Updated Environmental Management Plan (EMP) Report to Support the Application for the Renewal of the Environmental Clearance Certificate (ECC) for Mining License (ML) No. 205

KARIBIB DISTRICT, ERONGO REGION

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KGES

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Report status	***final***		

PROJECT DETAILS

TITLE: UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP) REPORT TO SUPPORT THE APPLICATION FOR THE RENEWAL OF THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) FOR MINING LICENSE (ML) NO. 205 KARIBIB DISTRICT, ERONGO REGION

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DECLARATION

I hereby declare that:

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

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

_____

Dr. J.J Sirunda

Position: Lead Environmental Assessment Practitioner (EAP)

REPORT/DOCUMENT CONTROL FORM

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<tr><td colspan="3">PROJECT NAME: RENEWAL OF THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) FOR MINING LICENSE (ML) NO. 205 KARIBIB DISTRICT, ERONGO REGION</td></tr>
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EXECUTIVE SUMMARY

Ludi Namibia Mining and Investments (Pty) Ltd, herein referred to as the Proponent, holds mineral rights under Mining License (ML) No. 205, located in the Karibib District, Erongo Region. The ML was issued on March 19, 2019, and remains valid until March 18, 2029, encompassing a total area of 502.796 hectares. Current delineated marble resources within the license area amount to 32 million cubic meters, with ongoing and planned exploration activities projected to increase this resource by fourfold. This updated Environmental Management Plan (EMP) outlines detailed mitigation measures for dimension stone (marble) mining operations, along with ancillary infrastructure such as road networks and water supply systems, excluding activities related to the processing of the extracted marble at Karibib or Walvis Bay.

This EMP is derived from an updated Environmental Impact Assessment (EIA) and integrates Namibia's legislative requirements, including the Environmental Management Act, 2007 (Act No. 7 of 2007), Environmental Impact Assessment Regulations (2012), and the Minerals (Prospecting and Mining) Act (No. 33 of 1992). The EMP forms a core component of the company's Environmental Management System (EMS) and ensures adherence to the proponent's Environmental Policy. It systematically addresses identified environmental impacts—both adverse and beneficial—arising from mining and exploration activities and supporting infrastructure. Management strategies and mitigation measures are delineated for each phase of the project lifecycle, including preconstruction, construction, operation, ongoing exploration, monitoring, rehabilitation, decommissioning, closure, and post-closure care.

To facilitate regulatory compliance, the EMP recommends the issuance of an Environmental Clearance Certificate (ECC), subject to specific conditions. These conditions include the preparation of a comprehensive Updated EMP Report addressing medium and high-risk impacts, negotiation of lease agreements with landowners within ML 205, and the exclusion of environmentally sensitive areas identified during consultations with stakeholders. Additionally, the proponent is required to implement all EMP provisions, conduct environmental monitoring as stipulated in the ECC, and ensure the integration of monitoring programs into the company's EMS. These measures are essential for the sustainable management of environmental and socio-economic impacts associated with the project.

The Proponent bears the responsibility for implementing the Updated EMP in its entirety. Key obligations include appointing an Environmental Control Officer or equivalent expert to oversee compliance, allocating adequate financial and human resources for mitigation measures, and developing an environmental awareness and induction program for employees and contractors. Contractual arrangements with service providers must address potential environmental liabilities, and a robust monitoring framework must be established for internal and external audits. Furthermore, a dedicated fund for mine closure and aftercare liabilities must be independently managed to ensure long-term environmental stewardship.

By adhering to these technical and operational requirements, the proponent will ensure that all project activities, including mining operations, exploration, and infrastructure development, are executed in alignment with best practices and regulatory standards, thereby safeguarding environmental integrity and project sustainability.

1. BACKGROUND

1.1 Introduction

Ludi Namibia Mining and Investments (Pty) Ltd (hereafter referred to as "the Proponent") holds exclusive mineral extraction rights under Mining License (ML) No. 205. This license, granted on 4 February 2022 and valid until 4 February 2025, encompasses a total area of 502.796 hectares within the Karibib District of the Erongo Region.

1.2 Ongoing Project Overview

The current mining and exploration operations within ML 205 are characterized by the following technical and operational components:

- **Commodity Focus**: The extraction of dimension stone, specifically marble.
- **Deposit Scale**: The deposit has been initially estimated at 32 million cubic meters. Ongoing and advanced exploration activities are anticipated to increase this estimate significantly, potentially by a factor of four.
- **Marble Variants**: Predominantly grey-white and black marble varieties.
- **Mine Longevity**: The estimated operational life of the mine extends beyond 25 years, contingent on continued resource evaluation and market conditions.
- **Socioeconomic and Strategic Contributions**:
    - Creation of direct and indirect employment opportunities.
    - Promotion of value addition through the beneficiation of marble products.
    - Development of in-situ underground mineral resource potential.
    - High-value downstream economic activities in Karibib and Walvis Bay, including processing and export.
    - Generation of significant fiscal contributions through capital investments, license fees, royalties, export revenues, foreign direct investment inflows, and diverse tax streams to the Namibian government.
- **Mining Methodology**: Quarry-based operations employing diamond wire saws and precision stone-cutting machinery to extract rectangular marble blocks, each approximately 5 m^3 in volume.
- **Processing**: Post-extraction processing will be conducted at dedicated facilities in Karibib or Walvis Bay, utilizing large-scale industrial saws to further refine the marble into commercially viable dimensions.
- **Water Supply**: Groundwater sourced from a locally drilled borehole will serve as the primary water supply for operational needs.
- **Energy Supply**: The project will utilize a hybrid energy system comprising diesel-powered generators and photovoltaic solar installations to meet power requirements.
- **Mining and Operational Equipment**: The mining fleet and operational infrastructure include:

- 2 loaders, 2 excavators, 4 generators, 4 air compressors, 8 wire saws, and 8 stone-cutting machines, 16 water tanks, 6 prefabricated "Wendy" houses, and 10 storage containers.

- **Waste Management**: Waste rock generated during operations will be repurposed for mine rehabilitation initiatives. The projected capacity of the waste rock storage facility is calculated to range around 100 × 90 m^3, utilizing a capacity coefficient of 0.85 to ensure operational efficiency and compliance with environmental standards.

1.3 Regulatory Requirements and Summary of the Regulatory Register

1.3.1 Regulatory Requirements

The ongoing mining and exploration / prospecting activities in the ML 205 falls under the activities that are listed in the Environmental Management Act, 2007, (Act No. 7 of 2007) and cannot be undertaken without an Environmental Clearance Certificate (ECC). To obtain the ECC for the ongoing mining and exploration activities, the proponent is required to have undertaken Environmental Assessment comprising Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) reports.

In fulfilment of the environmental requirements, the Proponent appointed Kalahari Geological and Environmental Solutions CC as the Environmental Consultant to undertake the EIA and EMP to support the application for Environmental Clearance Certificate (ECC). The current ECC as shown in Fig. 1 granted on the 2nd February 2022 will expire on 2nd February 2025 and need to be renewed. This updated Environmental Impact Assessment (EIA) Report covering the impact assessment for the ongoing mining and exploration operations and all the supporting infrastructures such as roads and water supply within the ML 205 has been prepared to support the application for the renewal of the current ECC.

The proponent shall meet all the applicable national legislative, regulatory and policies frameworks, standards and protocol with respect to the activities of the current and future exploration, mine testing and mine preconstruction, construction, operation, closure, rehabilitation and aftercare stages. It is hereby recommended that throughout the ongoing mining operations project lifecycle, the developer shall follow the provisions of all the relevant national regulatory frameworks.

1.3.2 Summary of the Regulatory Register

The following is the summary of the relevant and applicable national policies, legislations and regulation as well as regional (Southern Africa Development Community –SADC) treaties and protocols:

Table 1: Legislation relevant to the project

Law/Treaty/Policy	Description	Relevance to the Project
The Constitution of Namibia	Supreme law providing overarching principles, including environmental protection and sustainable development.	Guides overall compliance with national environmental laws and policies.
Environmental Management Act, No. 7 of 2007	Framework for sustainable environmental management and procedures for obtaining Environmental Clearance Certificates (ECC).	Requires the EMP and ECC for mining activities within ML 205.
Nature Conservation Ordinance, No. 4 of 1975	Protects biodiversity, ecosystems, and indigenous flora and fauna.	Ensures conservation of protected species and habitats affected by mining.
Forest Act, No. 12 of 2001	Governs the protection and utilization of forests and trees.	Controls deforestation and ensures sustainable use of

		local vegetation during operations.
Atmospheric Pollution Prevention Ordinance, No. 11 of 1976	Regulates emissions to minimize air pollution.	Mitigates dust and emissions from quarrying and transportation.
Electricity Act, No. 4 of 2007	Regulates electricity supply and safety standards.	Ensures safe and compliant use of generators and solar energy systems.
Labour Act, No. 11 of 2007	Sets labor standards, including health and safety regulations.	Governs workforce health, safety training, and working conditions.
Road Traffic and Transport Act, No. 22 of 1999	Regulates road usage, vehicle safety, and transportation operations.	Ensures safe transportation of marble blocks and adherence to speed limits on haul roads.
Hazardous Substances Ordinance, No. 14 of 1974	Controls handling and disposal of hazardous materials.	Ensures safe storage, use, and disposal of chemicals like fuel and oils.
Minerals (Prospecting and Mining) Act, No. 33 of 1992	Governs the exploration, mining, and beneficiation of minerals.	Provides legal backing for ML 205 activities and promotes sustainable resource extraction.
Waste Management Policy	Provides guidelines for sustainable waste disposal and recycling.	Mandates proper disposal of waste rock, domestic waste, and industrial waste generated on-site.
United Nations Framework Convention on Climate Change (UNFCCC), 1992	International treaty to combat climate change through sustainable practices.	Supports the project's hybrid energy systems and mitigation of greenhouse gas emissions.
Basel Convention, 1989	Regulates the transboundary movement of hazardous waste.	Ensures safe handling and disposal of hazardous waste to prevent environmental contamination.
SADC Protocol on Mining	Regional treaty promoting sustainable mining practices and economic benefits.	Aligns the project with regional standards for sustainable and environmentally friendly mining.
National Heritage Act, No. 27 of 2004	Protects heritage sites and cultural resources.	Prevents disruption or destruction of archaeological and heritage sites during mining activities.

1.4 Location, Site Description, Land Use and Infrastructure

1.4.1 Location

The Mining License (ML) Area falling within the ML 205 is located in central Namibia, approximately 180 km east of the Atlantic Ocean (Figs. 2 – 5). More specifically the ML 205 area is located within the Karibib Constituency (or Karibib Magisterial District) in the Erongo Region of Namibia.

The Town of Karibib is Constituency's district capital, and nearest town situated approximately 15 km to the northwest of the ML 205 area. Swakopmund, the regional centre of the Erongo Region and Walvis Bay the main Port, are situated to the west of the ML 205 area, about 170 km and 200 km respectively. Namibia's capital city, Windhoek, is located approximately 124 km southeast of the ML Area (Fig. 2).

ECC – 01959 Serial: tdbx7F1959

REPUBLIC OF NAMIBIA

MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

ENVIRONMENTAL CLEARANCE CERTIFICATE

ISSUED

In accordance with Section 37(2) of the Environmental Management Act (Act No. 7 of 2007)

TO

Ludi Namibia Mining and Investments (Pty) Ltd
P. O. Box 210, Windhoek.

TO UNDERTAKE THE FOLLOWING LISTED ACTIVITY

Dimension Stones (Marble) Mining and Exploration Operations in the Mining License (ML) No. 205, Karibib District, Erongo Region West-Central Namibia.

Issued on the date: 2022-02-04

Expires on this date: 2025-02-04

(See conditions printed over leaf)

Reuse

Recycle

This certificate is printed without erasures or alterations

Figure 1: Copy of the ECC granted on the 4th February 2022 to Ludi Namibia Mining and Investments (Pty) Ltd expiring in February 2025 and need to be renewed

Figure 2: Regional location of the EPL (Source: Updated from Risk-Based Solutions, 2015).

