry sites, vehicular movements on haulage access road - Production of gaseous substances from burning of diesel from running mobile machinery	minimize dust generation - Transport the marble silty clayey dust from the quarries to the proposed disposal earth dams containment sites in a slightly moist state - Cover vehicles carrying dusty materials with a fine net to prevent materials being blown from the vehicles - Strictly enforce speed limits to approximately 30 – 40 km/hr to minimize the creation of fugitive dust within the project boundary - Avoid vehicles from idling and keep vehicles well maintained to minimize particulate and gaseous emissions - As is the current practice continue using a wet cutting process in	- Continuous monitoring for ambient dust/ particulate (PM10 and PM2.5), bi-annually -All employees must do a mandatory health check every 6 months to monitor impact on their respiratory systems. Keep statistics of such results on site		personnel health checks -Technical Specialists (Air quality)	

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		the quarries to minimize dust generation - Where drilling of blocks is required to downsize blocks , the drill must be fitted with dust capture equipment -Reduction in unnecessary traffic volumes within the project area by utilizing high capacity trucks; -All personnel onsite to wear appropriate PPE				
Noise Pollution	-Increased nuisance to farmers due to increased noise levels stone cutting and block extraction machinery which run for long hours during the day, and from the regular movement of trucks on the D1941. - All workers and visitors must be provided with appropriate PPE	-Limit operational times to period between 06h00 and 19h00. - Schedule trucking of blocks from the quarry to the processing facility to low traffic hours such as between 09h00-13h00 and between 14h30 to 17h00	-	- SHE Officer	-Technical Specialists (noise, where necessary as warranted by intensity of public complains or the monitoring results)	Ongoing throughout the life of the operations

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
Surface Water Resources	- A continuous drainage channel runs near and along the southern toe of the NE-SW trending marble ridge and the block stockpiling bay, accommodation and parking lot area for the quarry operations at MC 68196 are situated adjacent to this channel. This set up presents a risk for possible pollution of runoff water through hydrocarbon spillages and subsequent washout into this channel, with the consequence of compromising surface water quality - Runoff over access roads and from exposed open pit quarries that lie above the surrounding natural ground level will likely be susceptible to an increase in turbidity	- Install and maintain efficient oil and grease traps or sumps around above-ground fuel storage tank, workshops, and ensuring that emergency spillage kits are available and installed under all operational machinery. This measure must be formalised into a procedure that should be part of the emergency response plan for each site - All areas where fuels or grease is stored or applied must be concrete lined -Attenuate surface runoff by using on-site storage and water	-Implement a monthly surface water quality monitoring program by sampling from any open water bodies in the vicinity of the operational and decommissioned sites. Target levels must comply with the Namibia's effluent water targets or any other similar local standards - Surface water management structures have been constructed, are maintained. This should be reported as part of the bi-annual environmental audits	- Quarry Site Supervisor - SHE Officer - Land Owner	-Funds to design and construct the proposed surface water management structures (e.g. diversion ditches, concrete pads, rainwater storage tanks) implement the monitoring program -Technical Specialists (Water Specialist)	Ongoing throughout the life of the operations and post decommissioning

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
	levels and an increase in solids content as they come into contact with loose marble dust. This will compromise the physical quality of runoff in the vicinity of the operational sites site due to erosion. Rainwater damming in the quarries is also at risk of being polluted by coming into contact with marble dust, spilled hydrocarbons.	management infrastructure (e.g. runoff storage sumps, low gradient ditches, clean runoff diversion ditches) around the operational sites -Divert clean water from all active sites (quarries, workshops, parking lots, the proposed marble dust containment dams) through construction of gently sloping diversion ditches - Rainwater should damming in quarries should immediately and continuously be pumped into water storage tanks and subsequently utilized in quarrying activities. Minimizing the volume				

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		of dammed water reduces risk of prolonged exposure to hydrocarbons and other physical pollutants				
Groundwater Resources and use	- Groundwater in the area is believed to be deep in excess of 60m and is structurally controlled due to the high crystallinity of the marble rock mass. Possible pollution of groundwater resources may occur through seepage of spilled hydrocarbons via stratigraphic contacts and secondary geological structures such as faults.	- Implement bi-monthly groundwater monitoring by sampling water for standards quality control testing from Osino's Twin Hills boreholes as well as existing farm boreholes located downstream of the operations and in the vicinity of the quarries.	-Implement monthly groundwater sampling and quality monitoring. Current water quality baseline levels must be established over a period of 3-6 months from submission of this EMRP, and subsequent water quality values must be benched marked again those baseline values to determine if there are increasing levels of groundwater contamination. The baseline values established in this manner may also be compared to selected	- Quarry Site Supervisor - SHE Officer	-Funds to implement the baseline establishment and monitoring program -Technical Specialists (Water Specialist)	Ongoing throughout the life of the operation and post decommissioning

