

Environmental Impact Assessment (EIA) for the Proposed Mining Activities on Mining License (ML) No. 107 located North-East of Aussenkehr (Karasburg District) in the //Karas Region, Namibia.

ENVIRONMENTAL ASSESSMENT REPORT: Final

ECC Application Reference: APP- 001252

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EXECUTIVE SUMMARY

Oa Ta Ra Development (Pty) Ltd (The Proponent) was granted a Mining License (ML) No. 107 by the Ministry of Mines and Energy (MME) on the 30th of June in 2010 following their application for the ML in January 2000 (Cadastre Portal, 30 November 2023). The ML-107 was applied for the mining of Dimension Stone and Industrial Minerals as commodities of interest. The ML is expiring on the 09th of November 2025. The 1,176-hectares (Ha) ML is located 35 km north-east of Aussenkehr in the //Karas Region and covers (overlies) Farm Bloukrans No. 363 as shown in **Figure 1**.

All mining-related activities are among the listed activities that may not be undertaken without an Environmental Clearance Certificate (ECC) under the Environmental Management Act (EMA) (2007) and its 2012 Environmental Impact Assessment (EIA) Regulations. Subsequently, to ensure that the proposed mining activity is compliant with the national environmental legislation, the Proponent appointed Excel Dynamic Solutions Pty Ltd (EDS), an independent team of Environmental Consultants, to conduct the required Environmental Impact Assessment (EIA) process and submit the ECC application to the Department of Environmental Affairs and Forestry (DEAF) at the Ministry of Environment, Forestry & Tourism (MEFT).

The application for the ECC was compiled and submitted to the competent authority (Ministry of Environment, Forestry and Tourism (MEFT)) as the environmental custodian for project registration purposes. Upon submission of an Environmental Scoping Assessment (ESA) Report and Draft Environmental Management Plan (EMP), an ECC for the proposed project may be considered by the Environmental Commissioner at the MEFT's Department of Environmental Affairs and Forestry (DEAF).

Brief Project Description

Planned Activities: Proposed Mining Methods

The Proponent intends to adopt a systematic mining approach to the project as follows:

- **Phase 1: Reconnaissance prospecting work-** This entails the preliminary examination of the general geological features and characteristics of a region. Systematic investigation in the reconnaissance stage comprises geological mapping, outcrop sampling, wide spaced geochemical sampling, and preliminary geophysical survey

- **Phase 2: Test-quarry-** The aim of test quarrying is to fully evaluate the recovery of saleable industrial mineral (Picture Jasper) within the formation to determine whether full-scale mining is economically viable, as well as to evaluate the implications of extraction methods on the economics of quarrying. Test quarrying is required, as other methods described above can only give an indication of the range of possible recovery, and the actual recovery possible can only be established by actual mining of the formation and recording the resultant production and costs. It also allows for the adjustment of extraction methods to determine the most feasible method to be employed.
- **Phase 3: Development Quarry-** This entails the extraction of industrial mineral (Picture jasper) determined under the test quarry.
- **Phase 4: Production Quarry-** This involves the breaking of picture jasper into pieces for selection and exportation.

Public Consultation

Public Consultation Activities

Regulation 21 of the EIA Regulations details steps to be taken during a public consultation process and these have been used in guiding this process. The public consultation process assisted the Environmental Consultant in identifying all potential impacts and aided in the process of identifying possible mitigation measures and alternatives to certain project activities. The communication with I&APs about the mining activities was done through the following means in this order to ensure that the public is notified and allowed to comment on the proposed project:

- A Background Information Document (BID) containing information about the mining activities was compiled and emailed upon request to all registered Interested and Affected Parties (I&APs).
- Project Environmental Assessment notices were published in New Era Newspaper (**12 April 2023 and 19 April 2023**) and The Namibian Newspaper (**12 April 2023 and 19 April 2023**), briefly explaining the activity and its locality, inviting members of the public to register as I&APs and submit their comments/concerns.
- A consultation meeting was scheduled and held with the affected landowners on the 18th of April 2023 at 10h00.

- The issues and concerns raised were noted and used to form a basis for the ESA Report and EMP.

Potential Impacts identified

The following potential impacts are anticipated:

- **Positive impacts:** Socio-economic development through employment creation (primary, secondary, and tertiary employment) and skills transfer; opens up other investment opportunities and infrastructure-related development benefits; produces a trained workforce and small businesses that can serve communities and may initiate related businesses; boosts the local economic growth and regional economic development and; Increased support for local businesses through the procurement of consumable items such as Personal Protective Equipment (PPE), machinery spare parts, lubricants, etc.
- **Negative impacts:** Potential disturbance of existing pastoral systems; physical land/soil disturbance; Impact on local biodiversity (fauna and flora); habitat disturbance and potential illegal wildlife and domestic hunting in the area; potential impact on water resources and soils particularly due to pollution; Air quality issue: potential dust generated from the project; potential occupational health and safety risks, vehicular traffic safety and impact on services infrastructures such as local roads, vibrations, and noise associated with drilling activities may be a nuisance to locals; environmental pollution (solid waste and wastewater), archaeological and heritage impact and potential social nuisance and conflicts (theft, damage to properties, etc.).

The potential negative impacts were assessed, and mitigation measures were provided accordingly.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The potential impacts that are anticipated from the proposed project activities were identified, described, and assessed. For the significant adverse (negative) impacts with a medium rating, appropriate management, and mitigation measures were recommended for implementation by the Proponent, their contractors, and project-related employees.

The public was consulted as required by the EMA and its 2012 EIA Regulations (Sections 21 to 24). This was done via the two newspapers (New Era and The Namibian) used for this environmental assessment. A consultation through a face-to-face meeting with directly affected landowners in Aussenkehr whereby they raised concerns and comments on the proposed project activities.

The issues and concerns raised by the registered I&APs formed the basis for this Report and the Draft EMP. The issues were addressed and incorporated into this Report whereby mitigation measures have been provided thereof to avoid and/or minimize their significance on the environmental and social components. Most of the potential impacts were found to be of medium-rating significance. With the effective implementation of the recommended management and mitigation measures, will particularly see a reduction in the significance of adverse impacts that cannot be avoided completely (from medium rating to low). To maintain the desirable rating, the implementation of management and mitigation measures should be monitored by the Proponent directly, or their Environmental Control Officer (ECO) is highly recommended. The monitoring of this implementation will not only be done to maintain the reduced impacts' rating or maintain a low rating but to also ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed right away too.

It is crucial for the Proponent and the contractors to effectively implement the recommended management and mitigation measures to protect both the biophysical and social environment throughout the project duration. All these would be done to promote environmental sustainability while ensuring a smooth and harmonious existence and purpose of the project activities in the community and environment at large.

Recommendations

The Environmental Consultant is confident that the potential negative impacts associated with the proposed project activities can be managed and mitigated by the effective implementation of the recommended management and mitigation measures and with more effort and commitment put into monitoring the implementation of these measures.

It is, therefore, recommended that the mining activities be granted an ECC, provided that:

- All the management and mitigation measures provided herein are effectively and progressively implemented.

- All required permits, licenses, and approvals for the proposed activities should be obtained as required. These include permits and licenses for land use access agreements to explore and ensure compliance with these specific legal requirements.
- The Proponent and all their project workers or contractors comply with the legal requirements governing their project and its associated activities and ensure that project permits and or approvals required to undertake specific site activities are obtained and renewed as stipulated by the issuing authorities.
- Site areas where mining activities have ceased are rehabilitated, as far as practicable, to their pre-mining state.
- Environmental Compliance monitoring reports should be compiled and submitted to the DEAF Portal as per the provision made on the MEFT/DEAF's portal.

Disclaimer

EDS warrants that the findings and conclusion contained herein were accomplished following the methodologies outlined in the Scope of Work and Environmental Management Act (EMA) of 2007. These methodologies are described as representing good customary practice for conducting an EIA of a property to identify recognized environmental conditions. There is a possibility that even with the proper application of these methodologies there may exist subject property conditions that could not be identified within the scope of the assessment, or which were not reasonably identifiable from the available information. The Consultant believes that the information obtained from the record review and during the public consultation processes concerning the proposed mining work is reliable. However, the Consultant cannot and does not warrant or guarantee that the information provided by the other sources is accurate or complete. The conclusions and findings outlined in this report are strictly limited in time and scope to the date of the evaluations. No other warranties are implied or expressed.

Some of the information provided in this report is based on personal interviews, and research of available documents, records, and maps held by the appropriate government and private agencies. This report is subject to the limitations of historical documentation, availability, and accuracy of pertinent records, and the personal recollections of those persons contacted.