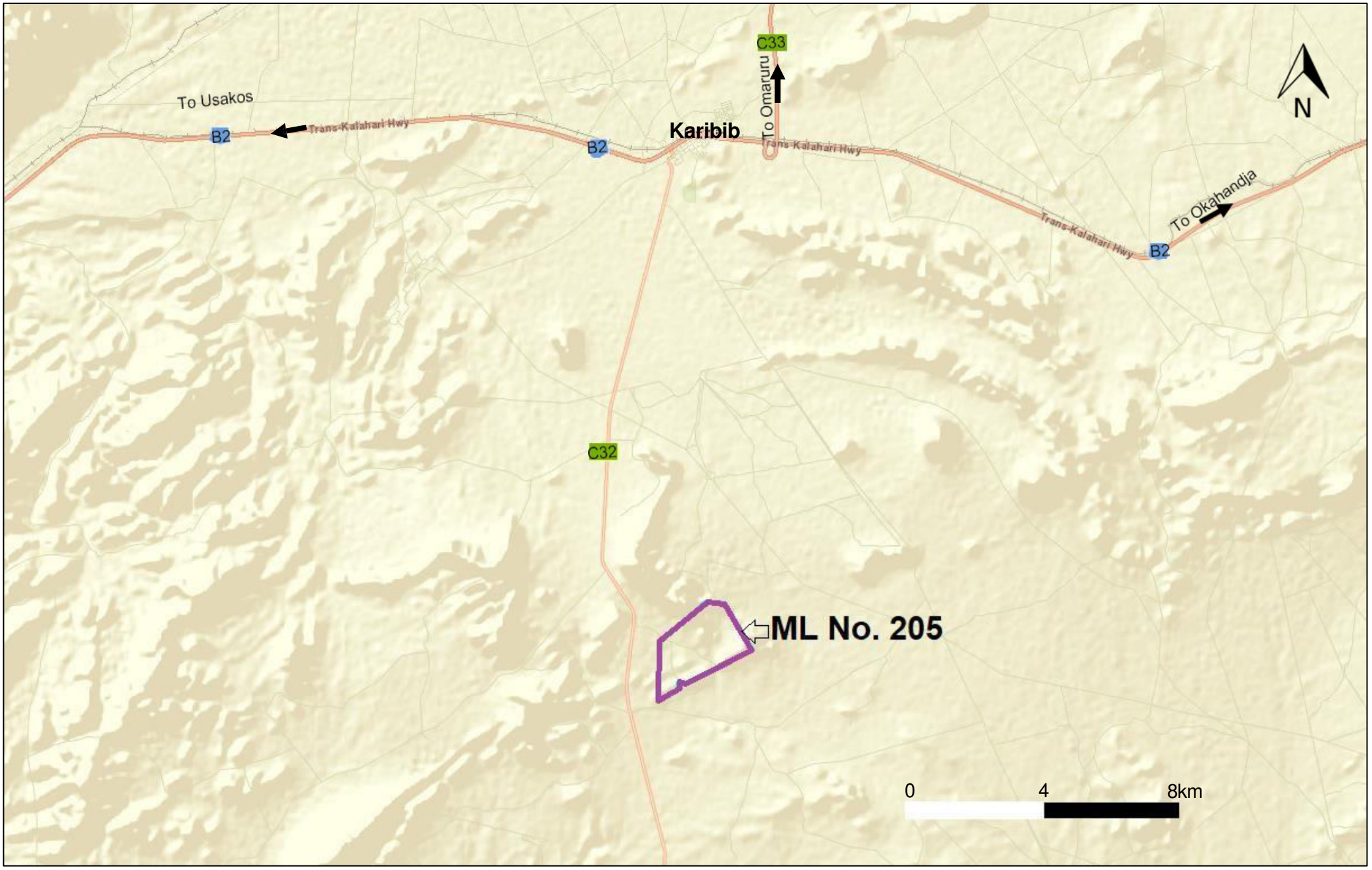

Figure 3: Detailed location of the ML 205 (Data Source: http://portals.flexicadastre.com/Namibia).

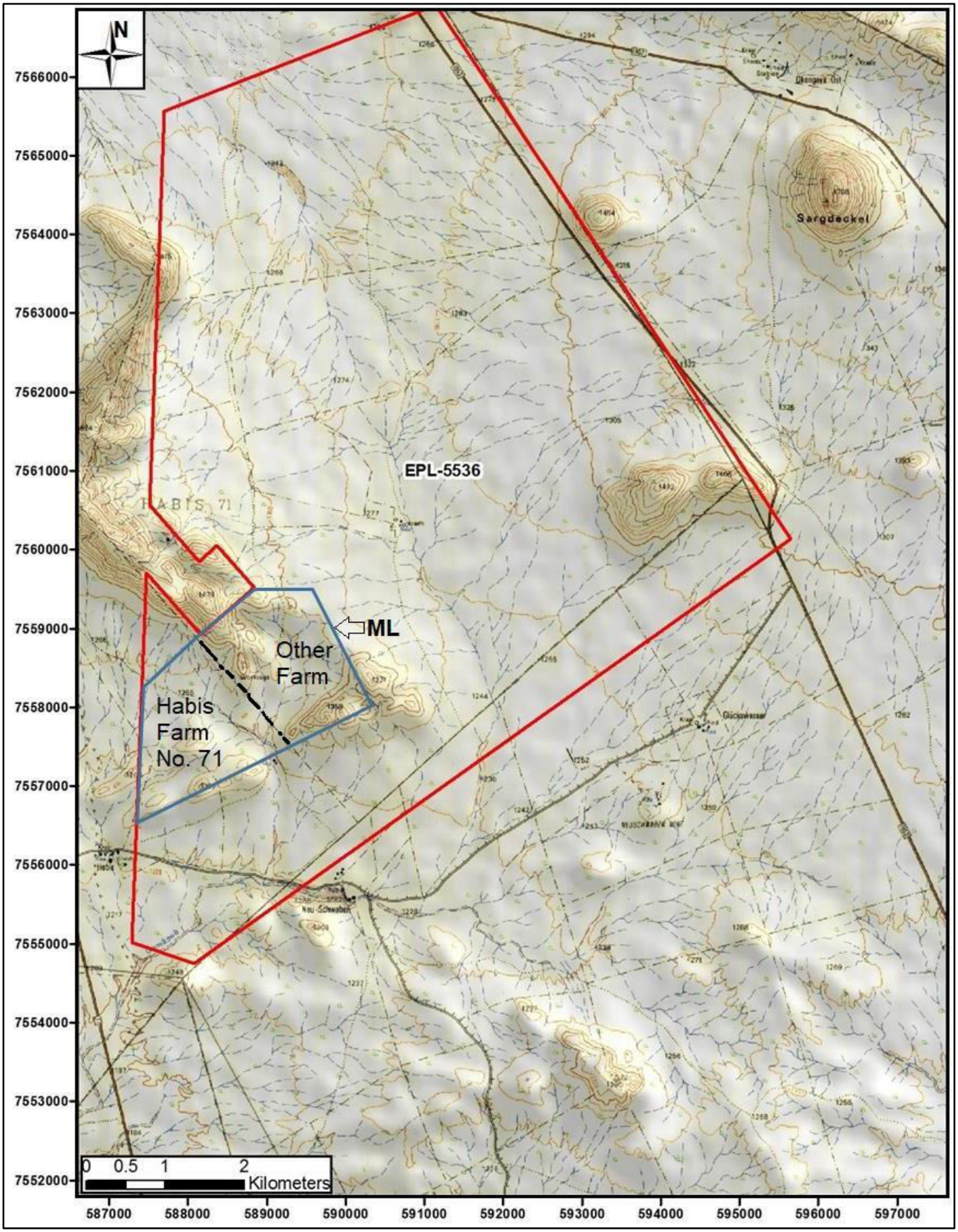

Figure 4: Detailed location of the ML 205 falling within the EPL 5536 and showing the two (2) privately owned farms covered by the ML 205 Area (Data Source: Geological Survey of Namibia)

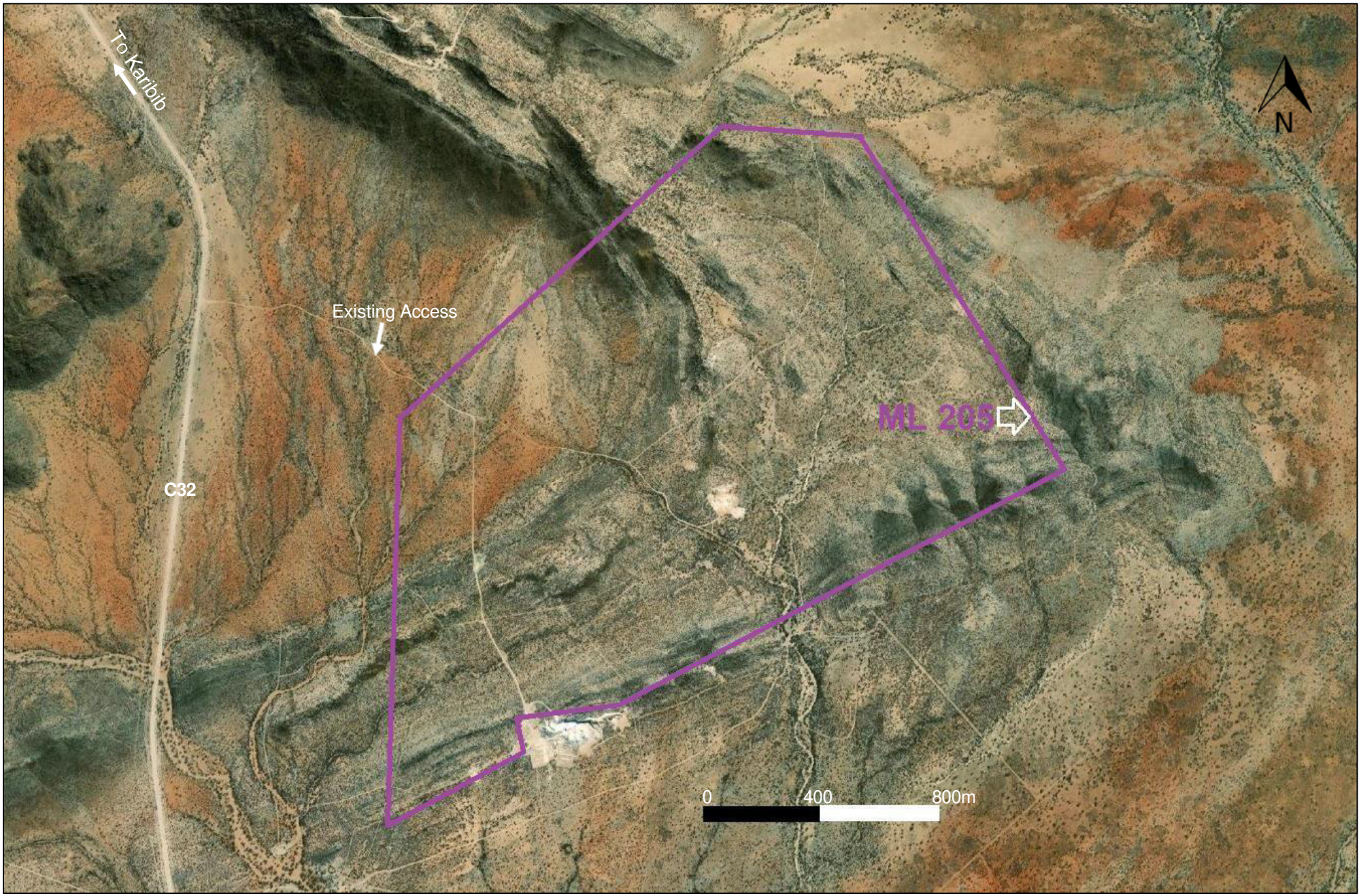

Figure 5: Detailed location of the 502 Ha ML 205 area with respect to the existing access roads and quarries / excavations in the area (Source: Google Earth, 2021).