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
			control borehole water quality levels			
Occupational Health and Safety	-Short to Long-term safety effects from exposure to lifting operations, risks of possible slips and falls, working near high energy earthmoving and cutting machines, working with electrical cables in wet environments, working in partially flooded quarries -Short to Long-term health effects from dust, noise, exposure to sun rays	-Proponent must avail adequate and appropriate PPE to all workers and visitors -Timeously recording and reporting of all health and safety incidences, together with actions taken & recommendations on mitigation measures going forward -Develop an MOU with the Local Healthcare Centres in Karibib for service provision to the local workforce -Enforcement of speed limits and sanctions for any personnel found in violation of speed limits, including senior staff and contractors' and	- Incident reports are captured and appended to the bi-annual environmental audit reports - Regular health screening of workers -Bi-annual health and safety audits completed to form part of the broader bi-annual environmental audit	- Quarry Site Supervisor and Group Safety Manager - SHE and PR Officers	-Funds to acquire health and safety related equipment and audits; and to pay for employee medical services -First Aid training for at least 2 personnel at each work site	Ongoing throughout the life of the operations

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		sub-contractors' employees - Ensure that edges of all quarries are barricaded and that warning signs of steep edges and "do not enter" are mounted to those barricades -Appropriate signalling of moving heavy machinery -All drivers to be given safety education focussing on speed and conflicts between pedestrians, rail traffic and animals - Enforce controlled access to the operational sites to minimize public exposure to dust, safety risks, etc - Ensure that SHE representatives are continuously trained for first aid				
	-Security threats workers due to presence of valuable goods on site and	-Appoint a security company to safeguard entrance to the sites	-Record and report (timeously) all theft,	- Quarry Site Supervisor	- Funds to procure security services & equipment	Ongoing throughout the life of the operation

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
Security of the operational sites	anger triggered by recent retrenchments	-Install flood light at the operational sites to facilitate visibility during the night.	injury related incidences	- SHE and PR officer	- Human resources to serve as security personnel	
Land use conflict	- There is currently high risk of possible conflict with the upcoming Twin Hills Gold Mine as some of the proposed mine's water supply boreholes might lie in the vicinity of the existing and possible future marble quarries - There are current land use conflicts with large and small stock farming activities	- The contract Miner and Osino will need to enter into MOU on this aspect	- Evaluate whether such MOU are in plae during the bi-annual environmental audits	- PR Officer - Osino Resources	- Funds to handle any legal battles that may arise	Implement before Osino starts to operate the proposed mine
Disputes/ Grievances	-Risk of compromised relationships between Licence Holder and Contract Miner, with Farm Owner, or the upcoming Twin Hills Gold Mine	-Have a complaints logbook. Monitor grievances, take the necessary actions, and provide feedback timeously	- Monitor community grievances and provide feedback - Record all complaints or disputes encountered and	- Group Safety Manager - Contract Miner - Farm Owner	- Funds to handle any legal matters	Ongoing throughout the life of the operation

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
	- Possible land and mining rights disputes with the Twin Hills Gold project	- Sign Memorandums of Understanding with operators of the upcoming Twin Hills Gold mine on mining boundaries, any shared water supply boreholes for future operations, etc - License Holder, Farm Owner and Contract Miner to continuously revisit their agreements and to the extent practical should resolve disputes internally	document how they were effectively managed			
Roads	- Regular transportation of heavy blocks by trucks have had a damaging effect on the condition of the D1941 public gravel road	- Possibly consider establishing new gravel roads for trucking of blocks only - Contractor Miner could be obliged to	- Progress towards one of the 2 impact management measures proposed	- Contract Miner - MME and MEFT	- Machinery and/ or funds for road maintenance	- throughout the lifespan of the operations