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Appendix B: Draft Environmental Management Plan (EMP)

Appendix C: Curricula Vitae (CV) for the Environmental Assessment Practitioner (EAP)

Appendix D: List of Interested and Affected Parties (I&APs) and Attendance Register

Appendix E: Background Information Document (BID)

Appendix F: EIA Notification in the newspapers (New Era and The Namibian)

Appendix G: Farmers' Consultation Meeting Minutes

Appendix H: Mineral License

LIST OF ABBREVIATIONS

Abbreviation	Meaning
AMSL	Above Mean Sea Level

BID	Background Information Document
CV	Curriculum Vitae
DEA	Department of Environmental Affairs
EA	Environmental Assessment
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EDS	Excel Dynamic Solutions
ESA	Environmental Scoping Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
GG	Government Gazette
GN	Government Notice
I&APs	Interested and Affected Parties
MEFT	Ministry of Environment, Forestry, and Tourism
MME	Ministry of Mines and Energy
ML	Mining License
PPE	Personal Protective Equipment
Reg	Regulation
S	Section
TOR	Terms of Reference

DEFINITION OF TERMS

Alternative	A possible course of action, in place of another would meet the same purpose and need of the proposal.
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Baseline	Work done to collect and interpret information on the condition/trends of the existing environment.
Biophysical	That part of the environment does not originate with human activities (e.g. biological, physical, and chemical processes).
Cumulative Impacts/Effects Assessment	About an activity, means the impact of an activity that in it may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.
Decision-maker	The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.
Ecological Processes	Processes play an essential part in maintaining ecosystem integrity. Four fundamental ecological processes are the cycling of water, the cycling of nutrients, the flow of energy, and biological diversity (as an expression of evolution).
Environment	As defined in the Environmental Management Act - the complex of natural and anthropogenic factors and elements that are mutually interrelated and affect the ecological equilibrium and the quality of life, including – (a) the natural environment that is land, water, and air; all organic and inorganic matter and living organisms and (b) the human environment that is the landscape and natural, cultural, historical, aesthetic, economic and social heritage and values.

Environmental Management Plan	As defined in the EIA Regulations (Section 8(j)), a plan that describes how activities that may have significant environments effects are to be mitigated, controlled, and monitored.
Interested and Affected Party (I&AP)	Concerning the assessment of a listed activity includes - (a) any person, group of persons, or organization interested in or affected by the activity; and (b) any organ of state that may have jurisdiction over any aspect of the activity. Mitigate - practical measures to reduce adverse impacts. Proponent – as defined in the Environmental Management Act, a person who proposes to undertake a listed activity. Significant impact - means an impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.
Fauna	All of the animals that are found in a given area.
Flora	All of the plants are found in a given area.
Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).
Nomadic Pastoralism	Nomadic pastoralists live in societies in which the husbandry of grazing animals is viewed as an ideal way of making a living and the regular movement of all or part of the society is considered a normal and natural part of life. Pastoral nomadism is commonly

	found where climatic conditions produce seasonal pastures but cannot support sustained agriculture.
Proponent	Organization (private or public sector) or individual intending to implement a development proposal.
Public Consultation/Involvement	A range of techniques can be used to inform, consult or interact with stakeholders affected by the proposed activities.
Protected Area	Refers to a protected area that is proclaimed in the Government Gazette according to the Nature Conservation Ordinance number 4 of 1975, as amended
Scoping	An early and open activity to identify the impacts that are most likely to be significant and require specialized investigation during the EIA work. Can, also be used to identify alternative project designs/sites to be assessed, obtain local knowledge of the site and surroundings, and prepare a plan for public involvement. The results of scoping are frequently used to prepare a Terms of Reference for the specialized input into full EIA.
Terms of Reference (ToR)	Written requirements governing full EIA input and implementation, consultations to be held, data to be produced, and form/contents of the EIA report. Often produced as an output from scoping.

1 INTRODUCTION

1.1 Project Background

Oa Ta Ra Development (Pty) Ltd (The Proponent) was granted a Mining License (ML) No. 107 by the Ministry of Mines and Energy (MME) on the 30th of June in 2010 following their application for the ML in January 2000 (Cadastre Portal, 30 November 2023). The ML-107 was applied for the mining of Dimension Stone and Industrial Minerals as commodities of interest. The ML is expiring on the 09th of November 2025. The 1,176-hectares (Ha) ML is located 35 km north-east of Aussenkehr in the //Karas Region and covers (overlies) Farm Bloukrans No. 363 as shown in **Figure 1**.

Section 27 (1) of the Environmental Management Act (EMA) (No. 7 of 2007) and its 2012 Environmental Impact Assessment (EIA) Regulations, provides a list of activities that may not be carried out without an EIA undertaken and an ECC obtained. Mining activities are listed among activities that may not occur without an ECC. Therefore, individuals or organizations may not carry out mining activities without an ECC awarded to the Proponent.