1.4.2 Current Land Uses

The ML 205 area is primarily utilized for agricultural activities, with a significant emphasis on livestock farming, including both cattle and small stock (sheep and goats). This agricultural use forms the economic backbone of the region, contributing to both local subsistence and the broader commercial market.

In addition to agriculture, the area is known for its substantial mineral resources, particularly dimension stone mining. This includes the extraction of high-quality marble and granite, which are important for both domestic use and international export. The mining activities are carefully regulated to ensure minimal environmental impact and to maintain the ecological balance of the region.

While direct commercial activities such as Safari Game Farms or Game Hunting Farms are not present within the ML 205 boundary, they are prevalent in the surrounding areas and contribute significantly to the region's economy. These enterprises not only support local employment but also enhance tourism and conservation efforts. Farms like Etusis Lodge offer lodging and facilitate a range of tourism-related services that promote the Erongo Region as a key destination for nature enthusiasts. The lodge and similar facilities are instrumental in drawing visitors for both leisure and adventure tourism, including hiking, bird watching, and photographic safaris.

The game farms in the vicinity play a crucial role in environmental conservation. They act as managed reserves for endemic and protected flora, providing critical habitats for a variety of plant species that contribute to the biodiversity of the area. Moreover, these farms serve as sanctuaries for several endangered faunal species, ensuring their protection and contributing to global conservation efforts.

Tourism activities in these game farms are diverse and tailored to different visitor interests. They offer extensive game viewing opportunities, where tourists can observe a variety of wildlife in their natural habitats. Additionally, these farms provide specially designed trails for hiking and exploration, which allow visitors to experience the natural beauty of the landscape intimately. Hunting activities are also available, managed under strict regulations to ensure sustainable practice and conservation of wildlife populations.

Beyond these primary uses, the land surrounding the ML 205 area hosts a mix of other activities that contribute to the region's socioeconomic fabric. The nearby Karibib Townlands are a hub for both residential and light industrial activities. The area is also a focal point for further prospecting, which aims to evaluate the potential for future mining projects. These prospecting activities are critical as they help delineate areas with viable mineral deposits for both small-scale and large-scale mining operations. Additionally, quarry operations in the region extract various stones and minerals essential for construction and other industries, further diversifying the land use and economic activities in the area.

Overall, the ML 205 and its surrounding areas represent a dynamic landscape where agriculture, mining, tourism, and conservation coexist and interact in complex ways. This multifaceted land use framework supports the regional economy while also promoting sustainable practices and biodiversity conservation.

Figure 6: Current operations at the project site

1.4.3 Supporting Infrastructure and Services

The ML area is accessible via the B2 road linking the towns of Okahandja and Karibib, the C32 road link the town of Karibib to the ML 205 area (Figs. 2- 5). The Town of Karibib is the nearest town to the ML 205 (Figs 2 - 5). The ongoing mining and exploration operations will not require major water and energy resources.

Water requirements for will be provided from the available local water resources supplied by private boreholes to be drilled with permission from the Department of Water Affairs (DWA) in the Ministry of Agriculture, Water and Land Reform (MAWLR). Electricity needs will be supplied by generators and solar installations while diesel and petrol will be the main sources of fuels and readily available in the Town of Karibib.

Figure 7: Access Road to site and installed hazard signage on site

2. THE EMP FRAMEWORK

2.1 Summary Objectives

This Environmental Management Plan (EMP) provides a detailed plan of actions required in the implementation of the mitigation measures for minimising and maximising the identified negative and positive impacts respectively. The EMP also provides the management actions with roles and responsibilities requirements for the successful implementation of environmental management strategies by the Ludi Namibia Mining and Investments (Pty) Ltd.

2.2 Limitations of this EMP

This Environmental Management Plan (EMP) is designed to address the environmental management requirements specific to the mining operations, ongoing exploration activities, and supporting activities within Mining License 205 (ML 205). Additionally, this EMP encompasses the protocols for the transportation of marble blocks from the mine to the processing plant. However, there are several aspects and stages of the broader operational process that this EMP does not cover, which are crucial for stakeholders to understand.

2.2.1 Excluded Activities:

- **Processing of Marble at Offsite Locations:** The activities related to the processing of mined marble blocks at external facilities located in Karibib and Walvis Bay are outside the scope of this EMP. Processing activities typically include cutting, polishing, and treating marble, which can involve substantial water usage, chemical treatments, and waste management challenges that require separate environmental considerations and management strategies.
- **Transportation of Finished Products:** This EMP does not address the environmental aspects associated with the transportation of the finished marble products from the processing plants in Karibib and Walvis Bay to their final destinations. The transport of finished products, especially to export markets via the Port of Walvis Bay, involves logistical activities that can impact road traffic, air quality due to emissions, and potential accidents leading to environmental hazards.

2.2.2 Rationale for Exclusions:

- **Specialized Operations Require Specific Plans:** The processing of marble and the transportation of finished products involve distinct environmental impacts and regulatory requirements that differ significantly from those associated with mining and initial block transportation. These processes are often managed under separate operational controls and require specialized environmental management plans to address site-specific and activity-specific impacts effectively.
- **Regulatory and Compliance Considerations:** The environmental regulations governing the processing of marble may differ from those applicable to mining due to the nature of the emissions and waste produced. Similarly, the transportation of finished products involves regulatory considerations such as road safety, vehicle emissions standards, and potential impacts on urban environments, which are managed under different frameworks.
- **Stakeholder Engagement and Responsibility:** Different stakeholders are involved in the processing and transportation stages, each with their own operational scopes and environmental management responsibilities. Comprehensive management of these stages requires coordination beyond the scope of this EMP, typically involving local authorities, environmental agencies, and third-party logistics companies.

2.2.3 Implications of Limitations:

Stakeholders should note that while this EMP provides a framework for managing the environmental aspects of mining operations and the primary transportation of marble blocks within ML 205, it does not extend to the downstream processes. Stakeholders involved in the processing and further transportation of marble products must ensure that separate environmental management strategies are developed and implemented in compliance with national and local environmental regulations to mitigate any adverse

impacts associated with these activities.

2.3 EMP Management Linkages

The Environmental Management Plan (EMP) detailed in this report is constructed upon the comprehensive evaluations conducted in the Environmental Impact Assessment (EIA) Report. This plan delineates strategies and measures to mitigate, monitor, and manage environmental impacts associated with the ongoing mining and exploration activities of Ludi Namibia Mining and Investments (Pty) Ltd.

Continuous Updating of EMP: It is imperative that the EMP undergo continuous updates to reflect any changes, new environmental findings, or technological advancements that occur during the operational phase of the mining project. This dynamic updating ensures that the EMP remains relevant and effective in mitigating environmental impacts throughout the lifecycle of the mining and exploration operations.

Integration with Company's EMS: The EMP is an integral component of the broader Environmental Management System (EMS) employed by Ludi Namibia Mining and Investments (Pty) Ltd. The EMS is a structured system designed to systematically manage and reduce environmental impacts associated with the company's activities. By incorporating the EMP into the EMS, the company ensures that environmental management is holistically approached and consistently aligned with the corporate environmental policy.

Alignment with Corporate Environmental Policy: The EMP is developed in strict adherence to the existing Environmental Policy of Ludi Namibia Mining and Investments (Pty) Ltd. This policy outlines the company's commitment to environmental stewardship and sustainable development. The EMP reflects this commitment by including specific environmental objectives and targets that are aligned with the corporate policy.

Compliance with Local and International Standards: The EMP adheres to all relevant Namibian environmental regulations and policies. This compliance ensures that the mining operations meet local legal requirements and contribute positively to national environmental goals. Furthermore, the EMP integrates international environmental best practices particularly relevant to mining development. This includes practices across all phases of mining, from development to operational processes, and extends through to rehabilitation, closure, and aftercare activities.

2.4 The EMP Framework

An Environmental Management Plan (EMP) is one of the most important outputs of the environmental assessment process and is the synthesis of all the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. The aim of the EMP is to assist Ludi Namibia Mining and Investments (Pty) Ltd Energy (Pty) Ltd (the Proponent), Contractors and Subcontractor to ensure that the day-to-day operations as well as medium to long term strategies are carried out in an environmentally responsible manner, thereby preventing, or minimizing the negative effects and maximizing the positive effects of the project-related activities on the natural environment.

It's highly imperative that there is an effective and response organisational structure of Ludi Namibia Mining and Investments (Pty) Ltd that defines the roles, responsibilities and authority to implement the provisions of this EMP. The summary of such a structure is shown in Fig. 2.1. Provision has also been made, on an ongoing basis, for sufficient management support and human and financial resources. Separate EMPs have been prepared for the project: an EMP for the upgrade and/or construction, including rehabilitation, of access road(s) to and from the ongoing mining and exploration operations. and EMPs for the Construction, Operations and Decommissioning/Closure / Aftercare Phases of the ongoing mining and exploration operations.

The EMPs are presented as comprehensive matrices: for each **Activity**/**Process** and related **Aspects** (defined by the International Organization for Standardization ISO 14001:2004 as *element of an*

organization's activities or products or services that can interact with the environment. environment is defined as *surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation*) and **Impacts** (*any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects*), **Management Actions** required to address the impacts arising directly and indirectly from the various aspects of the ongoing mining project, with **Responsible Persons** and **Timing** for each, are listed.

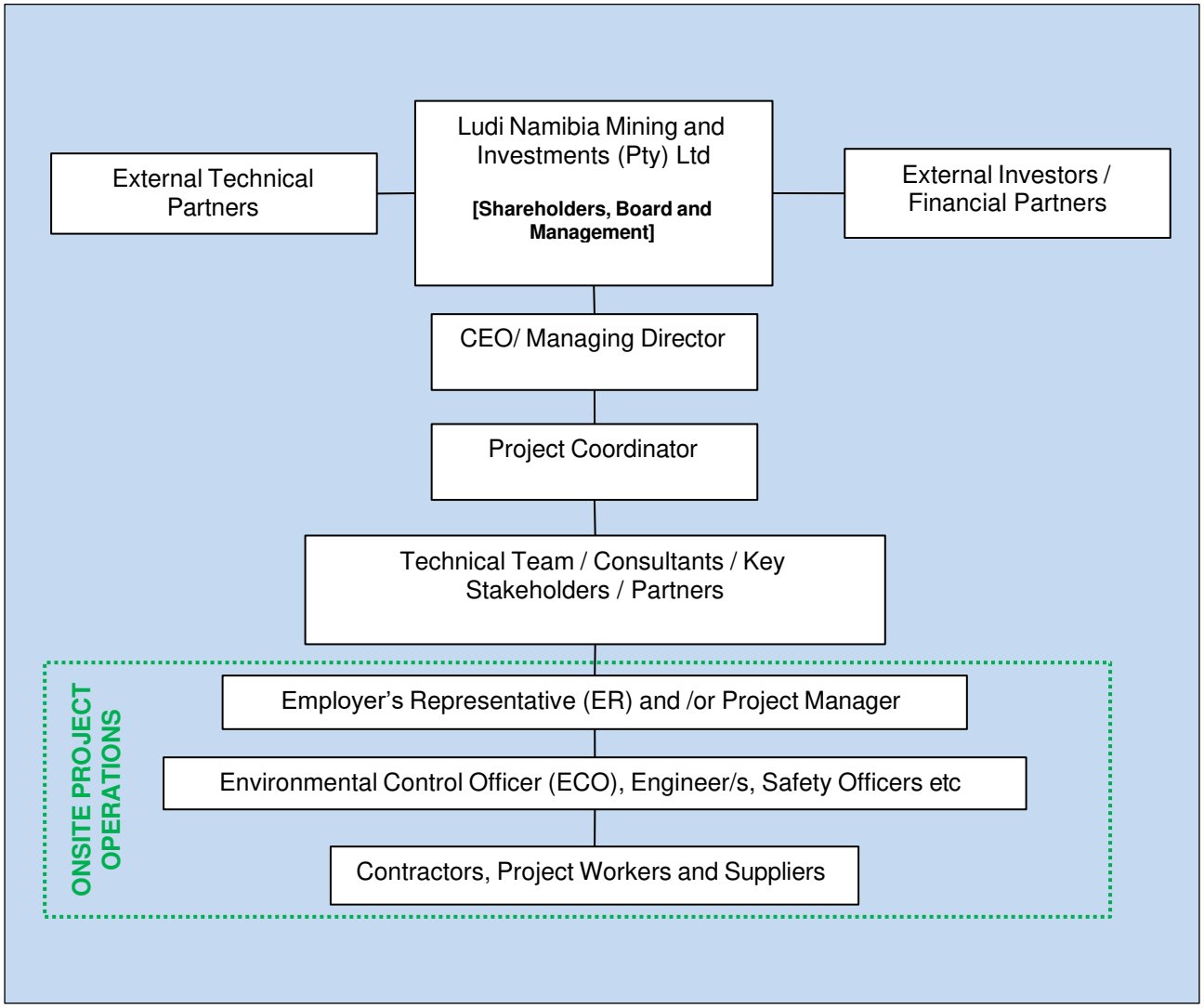

Figure 8: Ludi Namibia Mining and Investments (Pty) Ltd organisational structure for the ongoing mining operations with respect to the implementation of the EMP.