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
	- Risk of damaging the roads due to possible overloading of trucks	contribute towards monthly maintenance of the existing gravel road by availing machinery or contribute towards hiring contractors - Contract Miner must install and operate a weigh bridge near the operational block storage yards in order to limit truck loads				
POSITIVE IMPACTS						
Continuation of Employment and	-Employment opportunities for youth from Karibib & surrounding areas. Although employment levels at the operation are currently low due to poor product demand it may pick up in future	-Regular and accessible (transparent) dissemination of the human resources and employment policy to interested and affected communities	-For every key job occupied by a foreign national evaluate skills learned by local under-study at the end of each production year - Monitor employment levels of local youth	-Quarry Site Supervisor - PR Officer	-On the job training resources	Ongoing throughout the life of the operation

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
acquisition of technical skills	-Transfer of technical skills in the natural stone extraction and cutting industry	-Complaints of inequality and discrimination in job selection and in jobs -Ensure that every job occupied by a foreign national has a local under-study to ensure on the job training of the under-study				
Local Empowerment and Procurement Opportunities	- Possible new opportunities for empowerment of local SME contractors, retailers through sub-contract work relating to security services, cleaning services, block & final product transportation, sourcing of diesel, off take agreements for some waste (e.g., used tyres, used oil/ grease/ lubricants, scrap metals and used tyres)	-Procure support services (cleaning, machinery maintenance, security and product transportation services from local previously disadvantaged contractors) and spares locally from nearby towns - Evaluate proportion of annual procurement budget spent on contract works and	-Every 6 months review contracts awarded for support services to assess extent of local previously disadvantaged contractors	-Quarry Site Supervisor - PR Officer	- Annual procurement budget that is reserved for local businesses	Ongoing throughout the life of the operations

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
	-Opportunities for local companies to procure support services such as cleaning, marketing, cooking, and supply of spares	supply of goods by local SMEs or local businesses				
Continuation of benefits & generation of possible new benefits to Land Owner and Claims Holder	- Continuation and possible increase in financial benefits to the Farmer through payment of surface land lease levies - Possible assistance with maintenance of roads, fences and borehole infrastructure	- Surface land lease and Contract Mining agreements must be in place and reviewed on an ongoing basis	-	- Land Owner - Contract Miner Senior Representative - License Holder	- Annual budget for land lease levies and contract mining fees	Annually
Revenue for Government	- Revenue collection for government through various forms of taxes (income tax, VAT, export levies) and export duties from sale of blocks - Payment of Mining Claim renewal fees	-The proponent must pay all relevant taxes applicable under the constitution of the Republic of Namibia	- Evaluate taxes & other fees paid to government when conducting the bi-annual environmental audits	- Contract Miner - MME - Licence Holder	-	Ongoing throughout the life of the operation

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
	- Indirect financial benefits to organs of state such as Namwater, Namport, Road fund through payment of water sourced from the Marmorwerke Karibib Facility, port block handling fees, fuel , product storage & shipping services					
EMRP implementation and training	Lack of EMRP awareness, limited understanding of the measures set out in the EMRP, and implications thereof	An EMRP non-compliance penalty system should be developed & implemented by the License holder. Awareness of this must be made to all employees & must form part of induction process - The Contract Miner should appoint SHE Officer to be responsible for managing the EMRP	All required Plans or Procedures and systems are developed and are in place Safety, Health and Environmental (SHE) Officer is appointed & held accountable for any oversight of key measures presented in the EMRP	- Group Safety Manager - SHE & PRO - License Holder (shall hold Contractor Miner accountable) - Land Owner - Contract Miner	Records of EMRP implementation Plans and Systems Allocation of annual budget to support and ensure implementation of the EMRP	Throughout the life span of the operation

Aspect or Activity	Impact	Mitigation / Enhancement Measure(s)	Key Performance Indicator (KPI)	Responsible Party	Resources Required	Timeframe of management action(s)
		implementation and monitoring on site.				

8 MONITORING AND REPORTING PROGRAMS

In accordance with Environmental Best Practice monitoring of environmental aspects shall place throughout the period of operations as well as post decommissioning until such time that the site's landform has been declared stable by the Office of the Environmental Commissioner. The contract miner has indicated that they welcome the Department of Environmental Affairs and Forestry (DEAF) to inspect the concerned sites after the renewal of the ECC to ensure that all the information provided in this document are reflective of the site and that all the proposed impact mitigation and enhancement measures are being complied with. The DEAF must receive a report concerning environmental matters of the sites on a bi-annual basis.