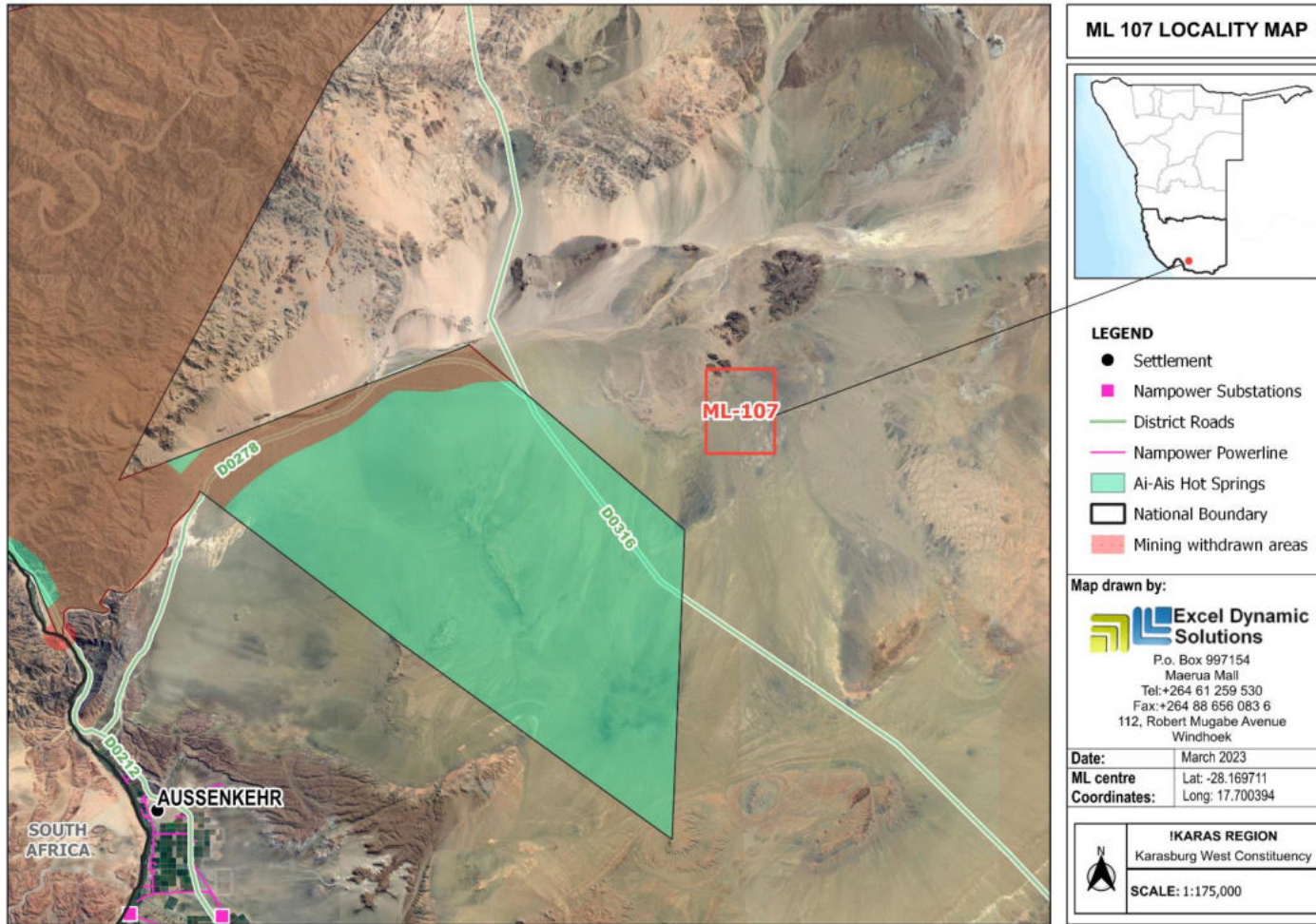


Figure 1: Locality map for ML 107

1.2 Site Layout

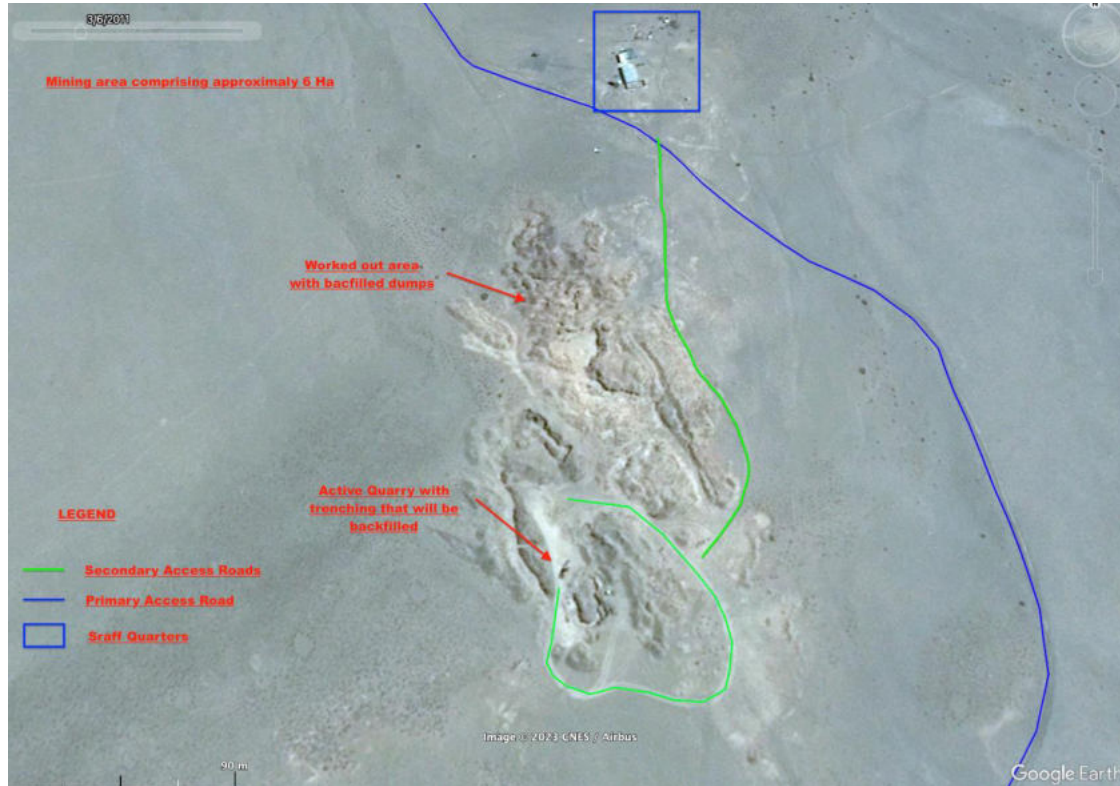


Figure 2: Site Layout for ML 107

1.3 The Need for the Proposed Project Activities

The mining sector plays a key role in socio-economic development of many resource-rich countries. In Namibia, the sector has been and remains the backbone of the Namibian economy as reflected by its average annual economic growth, contribution to GDP, job creation, income generation, and a key source of government fiscal receipts and foreign exchange earnings. Mining activities contribute to the national and local economies and may have a positive impact on the country's economy. Namibia's economy depends largely on mining activities. Should the ML provide economically viable dimension stones and Industrial minerals (Picture Jasper), the Namibian economy can expect benefits from revenues during the construction phase, royalties and taxes during the Life of Mine (LoM), and a positive contribution towards employment.

1.4 Appointed Environmental Assessment Practitioner

To satisfy the requirements of the EMA and its 2012 EIA Regulations, The Proponent appointed a team of independent environmental consultants. EDS to conduct the required Environmental Assessment (EA) process. The full EIA was conducted by the EDS Consultants' team members and appointed independent specialists as listed below:

- The EIA Study was headed by Mr. Nerson Tjelos, a qualified and experienced Geoscientist and experienced Environmental Assessment Practitioner (EAP) with over 8 years of experience in Natural Resources Consulting and Business Development. The CV's of the project team are presented under Appendix B.
- The EIA consultation process and reporting were done by Environmental Assessment Practitioner (EAP) Ms. Iyaloo Nakale. .

1.5 Terms of Reference and Scope of Works for the Environmental Consultant

The Terms of Reference (ToR) within this Environmental Impact Assessment Report has been developed from the scoping assessment stages:

- Registration of the EIA Study with the Ministry of Environment, Forestry and Tourism (MEFT),
- Ongoing engagement and consultation with Stakeholders/Interested & Affected Parties (I&APs),
- Potential Impact Assessments from a scoping level to a full EIA, which includes the respective specialists' studies for impacts that cannot be fully understood at a scoping level nor fully addressed by the Environmental Assessment Practitioner

The application for the ECC was compiled and submitted to the Environmental Custodian, the Ministry of Environment, Forestry and Tourism (MEFT)'s Department of Environmental Affairs and Forestry (DEAF). The Background Information Document (BID) was also uploaded on the online ECC Portal for project registration purposes.

The findings of the EIA process are incorporated into this Environmental Impact Assessment Report and the Draft Environmental Management Plan (EMP) - Appendix A. These documents will be submitted as part of the ECC application to the Environmental Commissioner at the DEAF of the MEFT for consideration of the ECC.

1.6 The Need for the EIA Study and Specialists Inputs

Given the nature of the proposed activities (mining stage), and significant comments received from some of the I&APs during the EIA consultation process, it was found that the some potential key adverse impacts could not be ascertained and addressed through a mere environmental scoping assessment. Therefore, the Study had to be inclusive and comprehensive. By doing this,

the impacts would be assessed in detail for the mining activities, therefore improving the chances of obtaining an ECC for the project activities.

- **Archaeological & Heritage Impact Assessment (internal specialist):**

- Review and input by Mr. Roland Mushi, a qualified and experienced Archaeologist.

- **Biodiversity impact assessment:**

- Mr. Titus Shuuya, a qualified and experienced Ecologist.

- **Hydrogeological (Groundwater) Impact Assessment:**

- Ms. Fredrika Shagama, a qualified and experienced Hydrogeologist.

- **Socio-Economic Impact Assessment (internal specialist):**

- Mr. Fillemon V. Shilongo, a qualified and experienced economist.

2 PROJECT DESCRIPTION: PROPOSED MINING ACTIVITY

The outline of a typical mining process is presented in Figure 3 below and the actual proposed mining of Dimension Stone and Industrial Minerals is presented under section 3.1.



Figure 3: Diagram of the major steps involved in a mining process (Socratic, 2016)

2.1 The Proposed Mining Activities (Methods)

The proposed mining activities will include the following:

- Phase 1-**Reconnaissance prospecting work**: This entails preliminary examination of the general geological features and characteristics of a region. Systematic investigation in the reconnaissance stage comprises of geological mapping, outcrop sampling, wide-spaced geochemical sampling, and preliminary geophysical survey.
- Phase 2-**Test-quarry**: Following successful reconnaissance prospecting work, minor test quarrying, test-processing and initial marketing activities are undertaken.
- Phase 3-**Development Quarry**: Extraction of test-blocks by means of compressor and jackhammers, processing tests and notably marketing studies, production of picture stones and finished goods. The following activities will take place

during this phase:

- A bulldozer, that removes approximately 1000 square meters of overburden (1 meter deep at maximum level). This will be done once a year or after every two years.
- The removed overburden will be used to fill the excavated area, “mined” over the previous 12 to 24 months;
- A compressor and 2 jack-hammers are used to break the stone bed of approximately 500 – 700 mm height;
- Suitable stones are selected from the broken bed and removed by TLB for weighing outside of the production area;
- Discarded stones are stacked in place to enable rehabilitation of the site, once the overburden is placed over the previously used area,
- The suitable stones removed from the pit are weighed, bagged into bulk bags, and transported from the site.
- A total of 6 to 8 loads are removed from the mine annually, with loads varying between 15 and 34 ton each. The annual production is in the order of 160 to 200 ton.

- Phase 4- **Production Quarry**: Once positive results are obtained from Phases 2 and 3 and customers place larger orders, then project enters the production phase.

2.2 Project Resources

The resources (in terms of human, vehicles, machinery, and equipment), services and infrastructure required for the proposed activities are presented as follows.