2.5 Summary of Impacts Assessment Methodology

The following is the summary of the ongoing mining operations developmental stages that have been assessed in this environmental assessment process covering the EIA and the development of the EMP phases:

(i) Preconstruction.

(ii) Construction.

(iii) Operation, ongoing exploration, monitoring and rehabilitation.

(iv) Decommissioning, closure and aftercare.

The detailed outline of all the activities associated with each of the above project developmental stages as sources of potential environmental impacts are outlined in Table 2. The impact assessment methodology has adopted a two-dimensional matrix approach in predicting the potential impacts of the ongoing mining operations on the receiving environment. The two-dimensional matrix consisted of the following cross-referencing:

- The activities linked to the project that are supposed to have an impact on man and the environment.

- The existing environmental and social conditions that could possibly be affected by the project.

The impact assessment considerations included land disturbance/land use impacts. potential impacts to specially designated areas. impacts to soil, water, and air resources. impacts to vegetation, wildlife, wildlife habitat, and sensitive species. visual, cultural, paleontological, socioeconomic and potential impacts from hazardous materials.

2.6 Summary of Impact Assessment Results

To ascertain the likely environmental impacts and the overall significance of impacts from individual sources associated with the ongoing marble mining, exploration operations, and supporting infrastructure activities within Mining License 205 (referenced in Table 2), a comprehensive impact identification and assessment process was conducted as elaborated in the Environmental Impact Assessment (EIA) report.

2.6.1 Impact Identification and Assessment Process

The methodology for assessing impacts involved a detailed environmental interaction approach, emphasizing the relationships between ongoing mining operations and the receiving environment. This methodological framework was designed to systematically identify and evaluate potential impacts arising from the project. The process included:

1. **Source-Pathway-Receptor Analysis:** This approach helped in tracing how various activities associated with marble mining (the sources) affect the environment (the receptor) through different pathways. For example, dust generation from mining activities could travel through the air and impact local air quality or settle on nearby vegetation.

2. **Scoping and Screening:** Initial scoping sessions were conducted to identify relevant environmental factors and focus the assessment on significant environmental issues. Screening was used to determine the need for detailed studies based on potential impacts' significance and scale.

3. **Baseline Data Collection:** Gathering comprehensive baseline data was crucial to understand the pre-existing environmental conditions. This data served as a benchmark against which potential impacts of the project were measured.

4. **Impact Prediction and Evaluation:** Using both qualitative and quantitative methods, predictions

were made about the nature and magnitude of potential impacts. These predictions were based on a combination of field data, scientific literature, and predictive models.

5. **Significance Assessment:** The significance of identified impacts was evaluated considering their magnitude, duration, frequency, and reversibility. This assessment also considered the mitigation measures that could be implemented to reduce adverse impacts.

2.6.2 Results of the Impact Assessment

The results from this rigorous assessment process are presented in Table 3, which details the overall impacts and key issues associated with ongoing mining operations and potential sources of impact concerning the receiving environment. This includes impacts to air quality, water resources, soil stability, flora and fauna, and socio-economic conditions.

The EIA process focused particularly on the interactions of the mining activities with the environment, pathways of potential impacts, and likely targets or receptors such as local communities, ecosystems, and economic sectors. The assessment delineated impacts across various developmental stages of the project:

- **Pre-construction:** Site clearing and preparation impacts.
- **Construction:** Impacts from the construction of infrastructure such as access roads and processing facilities.
- **Operation:** Continuous impacts from mining operations, including noise, dust, and water pollution.
- **Ongoing Exploration:** Impacts from exploratory drilling and sampling.
- **Monitoring and Rehabilitation:** Ongoing environmental monitoring and progressive rehabilitation impacts.
- **Decommissioning, Closure, and Aftercare:** Long-term impacts post-mining, focusing on site restoration and monitoring residual impacts.

Each stage was analyzed for its potential to impact the environment negatively, with specific attention to cumulative and synergistic effects when combined with other local or regional development activities.

2.6.3 Documentation

The detailed findings, including methodological approaches, data collected, impact predictions, and mitigation strategies, are systematically documented in the EIA report. Tables 3 and 4 provide a summary of key potential environmental concerns expected during different project stages, as well as proposed mitigation and management strategies to minimize adverse impacts effectively.

Table 2: Outline of the ongoing mining and exploration operations and all the associated activities as sources of potential environmental impacts.

PROJECT PHASE	DEVELOPMENT ACTIVITIES FOR EACH PHASE	
PRECONSTRUCTION	1. General site clearing, administration block, waste rock, supporting infrastructure (Office blocks, water, and electricity) other site infrastructure	
	2. Access roads clearing / upgrading 3.	
	4. Top soil removal and storage	
	5. Development of the temporary construction camp	
	6. Installation of campsites, offices, workshops, storage facilities.	
CONSTRUCTION	MINE SUPPORTING INFRASTRUCTURE	1. Transportation facilities, including access roads to the site and on-site roads
		2. Supporting site infrastructure including foundations and fencing
		3. Waste rock stockpiles
		4. Groundwater water supply systems
		5. Local generator areas for power infrastructure
		6. Administration blocks
		7. Fuel supply and storage / yard
		8. Workshop and equipment maintenance facilities
		9. Wastewater treatment systems
		10. Solid waste transfer facility (No Municipal Waste disposal shall be developed on Site)
		11. Storm water management around the pit, waste rock and supporting infrastructure
	MINE WORKINGS	1. Excavation as maybe required to create direct access to the marble
		2. Actual pit excavation and stripping of the overburden to create direct access to fresh marble
		3. Marble production for test mining operations
		4. Test mining and commissioning
OPERATION, ONGOING MONITORING AND REHABILITATION	1. Mining operations (actual mining operations including excavation as maybe required)	
	2. Transportation of the mined materials from pit to the yard for sorting	
	3. Transportation of the 5m^3 mined marble blocks to the sorting yard / storage facility and later to be further transported for processing in either Karibib or Walvis Bay	
	4. Operations of the waste rock	
	5. Ongoing exploration support	
	6. Ongoing rehabilitation and maintenance	
	7. Waste water and sludge management	
	8. Environmental Monitoring on the overall receiving environment	
DECOMMISSIONI NG CLOSURE AND AFTERCARE	1. Implementation of sustainable socioeconomic plan	
	2. Closure of open pits through backfill and fencing	
	3. Closure of waste rock stockpile and used for backfilling	
	4. Closure of storage, yard and municipal solid waste transfer sites	
	5. Decommissioning of water and electricity infrastructure	
	6. Overall land reclamation	
	7. Restoration of internal roads	
	8. Revegetation and aftercare as may be required	

Table 3: Matrix impact assessment results of the ongoing mining, exploration and supporting infrastructure activities.

SCALE	DESCRIPTION
0	no observable effect
1	low effect
2	tolerable effect
3	medium high effect
4	high effect
5	very high effect (devastation)

				RECEPTORS / TARGETS THAT MAY BE IMPACTED							
				PHYSICAL AND SOCIOECONOMIC ENVIRONMENT				BIOLOGICAL ENVIRONMENT			
SOURCES OF POTENTIAL IMPACT	PROJECT DEVELOPMENT PHASE	ACTIVITIES		Natural Environment – Air, Noise, Water, Green Space	Built Environment – Houses, Transport Systems,	Socioeconomic- Job, Investment, Taxes and Social Issues e.g. HIV&Aids	Archaeological and Cultural Resources	Flora	Fauna	Habitat	Ecosystem - Services, function, use values and non-use
	PRE-CONSTRUCTION	1. General site clearing, administration block, waste rock, supporting infrastructure		3 (-)	1 (-)	3 (+)	3 (-)	3 (-)	3 (-)	3 (-)	3 (-)
		2. Access roads clearing / upgrading		3 (-)	1 (-)	3 (-)	3 (-)	3 (-)	3 (-)	3 (-)	3 (-)
		3. Top soil removal and storage		3 (-)	1 (-)	3 (+)	1 (-)	3 (-)	3 (-)	3 (-)	3 (-)
		4. Development of the temporary construction camp		3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		5. Installation of campsites, offices, workshops, storage facilities.		3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
	CONSTRUCTION	MINE SUPPORTING INFRASTRUCTURE	1. Transportation facilities, including access roads to the site and on-site roads	3 (-)	1 (-)	3 (+)	1 (-)	3 (-)	3 (-)	3 (-)	3 (-)
			2. Supporting site infrastructure	3 (-)	1 (-)	3 (+)	1 (-)	3 (-)	3 (-)	3 (-)	3 (-)
			3. Waste rock stockpiles	3 (-)	1 (-)	3 (+)	1 (-)	3 (-)	3 (-)	3 (-)	3 (-)
			4. Groundwater water supply systems	3 (-)	1 (-)	3 (+)	1 (-)	3 (-)	3 (-)	3 (-)	3 (-)
			5. Local generator areas for power infrastructure	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
			6. Administration blocks	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
			7. Fuel supply and storage / yard	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
			8. Workshop and equipment maintenance facilities	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
			9. Wastewater treatment systems	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
			10. Solid waste transfer facility	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
			11. Storm water management around the pit, waste rock and supporting infrastructure	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		MINE WORKINGS	1. Excavation as maybe required to create direct access to the marble	3 (-)	1 (-)	3 (+)	1 (-)	3 (-)	3 (-)	3 (-)	3 (-)
			2. Actual pit excavation and stripping of the overburden to create direct access to fresh marble	3 (-)	1 (-)	3 (+)	1 (-)	3 (-)	3 (-)	3 (-)	3 (-)
			3. Marble production for test mining operations	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)
			4. Test mining and commissioning	3 (-)	1 (-)	3 (+)	1 (-)	2(-)	2(-)	2(-)	2(-)

Table 3: Cont.