To support and ensure that the proposed mitigation measures are achieving the desired results throughout the project's life cycle, a monitoring plan must be implemented. The environmental monitoring programme will also ensure compliance to the recommended mitigation measures and best practice environmental standards. In totality, the environmental monitoring plan/ programme will serve the following purposes:

- To establish a baseline, that is, gathering information on the basic site characteristics to establish current conditions against which all future measurements can be benchmarked;
- To establish long term trends in disturbance systems;
- To estimate inherent variation within the environment, which can be compared with the variation observed in another specific area;
- To make comparisons against a standard, guideline or target level.

The following monitoring tools/ techniques are recommended for this project going forward:

- **PHOTOGRAPHS** must be used to provide evidence and verify compliance with respect to the following aspects:
    - Confirm stability of side slopes for the quarries, the recommended marble dust containment dams, and waste rock dumps;
    - Provision for runoff diversion ditches around quarries, workshop areas, storage sites for fuel and used oil products;
    - Provision for dust and noise suppression facilities, e.g., crushed marble aggregates cover layer on access roads;
    - Conditions of all access roads and evidence of the recommended surface wearing course of crushed aggregates;
    - Evidence for the installation and extension of concrete pads around all oil storage and genset sites to limit risk of soil contamination from oil spillages.

- Changes to the topography and landscape of the area;
- Proper waste management practice onsite, e.g. provision for waste collection bins, general site conditions at the working areas, site office, storage area, workshop, sewage facilities, temporary storage of all waste disposed off through offtake arrangements and others;
- Conditions of the waste rock dumps as well as the block storage bays
- Evidence that the proposed weigh bridge to limit truck loads is operational and being utilized;
- Evidence of installation of a low permeability compacted layer or liner at the bottom and along the upstream side slopes of the proposed marble dust containment dams
- Evidence of the recommended quarry edge barricade fences

Additionally, when photographs are submitted for compliance monitoring, they should be geo-referenced or their exact location should be clearly marked on a map together with GPS coordintes, as well as the date and time they were taken.

- **PERIODIC FIELD CHECKS** must be carried out during site set up works (in the case of new sites) and operations in order to ensure compliance with the following mitigation measures:
    - Conditions of open pit slopes, waste rock dumps, the recommended marble dust disposal dams, access roads;
    - Validity of all operating permits and agreements such as the ECC, Mining Claims, agreements with land owner, etc;
    - Improved working practices/ management procedures at all work sites;
    - Landscaping works at decommissioned sites;
    - Compliance to provision of appropriate and adequate PPE;
    - Validity of calibrations for the weigh bridge;
    - Compliance to recommended safe practice such as holding daily safety meetings and conducting daily inspections on vehicles, mobile plant and stone cutting machinery;
    - Compliance to reporting of all safety, health and environmental incidences through inspection of safety books, reports and files;
    - Effective waste handling at all working areas;
    - Visual inspection for general cleanliness and good management practices within the site;
    - Effectiveness of dust and noise suppression measures on access roads and in the quarries;

  - Effectiveness of widened concrete bases and raised concrete bunds for oil spillage control
- **RECORDS** of activities to monitor compliance towards the following mitigation measures:
  - Records of all communications to the general public and farmers on temporary interruptions to usage of the D1941 gravel road due to planned maintenance activities;
  - Record of all safety, health and environmental incidences, remediation actions taken, and cause analysis;
  - Maintenance runoff diversion structures and top soil erosion control measures;
  - Records of daily working hours;
  - Records of daily inspection logs for all vehicles, mobile plant and cutting machinery;
  - Records of any complains launched concerning the ongoing and planned activities;
  - Documentation records of remediation measures implemented to rehabilitate oil contaminated soils with clear summaries of what was done and photographic evidence. This should be implemented by the next bi-annual audit.
  - Whether data records being collected for monitoring purposes are actually being utilized by the contractor miner to assess trends and continuously improve on the recommended impact management and mitigation measures;
  - Counts of the following parameters to determine the success of the revegetation program:
    - Plant density
    - Plant growth
    - Plant deaths
    - Weed infestation
- **CONTINUOUS UPDATE OF SITE LAYOUT MAPS AND PLANS** to indicate locations of key existing and planned structures and all monitoring tools or instruments being utilized during the operational phase. Such layout plans should encompass the following:
  - Boundary fence (if any) of each site, including access gates and barricade fences for the open pits;
  - Haul roads;
  - Block storage bays, waste rock dumps, top soil stockpile areas;
  - Drainage diversion channels and the recommended marble dust containment dams;
  - As-built workshop and associated re-fueling stations;