2.2.1 Human Resources

The project activities will require 6 to 8 permanent staff and consultants consisting of geologists, field assistants, geo-technicians and drilling crew.

2.2.2 Project Crew Accommodation

Most of project personnel will be accommodated in the nearest town, while a few of them will be accommodated on site in few caravans and/or make-shift buildings where provisions of ablution facilities will be made. The predominant type of waste that will be generated during the mining activities, in small volumes, is domestic waste (non-hazardous). An administration, accommodation camp shall be identified and setup within the ML' area. The campsite will be cordoned off and off-limits to those not part of the mining team (personnel).

2.2.3 Materials, Equipment and Vehicles

The input required for the mining program in terms of vehicles, machines and equipment but not limited to the following. These will be kept at a demarcated storage area on site that will be established within the ML. These include:

- 4X4 vehicles (1 LDV)
- Truck (6 to 8 times per year to load stone)
- Excavator / front-end loader / TLB
- Dozers (1 Bulldozer, once a year for 7 to 10 days)
- Air compressor
- Water Tanks (210 litre water drums)

2.2.4 Waste Management

Waste management: the different waste will be handled as follows:

- i. **Sewage:** Installation of a French drain system for domestic use will be provided on-site. The wastewater will be transported offsite for treatment at a facility either by the Proponent or a designated/appointed external waste management contractor.
- ii. **General and domestic waste:** The predominant type of waste that will be generated during the mining activities, in small volumes, is domestic waste (non-hazardous). Therefore, sufficient waste bins (containers) will be made available at both mining sites and campsite for waste storage. The bins will be emptied into the main onsite container for disposal at the nearest municipal approved solid waste site, when necessary (upon reaching a waste disposal agreement with the relevant local authority, which can be Karasburg Town Council)
- iii. **Hazardous waste:** All vehicles, machinery and fuel consuming equipment will be provided with drip trays to capture potential fuel spills and waste oils. The waste fuel/oils will be carefully stored in a standardized container until such a time that it can be disposed of at the nearest approved hazardous waste management facility or removal by an external hazardous handling & management contractor.

2.2.5 Health and Safety

Health and Safety: Adequate and appropriate Personal Protective Equipment (PPE) will be provided to every project personnel while on and working at site. A minimum of two well-furnished first aid kits will be readily available at mining sites to attend to potential minor injuries, while major injuries will need to be attended to further by transporting the injured to the nearest health center for treatment and needed care in Aussenkehr (a nearby Primary Health Care center within the proximity of the ML, i.e., Aussenkehr).

2.2.6 Accidental Fire management

A minimum of basic firefighting equipment, i.e., five well serviced and frequently serviced fire extinguishers will be readily available in vehicles, at the working sites on the ML and campsite.

2.2.7 Site Security

The storage areas for mining equipment, material and machines will be erected at selected ML sites. Security will be supplied on a 24-hour basis at the delegated storage sites to ensure that the project vehicles, machinery, and equipment are not stolen or vandalized. This is also to ensure that the community health is not compromised from the presence of potential hazardous mining materials such as fuels and heavy equipment.

2.3 Rehabilitation and Closure Phase

The Proponent needs to commit to the establishment of a rehabilitation plan for the mine closure plan, as part of the EMP requirements. The Proponent will need to contract a specialist to draft down a conceptual mine closure plan for the ML-107.

3 Project Alternatives

3.1 Alternatives Considered

Alternative mine designs and processing plant options are all considered and the availability of water sources, potential long term slope stability, safety and climate change will be considered when assessing the economic, technical and environmental suitability of an alternative. For every alternative option there is an impact on another aspect of the project. The detailed baseline environmental studies in the appendices and summarized in the environmental baseline chapter provide further information to the decision-making aspects.

3.1.1 Mining Activity Location

The areas selected for mining activities are dependent on the geological setting (regional and local), the economic geology, and the mining and mining history of the license (ML) and Proponents' preference of an area. This means that the mineralization of the commodities within the ML is area-specific, which means mining targets are primarily determined by the geology (host rocks) and the tectonic environment of the site (an ore-forming mechanism). The tenement has sufficient surface area for future related facilities should an economic mineral deposit be defined

3.1.2 Industrial Mineral (Picture Jasper)

Picture Jasper is a type of jasper, which is a variety of chalcedony, a cryptocrystalline form of quartz. It is known for its unique and scenic patterns, which resemble landscapes, deserts, or other natural scenes. Picture Jasper is valued for its remarkable resemblance to paintings or photographs captured in stone. Picture Jasper has been used for various purposes, including jewelry making, decorative items, and metaphysical practices. It is often used in crystal healing and meditation to enhance creativity and visualization.

The Jasper gemstones are found all over the world, but picture jasper has large deposits in Africa and Brazil. Jasper in general is an impure silicon dioxide with unique patterns formed during mineral consolidation that creates the various types of this stone.

Picture Jasper is known for its distinct characteristics, which contribute to its unique beauty and appeal. Below are some of the key characteristics of Picture Jasper:

Mineral Information	Silicate, chalcedony, quartz group
Chemical Composition	SiO ₂
Hardness	6-1/2 to 7 (Mohs)
Specific Gravity	2.58 - 2.91
Refractive Index	1.54 (Approximately)

Scenic Patterns: Picture Jasper is named for its scenic patterns that resemble landscapes, natural scenes, or abstract art. The patterns can include swirls, lines, waves, orbs, and various shapes, creating intricate and detailed designs within the stone. Each piece of Picture Jasper is unique, with its own individual pattern and arrangement of colors.

Earthy Colors: Picture Jasper typically exhibits earthy colors such as shades of brown, tan, cream, gray, and sometimes red or yellow. These colors are often layered or mottled, creating depth and dimension in the stone. The combination of earth tones contributes to the stone's natural and organic appearance.

Texture: Picture Jasper has a smooth and polished texture when used in jewelry or decorative items. Its surface can be glossy, allowing the intricate patterns and colors to be displayed prominently. When held, Picture Jasper feels cool and comforting to the touch.

Opacity: Picture Jasper is generally opaque, meaning that light does not pass through it easily. This opacity allows the intricate patterns and colors to be fully appreciated without being transparent or translucent.

Size and Shape Variations: Picture Jasper can be found in various sizes and shapes, ranging from small tumbled stones to large cabochons or sculptures. The stone can be cut and shaped into beads, pendants, or other forms for use in jewelry making and crafting.

Picture Jasper has been used for various purposes, including jewelry making, decorative items, and metaphysical practices.

The cost of Picture Jasper can vary depending on factors such as quality, size, and rarity of the specific piece. In general, Picture Jasper is considered to be a relatively affordable gemstone compared to some other varieties of jasper or precious gemstones.

The price of Picture Jasper can range from a few dollars for small tumbled stones or beads to higher prices for larger, high-quality cabochons or jewelry pieces. It's worth noting that particularly unique or exceptional specimens may command higher prices. As with any gemstone or crystal, prices can also be influenced by factors such as supply and demand and location of purchase,

3.1.4 Mining Methods

Picture Jasper is primarily mined using traditional mining methods. The specific mining techniques employed can vary depending on the location and geological characteristics of the deposit. Here are some common methods used for mining Picture Jasper:

1. **Open-Pit Mining:** In areas where the Picture Jasper deposit is near the surface, open-pit mining may be used. This method involves the removal of overburden (the topsoil and other layers covering the deposit) to expose the jasper-bearing rock. Heavy machinery, such as excavators, bulldozers, and loaders, is used to extract and transport the jasper material.
2. **Quarrying:** Another method used for mining Picture Jasper which involves the extraction of jasper from large open quarries or pits. Quarrying typically requires the removal of overburden and the use of heavy machinery to cut and extract blocks or slabs of Picture Jasper.
3. **Hand Digging:** In smaller-scale operations or areas where machinery cannot be used, hand digging methods may be employed. Miners use hand tools such as picks, shovels, and hammers to excavate the jasper-bearing rock manually. This method is labor-intensive but can be suitable for smaller deposits or artisanal mining.

It's important to note that the mining methods used should prioritize safety, environmental sustainability, and compliance with local regulations. Responsible mining practices aim to minimize environmental impact, ensure worker safety, and support the surrounding communities.

4. LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES

A review of applicable and relevant Namibian and international legislation, policies, and guidelines to the proposed activity is given in this section. This review serves to inform the project Proponent, Interested and Affected Parties, and the decision-makers at the DEAF of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled to establish the proposed mining activities.