SCALE	DESCRIPTION
0	no observable effect
1	low effect
2	tolerable effect
3	medium high effect
4	high effect
5	very high effect (devastation)

SOURCES OF POTENTIAL IMPACT	PROJECT DEVELOPMENT PHASE	ACTIVITIES	RECEPTORS / TARGETS THAT MAY BE IMPACTED: PHYSICAL AND SOCIOECONOMIC ENVIRONMENT: Natural Environment – Air, Noise, Water, Green Space	Built Environment – Houses, Transport Systems,	Socioeconomic- Job, Investment, Taxes and Social Issues e.g. HIV&Aids	Archaeological and Cultural Resources	BIOLOGICAL ENVIRONMENT: Flora	Fauna	Habitat	Ecosystem - Services, function, use values and non-use
	OPERATION, ONGOING MONITORING AND REHABILITATION	1. Mining operations (actual mining operations including excavation as maybe required)	3(-)	0(-)	3(+)	1 (-)	1(-)	2(-)	1(-)	1(-)
		2. Transportation of the mined materials from pit to the yard for sorting	3(-)	1(-)	3(+)	1 (-)	1(-)	2(-)	1(-)	1(-)
		3. Transportation of the 5m^3 mined marble blocks to the sorting yard / storage facility and later to be further transported for processing in either Karibib or Walvis Bay	3(-)	1(-)	3(+)	1 (-)	1(-)	2(-)	1(-)	1(-)
		4. Operations of the waste rock	3(-)	0(-)	3(+)	1 (-)	1(-)	2(-)	1(-)	1(-)
		5. Ongoing exploration support	3(-)	0(-)	3(+)	1 (-)	1(-)	2(-)	1(-)	1(-)
		6. Ongoing rehabilitation and maintenance	2(-)	0(-)	3(+)	1 (-)	1(-)	2(-)	1(-)	1(-)
		7. Waste water and sludge management	2(-)	0(-)	3(+)	1 (-)	1(-)	2(-)	1(-)	1(-)
		8. Environmental Monitoring on the overall receiving environment	1(-)	0(-)	3(+)	1 (-)	1(-)	2(-)	1(-)	1(-)
	DECOMMISSIONING CLOSURE AND AFTERCARE	1. Implementation of sustainable socioeconomic plan	0(-)	0(-)	3(+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		2. Closure of open pits through backfill and fencing	3(-)	0(-)	3(+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		3. Closure of waste rock stockpile and used for backfilling	3(-)	0(-)	3(+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		4. Closure of storage, yard and municipal solid waste transfer sites	3(-)	0(-)	3(+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		5. Decommissioning of water and electricity infrastructure	2(-)	0(-)	3(+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		6. Overall land reclamation	2(-)	0(-)	3(+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		7. Restoration of internal roads	2(+)	0(-)	3(+)	1 (-)	2(-)	2(-)	2(-)	2(-)
		8. Revegetation and aftercare as may be required	2(-)	0(-)	3(+)	1 (-)	2(-)	2(-)	2(-)	2(-)

Table 4: Significant matrix impact assessment results for mining, exploration and supporting infrastructure activities.

IMPACT SEVERITY	IMPACT LIKELIHOOD: Extremely Unlikely [0]	Unlikely [1]	Low Likelihood [2]	Medium Likelihood [3]	High Likelihood [4]
Slight [A]	[A0]	[A1]	[A2]	[A3]	[A4]
Low [B]	[B0]	[B1]	[B2]	[B3]	[B4]
Medium [C]	[C0]	[C1]	[C2]	[C3]	[C4]
High [D]	[D0]	[D1]	[D2]	[D3]	[D4]

SOURCES OF POTENTIAL IMPACT	PROJECT DEVELOPMENT PHASE	ACTIVITIES			RECEPTORS / TARGETS THAT MAY BE IMPACTED: PHYSICAL AND SOCIOECONOMIC ENVIRONMENT: Natural Environment – Air, Noise, Water, Green Space	Built Environment – Houses, Transport Systems,	Socioeconomic- Job, Investment, Taxes and Social Issues e.g. HIV&Aids	Archaeological and Cultural Resources	BIOLOGICAL ENVIRONMENT: Flora	Fauna	Habitat	Ecosystem - Services, function, use values and non-use
	PRE-CONSTRUCTION	1. General site clearing, administration block, waste rock, supporting infrastructure			B4 (-)	A1(-)	D3 (+)	A1(-)	B4 (-)	B4 (-)	B4 (-)	B4 (-)
		2. Access roads clearing / upgrading			B4 (-)	A1(-)	D3 (+)	A1(-)	B4 (-)	B4 (-)	B4 (-)	B4 (-)
		3. Top soil removal and storage			B4 (-)	A1(-)	D3 (+)	A1(-)	B4 (-)	B4 (-)	B4 (-)	B4 (-)
		4. Development of the temporary construction camp			B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
		5. Installation of campsites, offices, workshops, storage facilities.			B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
	CONSTRUCTION	MINE SUPPORTING INFRASTRUCTURE	1.	Transportation facilities, including access roads to the site and on-site roads	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			2.	Supporting site infrastructure	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			3.	Waste rock stockpiles	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			4.	Groundwater water supply systems	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			5.	Local generator areas for power infrastructure	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			6.	Administration blocks	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			7.	Fuel supply and storage / yard	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			8.	Workshop and equipment maintenance facilities	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			9.	Wastewater treatment systems	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			10.	Solid waste transfer facility	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
			11.	Storm water management around the pit, waste rock and supporting infrastructure	B4 (-)	A1(-)	D3 (+)	A1(-)	B3(-)	B3(-)	B3(-)	B3(-)
		MINE WORKINGS	1.	Excavation as maybe required to create direct access to the marble	B4 (-)	A1(-)	D3 (+)	A1(-)	B4 (-)	B4 (-)	B4 (-)	B4 (-)
			2.	Actual pit excavation and stripping of the overburden to create direct access to fresh marble	B4 (-)	A1(-)	D3 (+)	A1(-)	B4 (-)	B4 (-)	B4 (-)	B4 (-)
			3.	Marble production for test mining operations	B4 (-)	A1(-)	D3 (+)	A1(-)	B4 (-)	B4 (-)	B4 (-)	B4 (-)
			4.	Test mining and commissioning	B4 (-)	A1(-)	D3 (+)	A1(-)	B4 (-)	B4 (-)	B4 (-)	B4 (-)

Table 4: Cont.

IMPACT SEVERITY	IMPACT LIKELIHOOD: Extremely Unlikely [0]	Unlikely [1]	Low Likelihood [2]	Medium Likelihood [3]	High Likelihood [4]
Slight [A]	[A0]	[A1]	[A2]	[A3]	[A4]
Low [B]	[B0]	[B1]	[B2]	[B3]	[B4]
Medium [C]	[C0]	[C1]	[C2]	[C3]	[C4]
High [D]	[D0]	[D1]	[D2]	[D3]	[D4]

SOURCES OF POTENTIAL IMPACT	PROJECT DEVELOPMENT PHASE	ACTIVITIES	RECEPTORS / TARGETS THAT MAY BE IMPACTED: PHYSICAL AND SOCIOECONOMIC ENVIRONMENT: Natural Environment – Air, Noise, Water, Green Space	Built Environment – Houses, Transport Systems,	Socioeconomic- Job, Investment, Taxes and Social Issues e.g. HIV&Aids	Archaeological and Cultural Resources	BIOLOGICAL ENVIRONMENT: Flora	Fauna	Habitat	Ecosystem - Services, function, use values and non-use
	OPERATION, ONGOING MONITORING AND REHABILITATION	1. Mining operations (actual mining operations including excavation as maybe required)	C3(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		2. Transportation of the mined materials from pit to the yard for sorting	C3(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		3. Transportation of the 5m^3 mined marble blocks to the sorting yard / storage facility and later to be further transported for processing in either Karibib or Walvis Bay	C3(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		4. Operations of the waste rock	C3(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		5. Ongoing exploration support	C3(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		6. Ongoing rehabilitation and maintenance	B2 (-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		7. Waste water and sludge management	B2 (-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		8. Environmental Monitoring on the overall receiving environment	A1(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
	DECOMMISSIONING CLOSURE AND AFTERCARE	1. Implementation of sustainable socioeconomic plan	C3(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		2. Closure of open pits through backfill and fencing	C3(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		3. Closure of waste rock stockpile and used for backfilling	B4 (-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		4. Closure of storage, yard and municipal solid waste transfer sites	B4 (-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		5. Decommissioning of water and electricity infrastructure	B4 (-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		6. Overall land reclamation	B4 (-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		7. Restoration of internal roads	A1(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)
		8. Revegetation and aftercare as may be required	C3(-)	A1(-)	D3 (+)	A1(-)	A1(-)	A1(-)	A1(-)	A1(-)

Table 5: Summary of the selected key potential environmental impacts likely to be associated with ongoing marble mining, ongoing exploration, and infrastructural supporting activities in the ML 205.

ENVIRONMENTAL IMPACT OR ISSUE	SIGNIFICANCE RATING BEFORE & AFTER MITIGATION
1. Impacts on air quality: dust (PM_{10} & dust outfall including metals)	Medium (-) Low with mitigation
2. Impacts on soil / habitats/ ecosystem	Medium (-) Low with mitigation
3. Impacts on flora / habitats/ ecosystem	Low (-) Can be avoided
4. Impacts on invertebrates/ habitats/ ecosystem	Medium (-) Probably reducible
5. Impacts on reptiles/ habitats/ ecosystem	Medium (-) Probably reducible
6. Impacts on birds/ habitats/ ecosystem	Medium (-) Low with mitigation
7. Impacts on mammals/ habitats/ ecosystem	Medium (-) Low with mitigation
8. Impact on groundwater levels / resource	Low (-)
9. Impacts on groundwater quality (offices, ablutions, waste, refueling)	Medium (-) Low if mitigated
10. Impacts on groundwater quality	Medium (-) Low if mitigated
11. Impacts on groundwater quality (from rock waste drainage)	Medium (-) Low if mitigated
12. Impacts on volumes of surface runoff	Low (-)
13. Impacts on surface water quality	Medium (-) Low if mitigated
14. Impacts of solid and liquid waste	Medium (-) Low if fully compliant
15. Electricity demand	Low (-) but may be further reduced
16. Visual impacts and lighting	Medium (-) Low with mitigation
17. Impacts of water demand	Medium (-)
18. Impacts of water supply pipeline	Low (-) but may be further reduced
19. Road traffic and NamPort Walvis Bay Port	Low (-)
20. Mine rehabilitation, closure and aftercare	Medium (+) Must be a condition of approval
21. Local positive socioeconomic including benefits of direct employment	High (+) Medium term
22. Regional (Erongo region) and National (Namibia) overall positive socioeconomic benefits	High (+) Medium term
23. Impacts related to other land users / conflict / coexistence	Medium (-) Reducible to Low
24. Negative Socioeconomic and HIV/AIDS	Low (-)
25. Occupational Health and Safety	Low (-)
26. Emergency Response Plan	Low (-)

3. PRECONSTRUCTION TO MINE AFTERCARE EMP

3.1 Introduction

This section contains the Environmental Management Plan (EMP) for the preconstruction activities. The main activities of the preconstruction stage will be the bush clearing, upgrading and/or construction, including rehabilitation, of access road(s) to and from the ongoing mining and exploration operational areas as well as other mine supporting infrastructures. Table 2 outlines the EMP framework for the ongoing mining and exploration operations.

3.2 Roles and Responsibilities

3.2.1 Employer's Representative (ER) / Project Manager (PM)

Ludi Namibia Mining and Investments (Pty) Ltd is to appoint an **Employer's Representative (ER)** with the following responsibilities:

- Act as the Employer's (Ludi Namibia Mining and Investments (Pty) Ltd) on-site project manager and implementing agent.
- Appoint the Environmental Control Officer (ECO).
- Ensure that the Employer's responsibilities are executed in compliance with the relevant legislation and the EMP for the preconstruction stage).
- Ensure that all the necessary environmental authorizations and permits have been obtained.
- Assist the Contractor in finding environmentally responsible solutions to challenges that may arise (with input from the ECO).
- Should the ER believe a serious threat to, or impact on the environment may be caused by the construction operations, he/she may stop work. the Employer must be informed of the reasons for the stoppage as soon as possible.
- The ER has the authority to issue fines for transgressions of basic conduct rules and/or contravention of the EMP.
- Should the Contractor or his/her employees fail to show adequate consideration for the environmental aspects related to the EMP, the ER can have person(s) and/or equipment removed from the site or work suspended until the matter is remedied.
- Report to the Employer on the implementation of this EMP on site (with input from the ECO and/or independent environmental auditor).
- Maintain open and direct lines of communication between the Employer, ECO, Contractor and Interested and Affected Parties (I&APs) with regards to environmental matters, and.
- Attend regular site meetings and inspections.