  - Yards for used oils, grease, scrap metals, used tyres and used spares;
  - As-built positions for all dust fallout stations in the vicinity of the open pits, haul roads and the recommended marble dust containment dams;
  - Every quarter the Quarry Site Supervisor must ensure that a record of the areal extent of each quarry is reported
- **AIR QUALITY MONITORING:** at least one (1) dust fall out bucket should be installed at 120^{o} angle covering upwind & downwind directions around each of these structures:
  - The open pit areas
  - The haul roads and
  - The recommended marble dust containment dams
- **SURFACE WATER MONITORING:** Monitoring of surface water (in nearby drainage channels) at upstream and downstream locations of each active site should be implemented by the next bi-annual environmental audit. It is recommended that this takes place at least once every quarter given the scarcity of water in the area which makes preservation of water a key necessity for this area. It is recommended that the surface water samples should be analysed for pH, EC, Turbidity, SS, TDS, Total Alkalinity and Total hardness.

9 CLOSURE (Decommissioning & Rehabilitation)

9.1 Context and Background

In the context of this report closure of the quarrying operations shall include cessation of marble quarrying and associated activities, decommissioning and removal of any support infrastructure associated with these activities, and rehabilitation of the affected sites.

The objectives of the closure, decommissioning and rehabilitation phase for this project can be summarized as follows:

- Create a safe, stable and beneficial use landform (e.g., agricultural suitability) after termination of all quarrying and associated activities that would blend in well with future land uses of the general area;
- Rehabilitate disturbed land to a condition that is self-sustaining or one where maintenance requirements are consistent with the agreed post-quarry land use.
- Preserve the downstream water quality by ensuring that post closure surface waters that leave the site are not degraded to a significant extent.

- Comply with generic relevant regulatory requirements and attain regulatory consensus on the successful closure and rehabilitation of the site. Currently, Namibia does not have its own regulations or standards for the closure and rehabilitation of mine waste disposal site, but there are other relevant guidelines that could be drown from. These include:
    - Best Practice Guidelines for Care and Maintenance, Closure and Completion developed by the Namibian Chamber of Environment in 2019
    - Guidelines for Preparing Mine Closure Plans of 2015 developed by the Department of Mines and Petroleum of Western Australia
- To the extent practical complete rehabilitation works during operations on an ongoing basis, and in a cost-effective manner whilst achieving the primary socio-economic and developmental intent of the project.
- Produce a final "walk away" landform that is stable and that blends aesthetically into the surrounding landscape, yet as far as possible does not impend possible future land uses.

9.2 Site Reclamation & Rehabilitation

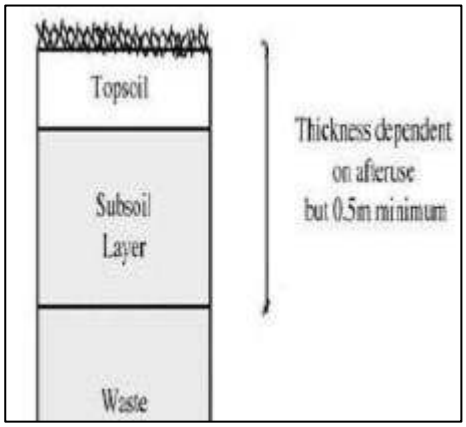
The following actions or practices are proposed to ensure that the operational quarry sites are restored and rehabilitated to acceptable levels, and have a beneficial end-use. The recommended implementation approaches and activities for the proposed decommissioning and rehabilitation works are also provided here.

Table 9-1 provides the decommissioning, rehabilitation and closure measures to be implemented to ensure that requirements of the Environmental Management Act of 2007 are met to the extent practical.

Table 9-1. Recommended Closure Measures

ENVIRONMENTAL ASPECT	REHABILITATION ACTIONS	COMPLETION CRITERIA
Surface preparation, reshaping & Construction considerations	- Ripping of soil will be undertaken along access/haul roads, over the block stockpiling bays, and previous accommodation/ workshop facilities. Ripping is important in assisting rapid tree growth through deep root growth and enhanced soil water infiltration. The ripping depth must be sufficient to penetrate any near-surface rock or clay. Inadequate site preparation and weed control are often the two biggest single factors responsible for tree revegetation failure. Thorough site preparation will be undertaken to ensure rapid establishment and growth of seedlings. All areas proposed for seeding will be deep ripped to an approximate depth	- Access/ haul roads, areas of decommissioned & dismantled structures have been ripped, reshaped, graded, - Photographic record present