4.1 Local and National Legislation, Policies and Guidelines

The EMA has stipulated requirements to complete the required documentation to obtain an ECC for permission to undertake certain listed activities. These activities are listed under the following Regulations:

- *3.1 The construction of facilities for any process or activities which requires a license, the right of other forms of authorization, and the renewal of a license, right, or other forms of authorization, in terms of the Minerals (Prospecting and Mining Act, 1992).*
- *3.2 other forms of mining or extraction of any natural resources whether regulated by law or not.*
- *3.3 Resource extraction, manipulation, conservation, and related activities.*

The Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878) detail requirements for public consultation within a given environmental assessment process (GN 30 S21). The EIA regulations also outline the required details of a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).

Other legal obligations that are relevant to the mining activities on ML No. 107 and related activities are presented below.



Table 1: Applicable local, national and international standards, policies and guidelines governing the proposed mining activities on the ML-107.

Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
<p>The Constitution of the Republic of Namibia, 1990 as amended:</p> <p>Government of the Republic of Namibia</p>	<p>The Constitution of the Republic of Namibia (1990 as amended) addresses matters relating to environmental protection and sustainable development. Article 91(c) defines the functions of the Ombudsman to include:</p> <p>“...the duty to investigate complaints concerning the over-utilization of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia...”</p> <p>Article 95(l) commits the state to actively promoting and maintaining the welfare of the people by adopting policies aimed at the:</p> <p>“...Natural resources situated in the soil and on the subsoil, the internal waters, in the sea, in the continental shelf, and in the exclusive economic zone are property of the State.”</p>	<p>By implementing the environmental management plan, the establishment will be conformant to the constitution in terms of environmental management and sustainability.</p> <p>Ecological sustainability will be the main priority for the proposed development.</p>

Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
<p>Minerals (Prospecting and Mining) Act (No. 33 of 1992): Ministry of Mines and Energy (MME)</p>	<p>Section 52 requires mineral license holders to enter into a written agreement with affected landowners before exercising rights conferred upon the license holder.</p> <p>Section 52(1) mineral license holder may not exercise his/her rights in any town or village, on or in a proclaimed road, land utilized for cultivation, within 100m of any water resource (borehole, dam, spring, drinking trough, etc.) and boreholes, or no operations in municipal areas, etc.), which should individually be checked to ensure compliance.</p> <p>Section 54 requires a written notice to be submitted to the Mining Commissioner if the holder of a mineral license intends to abandon the mineral license area.</p> <p>Section 91 requires that rehabilitation measures should be included in an application for a mineral license.</p>	<p>The Proponent should enter into a written agreement with landowners before mining their land. On commercial land, the Proponent should engage the landowners for land use consent.</p> <p>An assessment of the impact on the receiving environment should be carried out.</p> <p>The Proponent should include as part of their application for the ML, measures by which they will rehabilitate the areas where they intend to carry out mineral mining activities.</p> <p>The Proponent may not carry out mining activities within the areas limited by Section 52 (1) of this Act.</p>
<p>Nature Conservation Amendment Act, No. 3 of 2017: Ministry of</p>	<p>National Parks are established and gazetted following the Nature Conservation Ordinance, 1975 (4 of 1975), as amended. The Ordinance provides a legal framework concerning</p>	<p>The Proponent will be required to enhance the conservation of biodiversity and the maintenance of the ecological integrity of protected areas and</p>



Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
Environment, Forestry and Tourism (MEFT)	<p>the permission of entering a state-protected area, as well as requirements for individuals damaging objects (geological, ethnological, archaeological, and historical) within a protected area. Though the Ordinance does not specifically refer to mining as an activity within a protected area (PA) or recreational area (RA), it does restrict access to PAs and prohibits certain acts therein as well as the purposes for which permission to enter game parks and nature reserves may be granted.</p>	<p>another State land in the Project Site area.</p> <p>The Proponent will also be required to comply with the existing and planned local operational management plans, regulations, and guidelines.</p>
<p>The Parks and Wildlife Management Bill of 2008: Ministry of Environment, Forestry and Tourism (MEFT)</p>	<p>Aims to provide a regulatory framework for the protection, conservation, and rehabilitation of species and ecosystems, the sustainable use and sustainable management of indigenous biological resources, and the management of protected areas, to conserve biodiversity and contribute to national development.</p>	
<p>Mine Health & Safety Regulations, 10th Draft: Ministry of Health and</p>	<p>Makes provision for the health and safety of persons employed or otherwise present in the mineral licenses area. These deal with among other matters; clothing and devices; design, use, operation, supervision, and</p>	<p>The Proponent should comply with all these regulations concerning their employees.</p>

Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
Social Services (MHSS)	control of machinery; fencing and guards; and safety measures during repairs and maintenance.	
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001): Ministry of Mines and Energy (MME)	Regulation 3(2)(b) states that “No person shall possess [sic] or store any fuel except under the authority of a license or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 liters or less in any container kept at a place outside a local authority area”	The Proponent should obtain the necessary authorization from the MME for the storage of fuel on-site.
The Regional Councils Act (No. 22 of 1992): Ministry of Urban and Rural Development (MURD)	This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. From a land use and project planning perspective, their duties include, as described in section 28 “to undertake the planning of the development of the region for which it has been established with a view to physical, social and economic characteristics, urbanization patterns, natural resources, economic development potential, infrastructure, land utilization pattern and sensitivity of the natural environment.	The relevant Regional Councils are IAPs and must be consulted during the Environmental Assessment (EA) process. The project site falls under the Karas Regional Council; therefore, they should be consulted.
Water Act 54 of 1956: Ministry of	The Water Resources Management Act 11 of 2013 is present without	



Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
Agriculture, Water and Land Reform (MAWLR)	<p>regulations; therefore, the Water Act No 54 of 1956 is still in force:</p> <p>Prohibits the pollution of water and implements the principle that a person disposing of effluent or waste has a duty of care to prevent pollution (S3 (k)).</p> <p>Provides for control and protection of groundwater (S66 (1), (d (ii)).</p> <p>Liability of clean-up costs after closure/abandonment of an activity (S3 (l)). (l)).</p>	<p>The protection (both quality and quantity/abstraction) of water resources should be a priority.</p> <p>The permits and license required thereto should be obtained from MAWLR's relevant Departments (these permits include Borehole Drilling Permits, Groundwater Abstraction & Use Permits, and when required, Wastewater / Effluent Discharge Permits).</p>
<p>Water Resources Management Act (No 11 of 2013): Ministry of Agriculture, Water and Land Reform (MAWLR)</p>	<p>The Act provides for the management, protection, development, use, and conservation of water resources; provides for the regulation and monitoring of water services, and provides for incidental matters. The objects of this Act are to:</p> <p>Ensure that the water resources of Namibia are managed, developed, used, conserved, and protected in a manner consistent with, or conducive to, the fundamental principles set out in Section 66 - protection of aquifers, Subsection 1 (d) (iii) provide for preventing the contamination of the</p>	



Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
	aquifer and water pollution control (S68).	
National Heritage Act No. 27 of 2004: Ministry of Education, Arts, and Culture (MEAC)	To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters.	The Proponent should ensure compliance with this act's requirements. The necessary management measures and related permitting requirements must be taken. This is done by consulting with the National Heritage Council (NHC) of Namibia. The management measures should be incorporated into the Draft EMP.
The National Monuments Act (No. 28 of 1969): Ministry of Education, Arts, and Culture (MEAC)	The Act enables the proclamation of national monuments and protects archaeological sites.	
Soil Conservation Act (No 76 of 1969): Ministry of Agriculture, Water and Land Reform (MAWLR)	The Act makes provision for the prevention and control of soil erosion and the protection, improvement, and conservation of soil, vegetation, and water supply sources and resources, through directives declared by the Minister.	Duty of care must be applied to soil conservation and management measures must be included in the EMP.
Local Authorities Act No. 23 of 1992	To provide for the determination, for purposes of traditional government, of traditional authority councils; the	The Noordoewer is the responsible local Authority of the



Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
	establishment of such authority councils; and to define the powers, duties and functions of traditional authority councils; and to provide for incidental matters.	area therefore they should be consulted.
Public Health Act (No. 36 of 1919): Ministry of Health and Social Services (MHSS)	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	The Proponent and all its employees should ensure compliance with the provisions of these legal instruments.
Health and Safety Regulations GN 156/1997 (GG 1617): Ministry of Health and Social Services (MHSS)	Details various requirements regarding the health and safety of labourers.	
Public and Environmental Health Act No. 1 of 2015: Ministry of Health and Social Services (MHSS)	The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.	The Proponent should ensure that the project infrastructure, vehicles, equipment, and machinery are designed and operated in a way that is safe, or not injurious or dangerous to public health, and that the noise and dust emissions which could



Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
		<p>be considered a nuisance remain at acceptable levels.</p> <p>Public and environmental health should be preserved and remain uncompromised.</p>
<p>Atmospheric Pollution Prevention Ordinance (1976): Ministry of Health and Social Services (MHSS)</p>	<p>This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, apart from East Caprivi, is proclaimed as a controlled area for section 4(1) (a) of the ordinance.</p>	<p>The proposed project and related activities should be undertaken in such a way that they do not pollute or compromise the surrounding air quality. Mitigation measures should be put in place and implemented on-site.</p>
<p>Hazardous Substance Ordinance, No. 14 of 1974: Ministry of Health and Social Services (MHSS)</p>	<p>The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal, and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling.</p>	<p>The Proponent should handle and manage the storage and use of hazardous substances on site so that they do not harm or compromise the site environment</p>
<p>Road Traffic and Transport Act, No. 22 of 1999: Ministry of Works and Transport</p>	<p>The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of</p>	<p>Mitigation measures should be provided for, if the roads and traffic impact cannot be avoided, the relevant permits must be applied for.</p>

Legislation / Policy / Guideline: Custodian	Relevant Provisions	Implications for this project
(Roads Authority of Namibia)	road transport across Namibia's borders; and for matters incidental thereto. Should the Proponent wish to undertake activities involving road transportation or access to existing roads, the relevant permits will be required.	
Labour Act (No. 6 of 1992): Ministry of Labour, Industrial Relations and Employment Creation (MLIREC)	Ministry of Labour, Industrial Relations and Employment Creation is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety, and enhanced labour market services for the benefit of all Namibians. This ministry insures the effective implementation of the Labour Act No. 6 of 1992.	The Proponent should ensure that the prospecting and mining activities do not compromise the safety and welfare of workers.

Table 4: Namibian national policies and plans applicable to the proposed project

Policy or Plan	Relevant provisions	Relevance to the project
Vision 2030	Vision 2030 states that the overall goal is to improve the quality of life of the Namibian people aligned with the development world.	The proposed project aim to meet the objectives of vision 2030.

National Development Plan (NDP5)	The NDP5 is the fifth in a series of seven five-year national development plans that outline the objectives and aspiration of Namibia's long term vision.	The proposed project meets the objective of the NDPs by creating employment opportunity
The Harambee Prosperity Plan – Second Pillar	Ensuring increasing productivity of priority key sectors and the development of employment opportunity.	The proposed project will contribute to the continued advancement of the mining industry and create employment.

4.2 The National Legal Requirements in terms of Permitting

The legal requirements for which authorizations (permitting and licensing) are needed for activities prior to or as required are listed in **Table 2** below.

Table 2: Specific permits and licence requirements for the proposed project

Permit/ licence	Regulation/Legislation	Related activities requiring permits	Relevant Authority
Environmental Clearance Certificate (ECC)	Environmental Management Act, No. 07 of 2002: 2012 EIA Regulations	Required for all listed activities such as mining and quarrying activities	MEFT: Department of Environmental Affairs & Forestry
Permit for land/site clearing (vegetation)	The Forestry Act No. 12 of 2001	The Act governs the removal of vegetation within 100m of a water course.	MEFT: Forestry Division
Installation certificate for bulk fuel storage	Petroleum Products regulations	Installation certificate is required for bulk fuel storage in a quantity of more than 600 litres and dispensing facilities	MME: Directorate of Petroleum Affairs
Permit for water boreholes	Water Act No. 54 of 1956 The Water	The drilling of boreholes and	MAWLR: Department of Water

	Resources Management Act 11 of 2013 (presently without regulations)	groundwater abstraction & use for industrial and commercial purposes.	Affairs (Geohydrology Division)
Aviation	Civil Aviation Act, No. 6 of 2016; section 90 (3) of the Minerals Act, No. 33 of 1992	This regulations relate to safety and security aspects near aerodromes.	Civil Aviation Authority

4.3 International Policies, Principles, Standards, Treaties and Conventions

The legal requirements for which authorizations (permitting and licensing) are needed for activities prior to or as required are listed in **Table 3** below.

Table 3 International Policies, Principles, Standards, Treaties and Convention applicable to the project:

Statute	Provisions	Project Implications
Equator Principles	<p>A financial industry benchmark for determining, assessing, and managing environmental and social risk in projects (August 2013). The Equator Principles have been developed in conjunction with the International Finance Corporation (IFC), to establish an International Standard with which companies must comply to apply for approved funding by Equator Principles Financial Institutions (EPFIs). The principles apply to all new project financings globally across all sectors.</p> <p>Principle 1: Review and Categorization</p> <p>Principle 2: Environmental and Social Assessment</p>	<p>These principles are an attempt to: ‘...encourage the development of socially responsible projects, which subscribe to appropriately responsible environmental management practices with a minimum negative impact on project-affected ecosystems and community-based upliftment and empowering interactions.’</p>

	<p>Principle 3: Applicable Environmental and Social Standards</p> <p>Principle 4: Environmental and Social Management System and Equator Principles Action Plan</p> <p>Principle 5: Stakeholder Engagement</p> <p>Principle 6: Grievance Mechanism</p> <p>Principle 7: Independent Review</p> <p>Principle 8: Covenants</p> <p>Principle 9: Independent Monitoring and Reporting</p> <p>Principle 10: Reporting and Transparency</p>	
<p>The International Finance Corporation (IFC) Performance Standards</p>	<p>The International Finance Corporation's (IFC) Sustainability Framework articulates the Corporation's strategic commitment to sustainable development and is an integral part of the IFC's approach to risk management. The Sustainability Framework comprises IFC's Policy and Performance Standards on Environmental and Social Sustainability, and IFC's Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC's commitments, roles, and responsibilities related to environmental and social sustainability.</p> <p>As of 28 October 2018, there are ten (10) Performance Standards (Performance</p>	<p>The Performance Standards are directed toward clients, guiding how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business sustainably, including stakeholder engagement and disclosure obligations of the Client (Borrower) concerning project-level activities. In the case of its direct investments (including</p>

	<p>Standards on Environmental and Social Sustainability) that the IFC requires project Proponents to meet throughout the life of an investment. These standard requirements are briefly described below.</p> <p>Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts</p> <p>Performance Standard 2: Labour and Working Conditions</p> <p>Performance Standard 3: Resource Efficient and Pollution Prevention and Management</p> <p>Performance Standard 4: Community Health and Safety</p> <p>Performance Standard 5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement</p> <p>Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</p> <p>Performance Standard 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities</p> <p>Performance Standard 8: Cultural Heritage</p> <p>Performance Standard 9: Financial Intermediaries (FIs)</p>	<p>project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives.</p>
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	<p>Performance Standard 10: Stakeholder Engagement and Information</p> <p>A full description of the IFC Standards can be obtained from</p> <p>http://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards?cq_ck=1522164538151#ess1</p>	
<p>The United Nations Convention to Combat Desertification (UNCCD) 1992</p>	<p>Addresses land degradation in arid regions with the purpose to contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change.</p> <p>The convention's objective is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability United Nations Convention.</p>	<p>The project activities should not be such that they contribute to desertification.</p>
<p>Convention on Biological Diversity 1992</p>	<p>Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, to ensure their conservation and sustainable use.</p> <p>Promote the protection of ecosystems, and natural habitats, and the</p>	<p>Removal of vegetation cover and destruction of natural habitats should be avoided and where not possible minimized.</p>

	maintenance of viable populations of species in natural surroundings.	
Stockholm Declaration on the Human Environment, Stockholm (1972)	It recognizes the need for: “a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment.	Protection of natural resources and prevention of any form of pollution.

Relevant international Treaties and Protocols ratified by the Namibian Government

- Convention on International Trade and Endangered Species of Wild Fauna and Flora (CITES), 1973.
- Convention on Biological Diversity, 1992.
- World Heritage Convention, 1972.

5. ENVIRONMENTAL AND SOCIAL BASELINE

The project activities will be undertaken in specific environmental and social conditions. The understanding of these conditions helps in identifying the sensitive environmental features that may need to be protected through the implementation of certain management and mitigation measures. The summary of selected physical, biological and social baseline information of the project area is provided below as per the site visit conducted by the Environmental Consultant on the 18th Of April 2023 and relevant published reports and books.

The climatic conditions of the project area is described using the available nearest data for the area obtained from the World Online and Meteoblue websites (2023).