3.2.2 Environmental Control Officer (ECO)

The **Environmental Control Officer (ECO)** has the following responsibilities:

- Assist the ER in ensuring that the necessary environmental authorizations and permits have been obtained.
- Assist the ER and Contractor in finding environmentally responsible solutions to challenges that may arise.
- Conduct environmental monitoring as per EMP requirements.
- Recommend on the issuing of fines for transgressions of basic conduct rules and/or contraventions of the EMP to the ER.
- Advise the ER on the removal of person(s) and/or equipment not complying with the specifications of the EMP.
- Carry out regular site inspections (on average once per week) of all construction areas with regards to compliance with the EMP. report any non-compliance(s) to the ER as soon as possible.
- Organize for an independent internal audit on the implementation of and compliance to the EMP to be carried out half way through the construction period. audit reports to be submitted to the ER.
- Organize for an independent post-construction environmental audit to be carried out.
- Continuously review the EMP and recommend additions and/or changes to the EMP document.
- Monitor the Contractor's environmental awareness training for all new personnel coming onto site.
- Keep records of all activities related to environmental control and monitoring. the latter to include a photographic record of the preconstruction and environmental control and rehabilitation process, and a register of all major incidents, and.
- Attend regular site meetings.

3.2.3 Contractors and Subcontractors

The responsibilities of the **Contractors and Subcontractors** include:

- Comply with the relevant legislation and the EMP for the preconstruction activities.
- Preparation and submission to Ludi Namibia Mining and Investments (Pty) Ltd of the following Management Plans:
    - Environmental Awareness Training and Inductions.
    - Emergency Preparedness and Response
    - Waste Management, and.

- Health and Safety.

- Ensure adequate environmental awareness training for senior site personnel.

- Environmental awareness presentations (inductions) to be given to all site personnel prior to work commencement. the ECO is to provide the course content and the following topics, at least but not limited to, should be covered:

  - The importance of complying with the relevant Namibian, International and Best Practice Legislation.

  - Roles and Responsibilities, including emergency preparedness. Basic Rules of Conduct (Do's and Don'ts).

  - EMP: aspects, impacts and mitigation.

  - Fines for Failure to Adhere to the EMP, and.

  - Health and Safety Requirements.

- Record keeping of all environmental awareness training and induction presentations, and.

- Attend regular site meetings and environmental inspections.

3.3 Mitigation Measures for Significant Impacts

The impact assessment covered in the EIA and the mitigation measures presented in this Updated EMP reports have been undertaken in line with the following envisaged ongoing marble mining, ongoing exploration and supporting infrastructures developmental stages (ongoing mining operations project lifecycle):

(i) Preconstruction.

(ii) Construction.

(iii) Operation, ongoing monitoring and rehabilitation, and.

(iv) Decommissioning, closure and aftercare.

The following approach is taken regarding the concept of whether assessed key issues need to be actively addressed in the EMP:

- If environmental aspects are evaluated to be of low significance, they do not require specific management plans, and need not be actively addressed in the EMP (although they may still be listed and reported on).

- A decision on the need to actively address any issue with a "Medium" significance ranking will require consideration of other relevant factors, such as the nature of the impact, risks associated with possible cumulative aspects, and the degree of concern of stakeholders, and.

- If environmental aspects receive a "High" significance ranking, they must be addressed by means of active management, mitigation or rehabilitation measures.

For each negative impact of high or medium significance, mitigation objectives are set (i.e. ways of reducing negative impacts), and attainable management actions are subsequently addressed in the EMP for mining and prospecting. Without management, these impacts would either breach statutory limits or be unacceptable to statutory authorities or to stakeholders, as they would result in a significant deterioration of one or more environmental resources.

Based on the results of the impact assessment undertaken in the EIA report, the following is the summary of the key issues that have been assessed to have likely significance impacts on the receiving environment throughout the ongoing mining operations project lifecycle (Tables 6 - 20):

1. Pollution from routine operations and accidental incidences (Table 6).
2. Waste management (Table 7).
3. Stripping and stockpiling soils (Table 8).
4. Tracks and roads construction and access (Table 9).
5. Water abstraction and supply (Table 10).
6. Flora, habitat and ecosystem (Table 11).
7. Fauna habitat and ecosystem (Table 12)
8. Noise (Table 13)
9. Dust (Table 14)
10. Visual (Table 15).
11. Neighbouring communities and or the general public (Table 16).
12. Archaeological, historical, and cultural heritage resources (Table 17).
13. Office, workshop and all related sanitation (Table 18).
14. Final mine, exploration and supporting infrastructure rehabilitation, closure and aftercare (Table 19), and.
15. Mine components to be addressed in the ongoing and final mine closure plan (Table 20).

Detailed mitigation measures for each of the above (1) to 15) key issues have been prepared and presented in Tables 6 – 20 for implementation by the proponent.

Table 6: Pollution from routine operations and accidental incidences from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
1) Accidental/ Negligent Spillage's	Vehicles, earthmoving equipment	• Spillage's of any potentially toxic materials, whether by accident or through negligence, should be reported immediately and corrective action undertaken • Design structures and transfer equipment so as to avoid as much spillage's as possible • Train staff on how to make diesel/fuel transfer avoiding spillage's • Any spill should be cleaned up immediately by removing the spill together with the polluted soil and disposing of it at a recognised dumping facility to the satisfaction of the MET	Weekly monitoring of all equipment (visual check)	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
2) Workshop and Plant Area	Generators, vehicles, earthmoving equipment	• Oil traps will be installed in all appropriate places to collect potentially toxic materials • All diesel generators on site will be placed on concrete slabs • The entire work area of the workshop must be lined by concrete • Any runoff from the workshop/plant area, either arising from washdowns or rainfall, should be channelled into the pollution control pond	Weekly monitoring of the workshop and plant area (visual check)		

Table 7: Waste management from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
3) Domestic waste (visual and ecological impacts of refuse littering, domestic waste disposal)	Workforce	• Non-biodegradable and biodegradable refuse shall be stored in a container / refuse skip and collected on a regular basis and disposed of at a recognised disposal facility. Precautions shall be taken to prevent any refuse from spreading on and from the camp site. The container should also be covered with a mesh "lid" to control access by pest animals	Weekly monitoring of the containers/ when full transport it to a recognised waste disposal facility	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
4) Industrial waste (including scrap metal)		• Store the waste at a site close to the workshop • Remove it to a recognized waste disposal facility on a regular basis	Three monthly assessment of the generated quantities. Remove if more than $20m^3$		

Table 8: Stripping and stockpiling soils from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
5) Stripping and stockpiling (dust and covering of gravel areas with stockpiles)	New pits	• The upper layer of the soil will be valuable to the rehabilitation process because it contains a seedbank of dormant seeds. • This layer must be stripped and stockpiled separately • The soil stock pile will be surrounded by larger blocks to protect from wind erosion	Visual check on wind erosion/ control of plastic sheeting on a three monthly basis	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
6) Waste rocks (70% of mined pits)		• Design for closure principles • Separate waste rocks as well as stockpiled soils in order to allow easy rehabilitation • Follow closely the market demands in the world so as to avoid unnecessary storage of blocks	Measure the aerial extent and the height of the waste pile, at least once a year		

Table 9: Tracks and roads construction and access from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
7) Fixed route (potential damage to the substrate caused by heavy vehicles and off-road vehicles)	Vehicles, Trucks, Earthmoving equipment	• Haphazard driving across the veld where there are no existing routes must be avoided. • The use of fixed routes will reduce the visual impact and minimise the need for post-mining rehabilitation of the tracks	Weekly visual check	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
8) Road Safety (Safety of surrounding residents and land users, other motorists and animals must not be compromised by the vehicles associated with the mining operation)	Vehicles, Trucks, Earthmoving equipment	• Headlights must be switched on at all times • All vehicles, trucks moving in the mining area should not exceed 40km/h with warning and speed signs at relevant locations • All personnel responsible for driving the transport vehicles must be in a possession of a valid driver's licence • Access points off the gravel road to the mining area should be well signposted in advance	Daily monitoring (visual checks)		
9) Haul Road Utilisation (Source of various forms of pollution: dust, noise, visual)	Vehicles, Trucks, Earthmoving equipment	• Drivers may not exceed the general speed limit along the haul road of 40 km/h • There should be no littering along the road, dumping of waste and scrap, etc. and all drivers should be made aware of this	Daily monitoring (visual checks)		

Table 10: Water abstraction and supply from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
10) Water abstraction and pipelines	Mining activities	• Pipelines laid to a site shall be done in such a manner that the surface and natural vegetation are not unduly disturbed	Weekly visual checks on possible spillage's	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
11) Water effluent	Camp site and administration block	• All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain situated as far as possible, but not less than 50 m, from a stream, river, pan, dam or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, either for resale or for appropriate disposal at a recognised facility	Weekly inspections of the drain		
12) Water storage on Site	Reservoirs	• Concrete reservoir walls must be painted in a camouflage colour to aid in concealing it • Reservoirs should be covered to reduce evaporation • Reservoirs should not be visible from the main road	Weekly visual checks of the reservoirs		
13) Water conservation strategies (including recycling)	Work related cutting, cooling, washing,	• Water should be recovered from the cutting, cooling and washing stages • Advice the workforce to be sparing with the water for human consumption	Check the domestic water consumption on a three monthly basis		

Table 11: Flora, habitat and ecosystem from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
14) Preservation of communities (to ensure minimal disruption of important vegetation communities and valuable plant specimens)	Vehicles, trucks and earthmoving equipment Clearance for firewood	• Alternative fuel and/or power sources must be made available (paraffin stoves, diesel-driven generators) if workers are accommodated on site • No trees or shrubs will be felled or damaged for the purpose of obtaining firewood • Haphazard driving across the veld where there are no existing routes must be avoided	Daily inspections Weekly check whether the stock of alternative sources is sufficient	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
15) Sources of plant material for rehabilitation (to ensure the maximum use of the local plant material for rehabilitation process)	New pits	• Before new site construction begins, the upper layer of the soil must be stripped and stockpiled separately so that this layer can be utilised in the rehabilitation process	Visual check on wind erosion on a monthly basis		

Table 12: Fauna, habitat and ecosystem from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
16) Impacts on resident animals, habitat and overall ecosystem	Mining operations	• No hunting and trapping will be allowed • Fence off the pits (the fences must be sufficient to control the access of large and small animals) or alternatively put a berm with waste material	Weekly visual check of the fence	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line

Table 13: Noise from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
17) Impacts on adjacent settlements/ workforce	Generator, earthmoving equipment, cutting equipment, blasting	• The generator should be positioned away from the base camp and has boarding to help suppress noise • Blasting should be limited to the strict necessary and should be in compliance with the Explosive Act, 1961.	Weekly "hearing" check of the generator and other equipment (trucks/ cutting machinery)	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line

Table 14: Dust from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
18) Impacts on air quality in general/ flora & fauna/ workforce	Excavation areas including pits and trenches, vehicles	• The general speed limit on the haul road should be 40km/h if possible	Daily (visual) monitoring of transport activities and dust generation on the mine	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line

Table 15: Visual impacts from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
19) Impacts on surrounding land users/ tourists	Waste & stockpile dumps/ dust/ Infrastructure	• Sites to be established away from the tourist routes • Limit the height and aerial extent of the waste and stockpile dumps (may not visible from the road) • Ensure that all structure on site are blending with the surrounding landscape • Minimise dust generation from vehicles on the haul road so as not to draw attention to this area	Measure the aerial extent and the height of the waste pile, at least once a year Daily visual checks	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line

Table 16: Neighboring communities and or the general public from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
20) Informal settlements/ tourists	Noise/ dust/ visual impacts/ attitude	• Enhance communication with the neighbouring communities • Assist communities where possible	Visit the communities at least once a month to maintain good relationship	Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line