ENVIRONMENTAL ASPECT	REHABILITATION ACTIONS	COMPLETION CRITERIA
	of 400 – 500 mm. Where ripping on slopes is required, the ripping will be undertaken around the contour of the land at right angles to water flow	
Top Soil Preservation and Management	- During the creation of new roads, open pits, containment dams, block stockpiling bays, etc a maximum stockpile depth of 3m will be maintained for top soil heaps to preserve viability and reduce soil deterioration - Going forward it is recommended that top soil stockpiles are protected with sediment fencing and planted with a sterile cover crop - Surface drainage in the vicinity of the topsoil stockpiles should be configured so as to direct any runoff around the stockpile - Where the stockpile is not wholly contained within the "closed loop" water management system, temporary sediment control measures such as sand bags should be used to prevent sediment from leaving the disturbed areas. Stockpiles will be placed in areas, so as to avoid impediment of natural localised drainage lines and minimise the likelihood of water ponding against the stockpile - stripping of top soil from designated top soil stockpile within the disturbed area will be undertaken when the soil is in a slightly moist condition thus reducing damage to soil structure and minimizing risk of dust generation. Stripped material should be placed directly onto the disturbed areas and spread immediately. The top soil should be re-spread in the reverse sequence to its removal, so that the organic layer, containing any seed or vegetation, is returned to the surface. Re-spreading on the contours will aid runoff control and increase moisture retention for subsequent plant growth. Re-spread topsoil shall be levelled to achieve an even surface, avoiding a compacted or an over-smooth finish	- Photographic evidence of top soil stockpiles preserved in designated fenced off sites, surrounded by runoff diversion channels, revegetated
Revegetation	- The sites contain native vegetation and the entirety of the sites has had or will have some modification to the natural vegetation. It is expected that the revegetation program will re-establish native trees/shrubs/ground covers and will stabilise and reshape exposed areas. The program will entail deep ripping to actively promote infiltration of water, which will enhance soil moisture requirements for direct tree seeding and minimise surface run-of. -All surface infrastructure areas (fence, access control room, accommodation/ office facilities, block stockpiling bays, access/ haul roads) affected by the project will be re-vegetated using local plant	- Exotic weed species are not observed to be elevated in abundance when compare to the regional setting as reported by a trained independent botanist

ENVIRONMENTAL ASPECT	REHABILITATION ACTIONS	COMPLETION CRITERIA
	species. The following revegetation measures will be implemented over the disturbed site: Prepare surface rehabilitation areas for the natural establishment of vegetation by undertaking the following: • Rip disturbed footprint to a depth of approximately 500 mm with suitable agricultural equipment to alleviate compaction; • For areas that are heavily compacted (e.g., access roads and block tockpiling bays), rip with construction equipment to a depth of at least 1 m, and over-rip with agricultural equipment in order to create suitable conditions for vegetation establishment; spread a layer of subsoil & stockpiled topsoil as per sketch below; and ameliorate soils as required.  • Allow for natural establishment of a viable self-sustaining vegetation community, in keeping with the surrounding natural environment, or establish pioneer vegetation species as per findings of dedicated rehabilitation trials to be run from the start of the project; and • Undertake vegetation monitoring (including % recovery of un-revegetated sites) post closure to ensure rehabilitation success	-Monitoring sites are established on site and surrounding sites (at least four representative control sites). Flora species diversity in rehabilitated areas are representative of control sites. Vegetation density of monitoring sites are at least 80% when compared to the average of the control sites.
Contaminated Soils	-Undertake a site-wide contaminated soil assessment to determine the nature and extent of contamination, the sources of contamination and to identify appropriate remediation measures; -Rehabilitate moderately contaminated (inorganically contaminated) soils as follows: • Excavate contaminated material to the full depth of the contaminated ground, and remove and dispose off at closest approved landfill sites. - Rehabilitate moderately contaminated (organically contaminated) soils as follows:	-Inorganically contaminated soils are safely disposed off at closest approved Landfill, subject to granting of relevant permits -Organically contaminated soils are effectively treated and