5.1 Biophysical Environment

5.1.1 Climate

Climate has a major influence on the mining activities proposed on the ML. Understanding of climatic conditions helps to determine the appropriate and/or inappropriate times to conduct mining activities.

Aussenkehr has a desert climate, during the day temperatures are warm to hot, but can get cold at night. The average annual temperature for Aussenkehr is 28 degrees and there is about 38 mm of rain in a year. The project area is dry for 325 days a year on average, with an average humidity of 34% and an EV index of 6. **Figure 4** shows the climate condition around Aussenkehr.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Day temp. (°C)	34	34	33	29	25	20	20	23	26	29	32	34
Night temp. (°C)	21	21	20	17	14	10	9	10	13	16	17	19
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precipitation (mm)	7	11	5	2	3	1	1	1	1	2	2	2
Days with rain	4	5	4	3	1	1	1	1	1	1	1	2
Dry days	27	23	27	27	30	29	30	30	29	30	29	29
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sun hours per day	10	10	10	10	10	10	10	10	10	10	12	12
Wind force (Bft)	3	2	2	2	2	2	2	2	2	3	3	3
UV-index	7	7	7	6	5	5	5	5	6	6	7	7

Figure 4: Climate condition around the project area, Aussenkehr (source: <https://www.besttimetovisit.co.uk/namibia/aussenkehr-4027146/>)

5.1.2 Landscape and Topography

The ML 107 is located within the Gamchab Basin, which is formed by rivers eroding away from the terrains to the north of the Orange River. These River flow and erode the landscape only sporadically after heavy falls of rain. The landscape is dominated by large, open valleys of gently sloping ground covered with a sparse layer of grass, (Mendelsohn, 2003). The ML lies at an elevation of 400 - 650m, **figure 5** and **Figure 6** below shows the landscape and topography of the project.

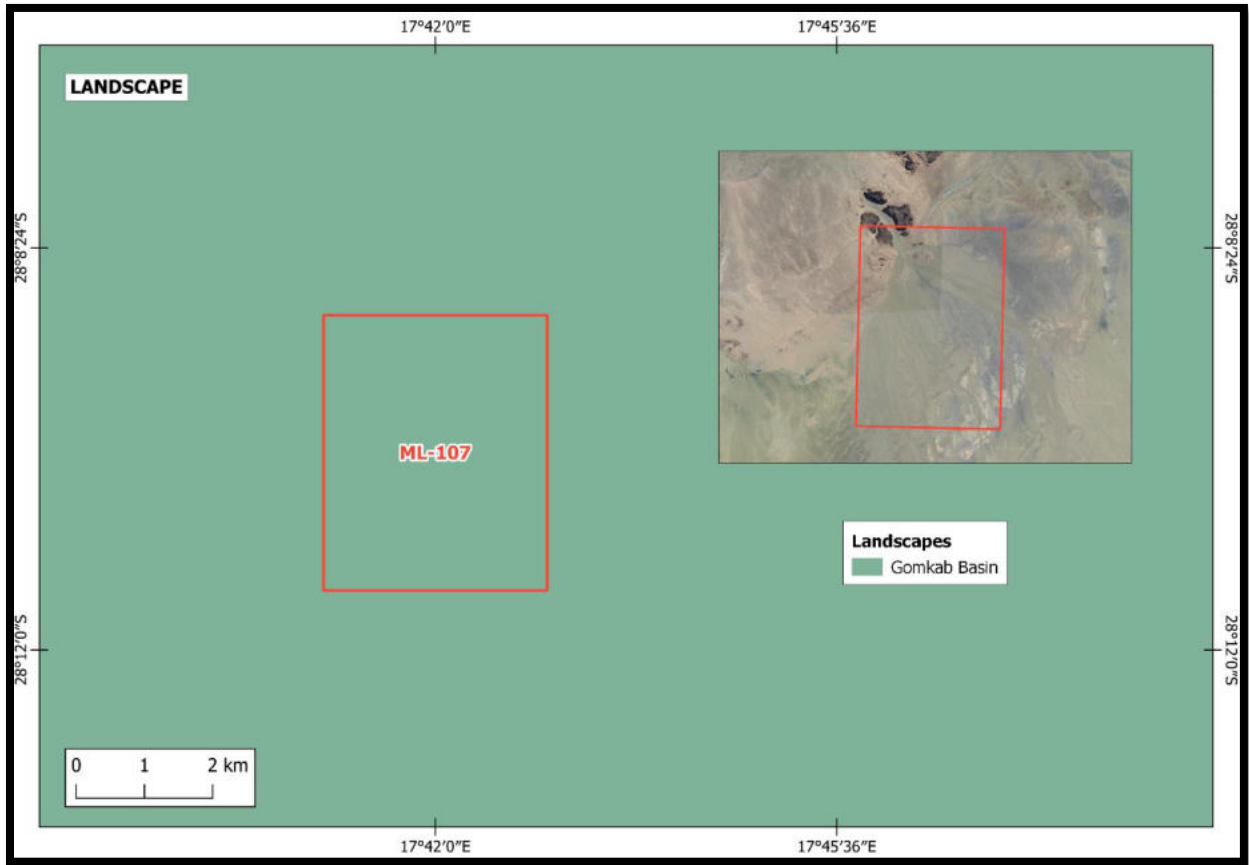


Figure 5: Landscape

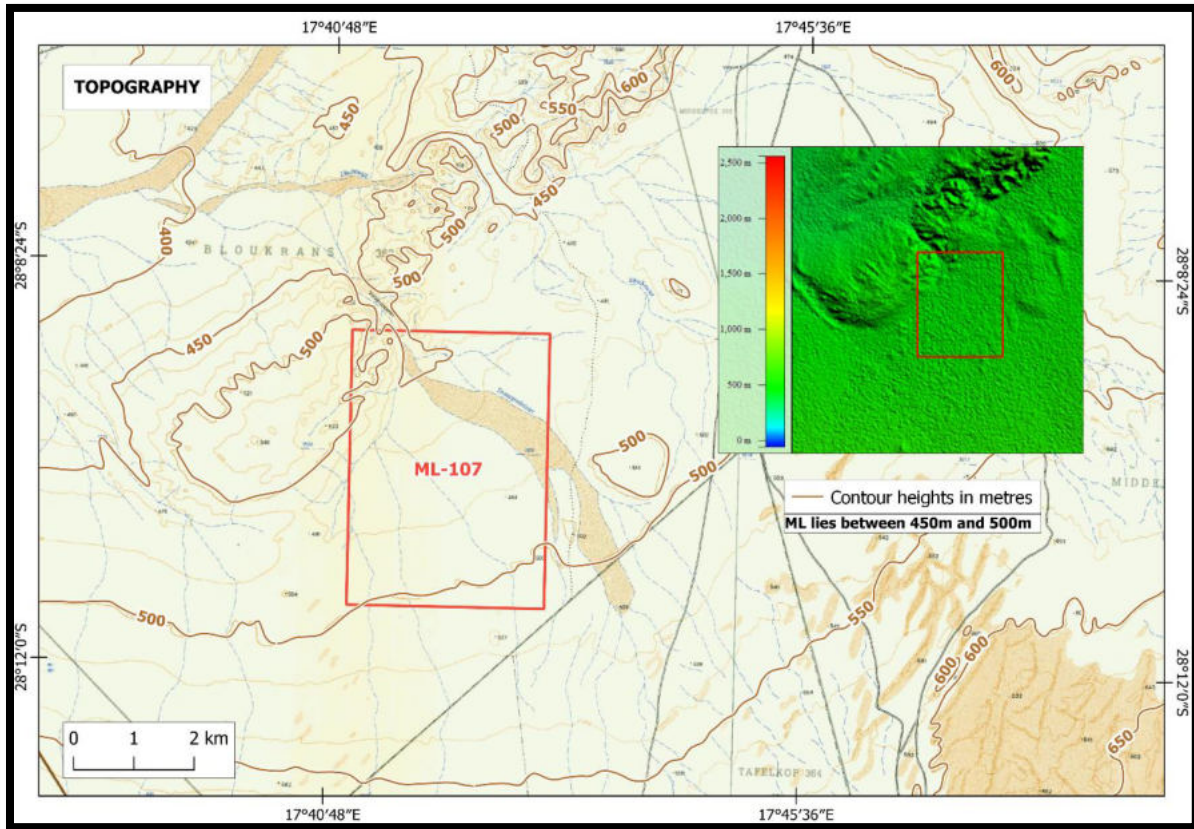


Figure 6: Topography map – ML 107

5.1.3 Geology

The area is within the Namaqua belt, hosting the Namaqua metamorphic complex, which extends across Southern Africa from Southern Namibia and Northerwestern South Africa in the west to KwaZulu-Natal. The Namaqua metamorphic Complex is made up of deeply eroded , high-grade metamorphic rocks, mainly various granitic gneisses. The Namaqua metamorphic complex is overlaid by sedimentary rocks of the Nama Group that form the plateau of the Great Escarpment in the region. The plateau is formed by Basal Beds overlain by the Schwarskalk Series of the Nama system, which dips 5-to-10-degree E. The Basal Beds are described by as carbonate, volcanic, and sedimentary sequence. These are overlain by compact finer grained layered quartzite that make up the lowermost unit of the Nama Group. **Figure 7** below shows the geology and main lithology map for the ML which consist of sand, gravel scree and calcrete, alluvium, shale (carbonaceous), dolerite and shale