Table 17: Archaeological, historical and cultural heritage from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
21) Impacts on archaeological and cultural heritage sites	Mining, exploration blasting/ drilling	• Careful examination of the area before any blasting and/ or drilling is undertaken. Immediately advice the National Monuments Council if archaeological and/ or cultural heritage sites are found	Thorough inspection of rocks before any drilling and/ or blasting is undertaken	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line

Table 18: Office, workshop and all related sanitation from preconstruction to mine closure.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
22) Accommodation	Camp and office sites	• no camp or office site shall be located closer than 50 meters from a spring, river, dam or pan • The area required for the camp and office site must be kept to a minimum	Visual Inspection and Monthly Water Quality Test	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
23) Sanitation (Impacts on water pollution)	All staff	• Chemical toilet facilities (preferred) or other approved toilet facilities such as a septic drain shall be used and sited on the camp site in a way that they do not cause water or other pollution			

Table 19: Final mine, exploration and supporting infrastructure rehabilitation, closure and aftercare.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
24) Mining voids	Excavated trenches, pits, etc	• Refill pit alternately with waste and not saleable stockpiled blocks and smaller fragments of larger blocks. This systematic replacement can only be achieved if the different fractions are separated during excavations (design for closure principle) • Cover refilled rock waste with saved topsoil, complemented if necessary by scraping the area adjoining the pit on the condition that no vegetation is cleared for this operation	All rehabilitated areas should be monitored over a 4 year period from the onset of the rehabilitation procedures. The frequency of monitoring suggested is dependent on satisfactory performance. If however the requirements are not being met, the frequency	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
25) All waste and unwanted materials	Domestic and industrial waste	• Collect remaining domestic waste on site and transport it to a recognised disposal facility • Clean out the oil traps, collect the waste material in drums and transport to a recognised disposal facility • Manually remove all weedy species that are present at the site	Of monitoring can be increased. It is suggested that the monitoring be conducted once a year around January when the grasses are flowering. The rehabilitated areas can be monitored in two ways:		
26) All structures	Base camp constructions, workshop, processing plant, water tanks	• Upon cessation of all mining activities remove the workshop, surrounding fences, generators and any scrap material in the vicinity of the workshop • Seal all petrol, diesel, oil and grease containers and remove from the site to a recognised storage facility • Break up all concrete slabs and structures on site and transport the fragments to a suitable site for disposal or dump it in one of the pits. • Pending the approval by relevant authorities, the company may donate the remaining buildings, such as the workers quarters, office complex and the manager's house, to organizations aimed at uplifting the standards of the local communities	1. Sampling randomly located 1m^2 quadrats. Approximately 10 quadrats per hectare (or a minimum of 3) should be sampled per plant community. The factors that will be examined in each quadrate include: • Percentage basal cover • Percentage aerial cover • Species composition & diversity • Vigor and health of plants • Presence of and evidence of fauna • Nature of the substrate		

Table 19: Cont.

SIGNIFICANT ENVIRONMENTAL IMPACTS REQUIRING MITIGATION	SOURCES OF IMPACTS	MITIGATION MEASURES	MONITORING ACTIONS AND METHODS	RESPONSIBILITIES FOR IMPLEMENTATION	RESOURCES REQUIRED FOR THE IMPLEMENTATION
27) Stormwater channel (Diversion of the natural flow)	Channel	• Replace the subsoil layer by backfilling the soil on top of the overburden and contour • Cap the subsoil with a topsoil layer about 10cm deep • Cap the topsoil containing the seedbank with a layer of gravel by manually spreading the fragments across the surface using a rake	To enable a comparison, control plots located within the surrounding unmined areas should also be monitored. Approximately 5 to 10 quadrats of 1m^2 should be sampled per community type to set the controls.	(Proponent) Ludi Namibia Mining and Investments (Pty) Ltd (ECO, ER, PM, ENV)	Environmental Management Budget Line
28) All roads and substrate underlying the waste dumps, pipeline and areas covered by concrete	Vehicles and all (mining) infrastructure	• Rip the road surface/ substrate to a depth of at least 50 cm using a multi-toothed ripper and tractor or similar method • Disk the ripped surface to break up the clods • Cover with a layer of topsoil (if available) to a depth of about 10cm • Cap the topsoil containing the seedbank with a gravel layer by manually spreading the fragments across the surface using a rake	Photographic evidence at different rehabilitated places with a camera providing dates on the prints. Photographs should be taken every year around the same period at the same places and should be commented (visual observations)		

Table 20: Mine components to be addressed in the ongoing and final mine closure plan.

COMPONENTS	ASPECTS TO BE ADDRESSED
Open Pit Mines	○ Slope and bench stability ○ Groundwater and rainwater management ○ Security and unauthorized access ○ Wildlife entrapment ○ Effects of drainage into and from the pit
Ore Processing Facilities	○ Removal of buildings and foundations ○ Clean-up of workshops, fuel and reagent ○ Disposal of scrap and waste materials ○ Re-profiling and revegetation of site
Waste Rock Piles	○ Slope stability ○ Effects of leaching and seepage on surface and groundwater ○ Dust generation ○ Visual impact ○ Special considerations for some types of mines such as uranium mines
Water Management Facilities	○ Restoration or removal of dams, reservoirs, settling ponds, culverts, pipelines, spillways or culverts which are no longer needed ○ Surface drainage of the site and discharge of drainage waters ○ Maintenance of water management facilities
Landfill / Waste Disposal Facilities	○ Disposal or removal from site of hazardous wastes ○ Disposal and stability of treatment sludge ○ Removal of sewage treatment plant ○ Prevention of groundwater contamination ○ Prevention of illegal dumping ○ Security and unauthorized access
Infrastructure	○ Removal of power and water supply ○ Removal of haul and access roads ○ Reuse of transportation and supply depots

4. ENVIRONMENTAL PERFORMANCE MONITORING

4.1 Overview

The environmental monitoring process of the EMP performances for the ongoing marble mining operations, ongoing exploration and supporting infrastructures activities is divided into two parts and these are:

(i) Monitoring activities and effects to be undertaken by the Environmental Control Officer (ECO), and.

(ii) Preparation of an Environmental Monitoring Report covering all activities related to the Environmental Management Plan throughout the life cycle of the ongoing mining and exploration operations to be undertaken by the Environmental Control Officer (ECO).

4.2 Ongoing Environmental Monitoring Programme

The Environmental Management Plan (EMP) mandates the implementation of a robust and continuous environmental monitoring programme. This requirement is stipulated as a condition of the Environmental Clearance Certificate (ECC), which is issued by the Office of the Environmental Commissioner (OEC) within the Ministry of Environment, Forestry and Tourism. The purpose of this monitoring is to ensure compliance with environmental regulations and standards, assess the effectiveness of the implemented management measures, and facilitate adaptive management.

4.2.1 Key Components of the Monitoring Programme

1. **Comprehensive Monitoring Strategy:**
   - The environmental monitoring programme will be designed to cover all critical environmental aspects identified in the EMP. This includes monitoring of air and water quality, soil conditions, wildlife populations, and vegetation health, among others.
   - Specific monitoring protocols will be developed for each environmental component to ensure data consistency, reliability, and accuracy. These protocols will define the frequency of monitoring, methods to be used, and the parameters to be measured.
2. **Data Collection and Reporting:**
   - Systematic data collection is integral to the monitoring programme. Regular and systematic collection of environmental data will be performed using standardized methods approved by the OEC.
   - All collected data will be compiled into comprehensive reports that assess performance against the EMP's environmental objectives. These reports will be submitted periodically to the OEC as part of the compliance requirements.
3. **Roles and Responsibilities:**
   - The Environmental Control Officer (ECO), potentially in collaboration with external consultants or suitably qualified in-house resource personnel, will coordinate the monitoring activities. The ECO will ensure that all data collection and reporting are conducted according to the stipulated guidelines and within the required timeframes.
   - The ECO will also be responsible for maintaining records of all environmental monitoring activities, findings, and any corrective actions taken. Detailed logs will be kept as part of the continuous assessment process, ensuring that all environmental impacts are promptly addressed and documented.
4. **Performance Assessment and Auditing:**
   - The ongoing environmental monitoring programme includes both internal and external auditing mechanisms to verify compliance and efficacy of the EMP implementation.
   - Audits will be conducted to evaluate the adherence to the monitoring protocols, the accuracy of the environmental data, and the effectiveness of the environmental management measures in place. These audits will help in identifying any areas of non-compliance or opportunities for improvement.
5. **Documentation and Continuous Improvement:**

- The monitoring process will include the documentation of all environmental activities and their impacts. Table 21 in the EMP document outline the specific types of information that must be recorded regularly.
- This documentation will play a critical role in continuous improvement by providing a basis for evaluating the environmental performance of the project and making informed decisions on necessary adjustments in management practices.

4.2.2 Implementation Framework

The ongoing environmental monitoring programme is designed to be dynamic, allowing for adjustments based on the findings from continuous data analysis and environmental audits. The feedback mechanism incorporated into the programme will enable responsive actions that align with evolving environmental conditions and regulatory requirements.

In summary, the ongoing environmental monitoring programme as part of the EMP is a comprehensive effort aimed at ensuring sustained compliance with environmental standards and improving environmental performance over the life of the project. Through meticulous planning, systematic execution, and continuous evaluation, the programme seeks to uphold and enhance environmental integrity in line with national and international environmental commitments.

4.3 Closure Environmental Monitoring Programme

The monitoring of the EMP performance will require a report outlining all the activities related to effectiveness of the EMP at the end of the ongoing mining operations to be undertaken by the Environmental Control Officer (ECO). The types of the data sets to be used in the preparation of such a report are outlined in Table 21.

The objective will be to ensure that corrective actions are reviewed and steps are taken to ensure compliance for during the aftercare stage. The report shall outline the status of the environment and any likely environmental liability after completion of the mining operations. The report shall be submitted to the OEC in the Ministry of Environment, Forestry and Tourism.

Table 21:

Aspect	Mitigation	Compliance	Follow-up Action Required	By Whom	By When	Completed
Monitoring of environmental performance implementation / environmental awareness training	Is there an Environmental awareness training programme?					
	How many people have been given environmental awareness training?					
	Is a copy of the EMP on site?					
	How effective is the awareness training? Do people understand the contents of the EMP? Where are the weaknesses? Ask 3 people at random various questions about the EMP.					
Monitoring of environmental performance for the temporal and permanent structures.	Are the temporal and permanent structures positioned to avoid sensitive zones, ephemeral river channels and potential sensitive sites?					
	Has new infrastructure been created? If so, what, and how well planned / built with respect to environment?					
	Have toilets and showers been provided? Where are they situated?					
	Do receptacles for waste have scavenging animal proof lids?					
	What litter is there – who is littering?					

	Are there facilities for the disposal of oils / etc and how often is it removed to an approved disposal site?					
	Is there evidence of oil / diesel spills? Bunding or not?					
	What fuel source is being provided for cooking?					
	Housekeeping					
Environmental data collection.	Are records being kept?					
	Birds' mortality records as result of collision with the mine associated infrastructure?					
	Birds nesting activities around the mine site?					
	Noise level?					
	Air Quality?					
	Have archaeological sites been found / disturbed / described?					
	Other key environmental data sets?					
Health, Safety and ENvionment (HSE)	Is there First Aid Kit containing anti-histamines etc?					
	Are dangerous areas clearly marked off?					
	Do vehicles appear to maintain the recommended speed limits?					
	Do vehicles drive with headlights on along the gravel roads at all times?					
Recruitment of labour.	What labour source is used?					
	How has the recruitment practice been done?					