ENVIRONMENTAL ASPECT	REHABILITATION ACTIONS	COMPLETION CRITERIA
	• Treat organic contamination by means of biological remediation via the establishment of a bioremediation site and monitor soil quality against a selected control site.	compositions are restored to acceptable levels once compared with control sites
Surface Infrastructure and Equipment	**<u>Infrastructure for Potential Beneficial re-use</u>** • Compile an inventory of infrastructure and equipment to potentially remain at closure, aligning to end land use plan; • Obtain legal authorisations from Land Owner on infrastructure that must remain and be transferred; and • Finalise agreements with third parties, along with transfer schedule **<u>Surface infrastructure to be removed</u>** • Remove all assets/equipment that can be profitably removed for salvage or resale; • Dismantle/demolish infrastructure; • Demolish and excavate concrete foundations to 1 m below ground level. Alternatively and in appropriate instances the concrete slabs of "clean" infrastructure (not processing infrastructure) can be covered with a 1 000 mm soil cover as part of site re-profiling and integrated into the surrounding topography; • Backfill excavations of disturbed infrastructure footprint areas through a cut to fill action; • Shape and profile the disturbed surface areas to match surrounding topography and to ensure free drainage, thus limiting run-off erosion; • Stabilise disturbed areas to prevent erosion and sediment mobilisation in the short to medium term until a suitable vegetation cover has been established; • Rip disturbed footprint to a depth of approximately 500 mm with suitable agricultural equipment to alleviate compaction; and • Establish vegetation species that mimic the surrounding flora by collecting seed from pristine bush and shrub land and actively planting before the wet season **<u>Measures relating to support Infrastructure</u>** • Obtain legal authorisations for infrastructure to remain and to be transferred; • In addition Identify and donate equipment to Land Owner that can be reused and/or recycled • Dismantle the remaining overland pipes, decants and salvage as much as possible;	-Formal transfer of ownership and liability of specific infrastructure -Independent sign-off by a qualified engineer confirming the safe and stable condition of all transferred infrastructures such as workshop areas -All other infrastructure dismantled to ground level and removed from site

ENVIRONMENTAL ASPECT	REHABILITATION ACTIONS	COMPLETION CRITERIA
	• Seal open ends of buried pipelines and fully cover with nothing exposed **Measures relating to transport Infrastructure** • Agreements will be put in place between the License Holder/ Contractor Miner and the Land Owner as well as other relevant authorities as to which roads shall remain post closure for beneficial use by farmers. -Roads that will no longer be used post closure will be rehabilitated as follows: • Re-establish natural drainage; • Profile to be free draining and emulating the natural surface topography; • Rip access roads to a depth of approximately 300 mm with suitable agricultural equipment to alleviate compaction; and • Establish vegetation species that mimic the surrounding shrub/ bushland by collecting seeds from pristine surroundings and actively planting before the wet season **Measures relating to Electrical Infrastructure** • Remove flash flood lights offsite and demolish concrete bases; • Generally all underground services should be made safe and left buried in the ground. **Measures relating to crusher plant and Mobile Machinery/ Vehicles** Machinery and Vehicles • Identify equipment that can be reused and/or recycled that will not be salvaged;	
Fencing and Site Access	- Fencing and gates will be erected and maintained to exclude and prohibit the movement of persons and vehicles into areas that have been rehabilitated. The fencing and gates will be routinely checked and repaired where necessary. - Barbed wire fencing will not be utilised for site access given the environmental impacts this has on local fauna species. Plain wire and rural fencing with therefore only be utilised. - Signs will be placed in prominent locations to indicate areas that are undergoing rehabilitation and gates will be locked to prevent unwanted vehicle, person access and disturbance	- Photographic evidence provided in bi-annual monitoring reports
Void Rehabilitation	- The main aim will be to ensure that the pits will be left geo-technically stable and that the remnant void has a beneficial use.	- Photographic evidence of battered and

ENVIRONMENTAL ASPECT	REHABILITATION ACTIONS	COMPLETION CRITERIA
and Management	- Given the likely sizes of the final pits, these areas will not be completely backfilled to pre-quarrying day levels, but rather will be reshaped and stabilised with a 1:4 batter or flatter for possible conversion into usable water storage dams for the farm. This will avoid the creation of a formal 'void', as the land will be placed to positive use	partially backfilled slopes - Shallow test quarries are completely backfilled with same material excavated, and rock blinding is effectively implemented
Surface water	Going forward surface monitoring must be undertaken once every six months post closure to ensure that mining effluents (e.g., water used in the block cutting process) meet local regulatory requirements. The following actions are to be undertaken: <u>For Surface Water</u> • Bi-annual monitoring of surface water sites for quality – for at least 5 years post closure or until site relinquishment criteria have been achieved; and • Conduct biomonitoring at selected downstream sites for at least 5 years or until site relinquishment criteria have been achieved.	-Water samples taken from sampling points downstream of the site are within the National effluent quality specifications for a 12-month period
Cover system for affected sites	• After ripping and grabbing earthworks on specific affected sites such as the block storage bays, access roads, etc a cover system must be installed. Such cover system should comprise at least a 250 mm thick layer of subsoil spread across the entire site, and that should be overlain by another 250 mm layer of top soil. For sites that are sloped, such soil layers must be placed along contours to minimize erosion and lost of such cover.	- subsoil & topsoil placed and spread across the site, and ultimately revegetated
Sudden or Unplanned Closure	- In the event of unplanned closure some of the objectives, processes and implementation timeframes may vary. However, the practice of progressive rehabilitation and quarry closure planning including adequate financial provisioning should be in place. This forms a strong foundation in the event of unplanned closure, to provide the highest chance of a successful closure to the satisfaction of the relevant agencies and stakeholders. - The following general site requirements will be completed under a sudden unplanned closure:	- Written records for each of the recommended rehabilitation measures are filed, kept safe and are available for review by relevant authorities

ENVIRONMENTAL ASPECT	REHABILITATION ACTIONS	COMPLETION CRITERIA
	• Notify workers and contractors, as well as the land owner(s), license holder, and relevant government authorities; • Review and update the Rehabilitation and Closure Plan; • Designate a contact person(s) for authorised access to the site and project management of rehabilitation and closure; • Where required, demolish buildings/infrastructure, if buildings were to remain then seal, secure and/or lock buildings; • Remove or store all mobile equipment from the site, salvage and sell machinery/infrastructure to assist with closure costs; • Construct fences/barriers to restrict access to the site of specific areas within the site; • Establish a program for roadway maintenance to ensure access to the site is maintained; • Continue regular inspections of the sites; and • Establish a schedule for environmental and rehabilitation monitoring.	

10 CONCLUSIONS

10.1 Summary

It is recognized internationally that dimension stone processing operations exhibit low environmental impacts compared to conventional processing of metallic mineral resources, largely because of the physical treatment process involved for the former. However, the author also acknowledges that this industry can have significant detrimental impacts particularly arising from the excessive generation of dust due to the fine (silt and clay sized) particles generated during the block cutting and extraction process. In the case of marble, the dust has further adverse visual impacts when it is stored in an area where marble is a foreign material because the prominent white colour typically stands out and visible from afar.

Based on the above review of the ongoing and potential future quarries, the likely impacts from the current and planned operations, and the proposed impact management measures it is concluded that the marble quarrying operations from the concerned sites generate a number of significant adverse impacts such as:

- Local disturbance and possible destruction of marble ridge flora and habitats
- Visual impacts from the C33 and D1941 roads
- Localized soil contamination from hydrocarbon spillages and mixing of subsoils with marble dust as observed on site
- Erosion of fine marble dust from the quarries onto the flat veld

- Localized destruction of soil structure
- Continued deterioration to the district gravel road, D1941
- Possible land and mining rights conflict with the upcoming Twin Hills Gold mine
- Undesignated stockpiling and storage of marble dust on site
- Undesignated stockpiling and storage of topsoil near active sites

Despite these however, if the impact management actions and monitoring programs recommended in this report are strictly implemented and maintained, the author believes that the impacts can be reduced to acceptable levels.

10.2 Closing Remarks

The aim of this report was to review the current quarrying operations on some of the 4 mining claims concerned; present the proposed amendments to the scope of activities that are to be covered under the new ECC; review the current conditions of the environment surrounding the concerned sites and assess how those would be affected by the continuation of current operations and the possible development/ expansion of quarries in future; and formulate pragmatic impact management actions and monitoring measures with allocated clear roles and responsibilities to guide the continuation of operations in an improved and environmental friendly manner.

Overall, due to the already highly disturbed nature of areas around MC 68194 and MC 68196 where quarry operations exists, and the fact that the quarrying operations and associated activities have been ongoing for a while, the potential environmental and socio-economic changes expected are largely considered to be limited.

Based on this and the anticipated projected residual risks that remain from the impacts identified after implementing proposed mitigation measures, it is recommended that an Environmental Clearance Certificate can be issued; subject to the full implementation of the impact management and monitoring measures outlined in this report.

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