Management of the natural habitat and surficial materials management.	Has there been any development done on or very close sensitive areas?					
	Has anyone been caught with plants or animals in their possession?					
	Has there been wilful or malicious damage to the environment?					
	Has topsoil / seed bank layer been removed from demarcated development areas and appropriately stored?					
Tracks and off-road driving.	Are existing tracks used and maintained?					
	What new tracks have been developed and are they planned?					
	What evidence is there of off-road driving? Who appears to be responsible?					
	Are corners being cut, what type of turning circle are there? Three point turns vs. U turns?					
	Have unnecessary tracks been rehabilitated and how well?					
	Comments					
Management of surface and groundwater.	How is potable water supplied and how often? Position of tanks?					
	Is water being wasted?					
	Is there any leakage from pipes or taps?					
	Were water samples taken					

	regularly and measured?					
Public relations.	Have any complaints been made about the mine construction and or operational activities by the different I&APs? If so, what, and how was the issue resolved?					

5. ENVIRONMENTAL AWARENESS

5.1 Company / Proponent Environmental Policy

Table 22 below summarises the environmental statement with respect to environmental commitment that the Proponent, Ludi Namibia Mining and Investments (Pty) Ltd will implement as part of the company environmental policy.

Table 22: Environmental statement.

Ludi Namibia Mining and Investments (Pty) Ltd Environmental Statement
Ludi Namibia Mining and Investments (Pty) Ltd is Committed to: 1. Exercising appropriate environmental care in accordance with the provisions of the EMP as presented in Tables 6 - 20 from preconstruction to closure and aftercare stages. 2. Fully comply with all applicable environmental regulations in force in Namibia. 3. Delivery of significant socioeconomic benefits for through broad-based equity participation in the Project Development and Operation. 4. The promotion the development of open and constructive partnerships with the all the relevant stakeholders to address environmental concerns and advance necessary protection measures. 5. The advancement of scientific knowledge to be applied to the identification and effective resolution of environmental challenges associated with the ongoing mining operations. 6. Continuously encouraging Pollution Prevention (P2), Cleaner Production (CP), Waste Minimisation, Reuse and Recycling efforts, and. 7. Conducting regular internal and external audits of all our operations to ensure adherence to this policy and compliance to all relevant regulations throughout the life cycle of the ongoing mining operations.

5.2 Environmental Awareness Guidance

(i) The Environmental Rules apply to EVERYBODY. This includes all permanent, contract, or temporary workers as well as any other person who visits the mine site. Any person who visits the mine site will be required to adhere to the company Environmental Code of Conduct.

(ii) The Site Manager will issue warnings and will discipline ANY PERSON who breaks anyone of the Environmental Rules and Procedures. Repeated and continued breaking of the Rules and Procedures will result in a disciplinary hearing and which may result in that person being asked to leave the site permanently.

(iii) The ENVIRONMENT means the whole surroundings around us. The environment is made-up of the soil, water, air, plants and animals. and those characteristics of the soil, water, air, plant and animal life that influence human health and wellbeing.

5.3 Environmental Awareness Training Materials

5.3.1 Natural Environmental Management Guidance

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

5.3.2 Vehicle Use and Access Guidance

- Never drive any vehicle without a valid licence for that particular vehicle and do not drive any vehicle that appears not to be road-worthy.
- Never drive any vehicle when under the influence of alcohol or drugs.
- DO NOT make any new roads without permission. Stay within demarcated areas.
- Avoid U-Turns and large turning circles. 3-point turns are encouraged. Do not ever drive on rocky slopes or vegetated dune areas.
- Stay on the road, do not make a second set of tracks and do not cut corners.
- DO NOT SPEED - keep to less than 60 km per hour on the tracks and site roads.
- No off-road driving is allowed.
- Vehicles may only drive on demarcated roads, and.
- Adhere to speed limits and drive with headlights switched on along any gravel road.

5.3.3 Air Emission and Dust Reduction

- Reduce speed for all trucks and vehicles on the mine and community roads to reduce dust emissions.Stock piles should be covered with dust biding chemical to reduce fugitive emissions.
- Chemical biding substance can be applied to road surfaces to supress dust particle and reduce emission within the mine which will reduce fugitive emissions in the community.
- Recycling water can be sprayed on roads, stockpiles and conveyors to suppress dust

thus reducing dust emissions.

- Creating a buffer zone between the mine and the community – this can reduce noise and dust impact on the surrounding community by reducing the distance.

- Planting of trees in the buffer zones - this can further help to minimise the visual impact of mining operations on local communities. This also reduces the levels of noise and dust, and.

- Continuous weather monitoring on site and purchasing of quiet trucks and excavators and customised trucks with rubber matting to dampen sounds when they are being loaded.

5.3.4 Noise and Vibrations Emission Reduction

- Speed reduction can reduce noise associated with vehicles and trucks movements and ensure that vehicles are services regularly.

- Management to consider purchasing machineries that emit low levels of noise and ensure up-to-date maintenance of all equipment to reduce emission of noise from such machines.

- Careful selection of equipment and insulation and sound enclosures around machinery can control noise.

- Development of environmental noise management plan to keep any disturbance of the community to minimum levels – this can be done through: mine planning. plant and equipment design and selection. housing crushing and processing plant within buildings. enclosing conveyor systems. using terrain to acoustically shield the operations and operational procedures like speed limits on roads around site which minimise dust emissions from trucks.

- Regular and extensive monitoring of noise impact associated with blasting as well as other mining operations.

- Restrictions of blasting time to midday can reduce the impact of noise and vibration, and.

- Designing detonation sequence with delays between holes so that blast waves from individual holes do not occur simultaneously at a neighbouring home or property.

5.3.5 Health and Safety Guidance

- Drink lots of water every day, but only from the fresh water supplies.

- Take the necessary precautions to avoid contracting the HIV/AIDS virus.

- Only enter or exit the mine at the demarcated gates / or road.

- Always keep the access area as you found them.

- Any damage to any existing infrastructure in the area must be report to the Environmental

Control Officer / Project Manager who will then inform the owner of any damage with all the repairs done to the satisfaction of the owner or Environmental Control Officer.

- Never enter any area that is out of bounds, or demarcated as dangerous or wander off without informing or permission of team leader.
- Report to your Contractor or the Site Manager if you see a stranger or unauthorised person in the mine site.
- Do not remove any vehicle, machinery, equipment or any other object from the mine site without permission of your Contractor or the Site Manager.
- Wear protective clothing and equipment required and according to instructions from your Contractor or the Site Manager, and.
- Never enter or work in the mine when under the influence of alcohol or drugs.

5.3.6 Preventing Pollution and Dangerous Working Conditions Guidance

- Never throw any hazardous substance such as fuel, oil, solvents, etc. into streams or onto the ground.
- Never allow any hazardous substance to soak into the soil.
- Immediately tell your Contractor or Environmental Control Officer / Site Manager when you spill, or notice any hazardous substance being spilled anywhere in the mine.
- Report to your Contractor or Environmental Control Officer / Site Manager when you notice any container, which may hold a hazardous substance, overflow, leak or drip.
- Immediately report to your Contractor or Environmental Control Officer / Site Manager when you notice overflowing problems or unhygienic conditions at the ablution facilities.
- Vehicles, equipment and machinery, containers and other surfaces shall be washed at areas designated by the Contractor or Environmental Control Officer/ Site Manager, and.
- If you are not sure how to transport, use, store or dispose any hazardous substance - ASK your Contractor or Environmental Control Officer / Site Manager for advice.

5.3.7 Saving Water Guidance

- Always use as little water as possible. Reduce, reuse and re-cycle water where possible.
- Report any dripping or leaking taps and pipes to your Contractor or Environmental Control Officer or Site Manager, and.
- Never leave taps running. Close taps after you have finished using them.

5.3.8 Disposal of Waste Guidance

- Learn to know the difference between the two main types of waste, namely:
  - General Waste, and.
  - Hazardous Waste.
- Learn how to identify the containers, bins, drums or bags for the different types of wastes. Never dispose of hazardous waste in the bins or skips intended for general waste or construction rubble.
- Never burn or bury any waste within mining license area.
- Never overfill any waste container, drum, bin or bag. Inform your Contractor or the Environmental Control Officer / Site Manager if the containers, drums, bins or skips are nearly full.
- Never litter or throwaway any waste on the site, in the field or along any road. No illegal dumping, and.
- Littering is prohibited.

5.3.9 Religious, Cultural, Historical and Archaeological Objects Guidance

- If you find any suspected religious, cultural, historical or archeologically object or site around the mine, you must immediately notify your Contractor or Environmental Control Officer / Site Manager, and.
- Never remove, destroy, interfere with or disturb any religious, cultural, historical or archaeological object or site around the mine site.

5.3.10 Dealing with Environmental Complaints Guidance

- If you have any complaint about dangerous working conditions or potential pollution to the environment, immediately report this to your Contractor or the Environmental Control Officer / Site Manager, and.
- If any person complains to you about noise, lights, littering, pollution, or any other harmful or dangerous condition, immediately report this to your Contractor or the Environmental Control Officer / the Site Manager.

5.4 Environmental Personnel Register

Table 23 below shows the Environmental Personnel Register to be signed by every person who receives or attends the Environmental Awareness Training or who has the training material explained to him or her or in possession of the training material.

Table 23: Environmental personnel register.

Date	Name	Company	Signature

6. CONCLUSION AND RECOMMENDATIONS

6.1 Summary of Conclusions

Mitigation measures for both positive and negative impacts have been proposed and management strategies are provided in this updated Environmental Management Plan (EMP) for the following development stages:

(i) Preconstruction.

(ii) Construction.

(iii) Operation, ongoing exploration, monitoring and rehabilitation, and.

(iv) Decommissioning, closure and aftercare.

Based on the extent, duration, intensity and likely negative and positive impacts of the ongoing mining operations, this Environmental Management Plan (EMP) Report incorporating all the relevant mitigation measures with respect to likely impacts and recommendations to be implemented by the developer / operator. This EMP implementation and monitoring activities covers all the stages of the ongoing mining operations project life cycle and is inclusive of the operation and ongoing rehabilitation and closure, final rehabilitation and aftercare stages.

6.2 Recommendations

It is hereby recommended that the Ludi Namibia Mining and Investments (Pty) Ltd takes all the necessary steps to implement all the recommendations of the EMP for the successful implementation and completion of the ongoing mining operations. The following are the recommended actions to be implemented by the proponent (Ludi Namibia Mining and Investments (Pty) Ltd) as a part of the management of the impacts through implementations of this updated EMP Report:

(i) Contract an Environmental Control Officer / External Consultant / suitable in-house resources person to lead and further develop, implement and promote environmental culture through awareness raising of the workforce, contractors and sub-contractors in the field during the whole duration of the ongoing mining operations.

(ii) Provide with other support, human and financial resources, for the implementation of the proposed mitigations and effective environmental management during the planned mine project life cycle.

(iii) Develop a simplified environmental induction and awareness programme for all the workforce, contractors and subcontractors.

(iv) Where contracted service providers are likely to cause environmental impacts, these will need to identified and contract agreements need to be developed with costing provisions for environmental liabilities.

(v) Implement internal and external monitoring of the actions and management strategies developed during the project duration and a final Environmental Monitoring report to be prepared by the Environmental Control Officer / External Consultant / suitable in-house resource person and to be submitted to the regulators and to end the ongoing mining operations, and.

(vi) Develop and implement a monitoring programme that will fit into the overall company's Environmental Management Systems (EMS) as well as for any future EIA related to the expansion of the current delineated resources or development of completely new mine site within the EPL area.

All the responsibilities to ensure that the recommendations are executed accordingly, rest with the proponent (Ludi Namibia Mining and Investments (Pty) Ltd). The proponent must provide all appropriate resource requirements for the implementation of this Updated EMP as well as an independently managed (not directly controlled by the mining company) funding instrument for mine Closure and Aftercare environmental liabilities.

It is the responsibility of the proponent to make sure that all members of the workforce including contractors and subcontractors are aware of this EMP provisions and its objectives.

It is hereby recommended that the proponent take all the necessary steps to implement all the recommendations of this EMP for the successful execution of the preconstruction, construction, operational, decommissioning, closure and aftercare activities of the ongoing marble mining operations, ongoing exploration and supporting infrastructures activities.