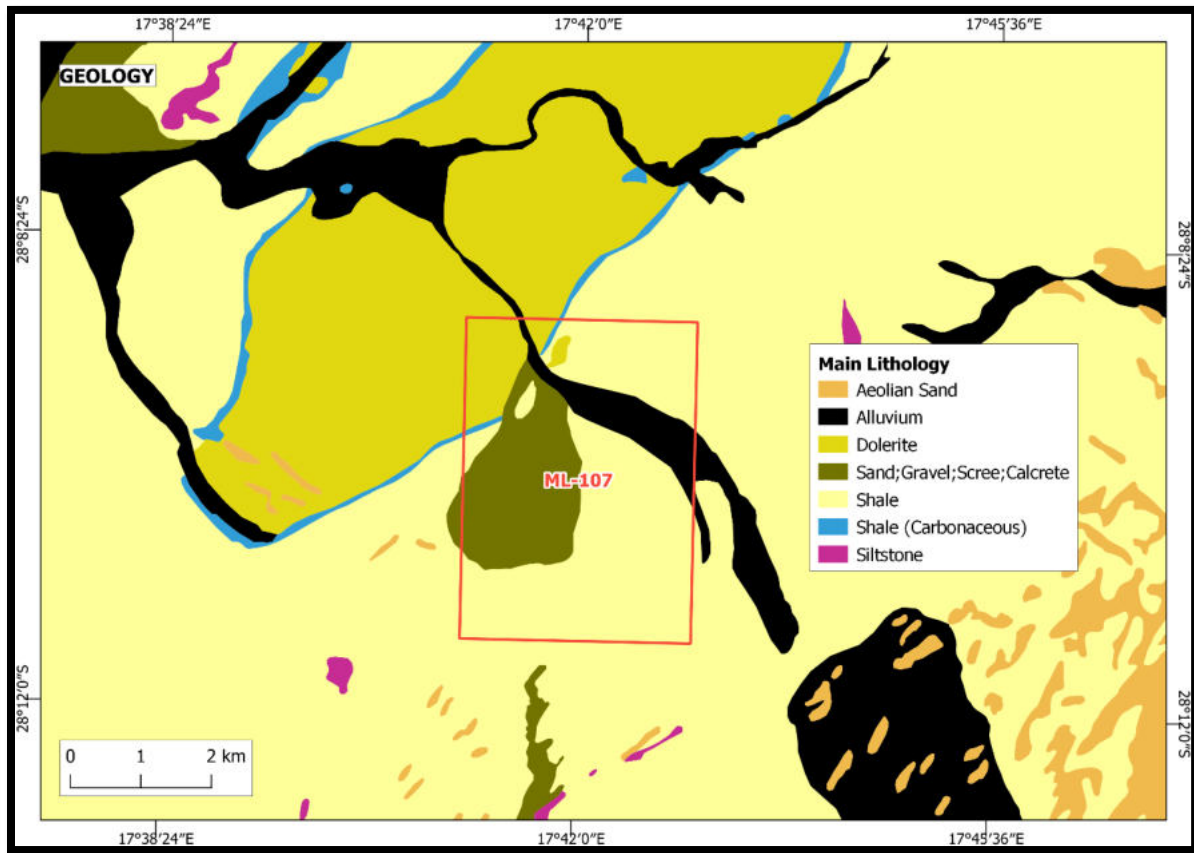


Figure 7: General geology map – ML 107

5.1.4 Soil

The ML area is dominated by Eutric Leptosols, form in actively eroding landscapes, especially in hilly areas of southern and north-western Namibia. According to Mendelsohn (2003) these coarse-textured soils are characterized by their limited depth caused by the presence of a continuous layer within 80 cm of the surface while Garrard (2021) states that the course-grained soils are characterized by a presence of hard rock within 30cm from the surface making them the shallowest soils with a low water holding capacity . **Figure 8** below is a map of the soil types found within the ML area.

It is notable that during the operational phase of the project, soil sampling may be conducted. *Therefore, the Soil Conservation Act (No 76 of 1969) should be taken into account to ensure that soils are conserved in a way that does not promote soil erosion.* (Refer to the EMP).

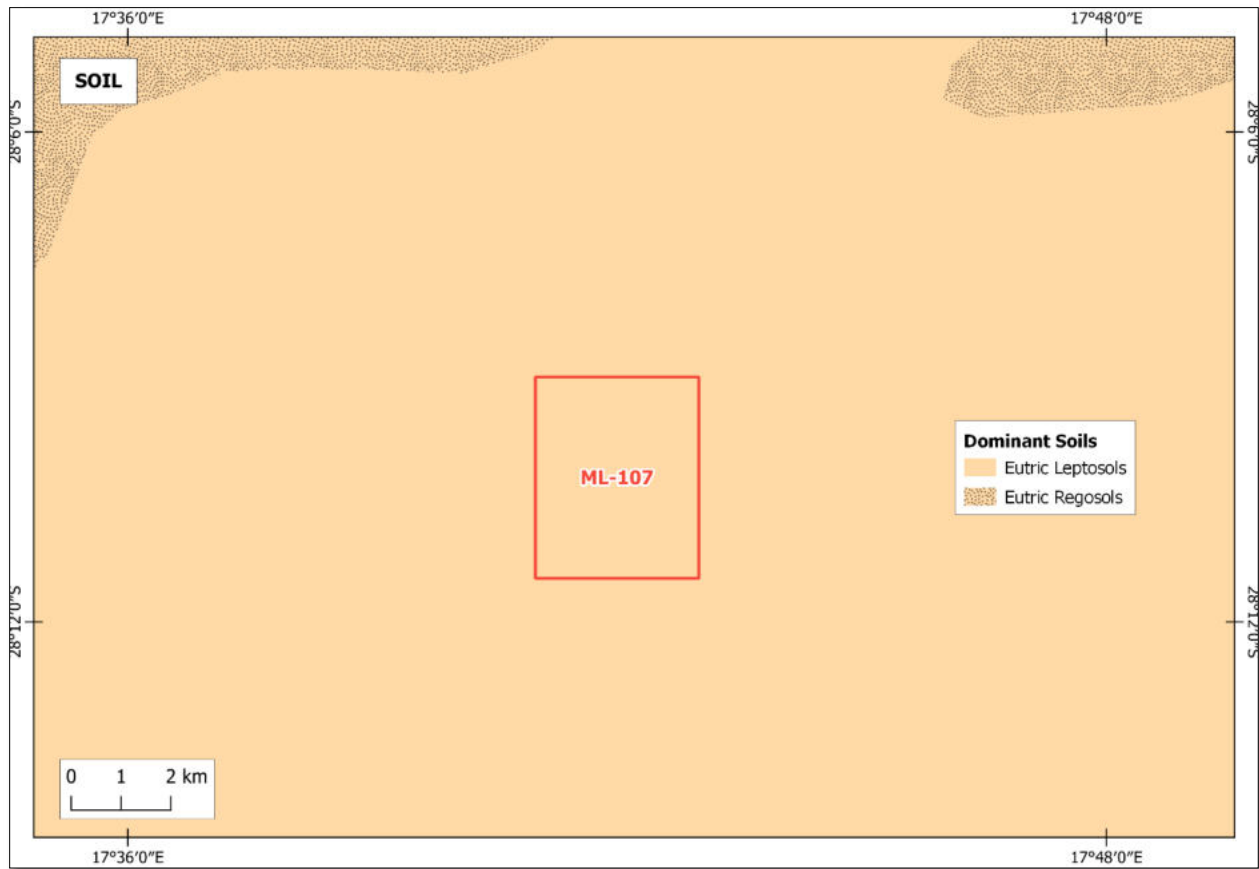


Figure 8: Dominant soil types – ML 107

5.1.5 Water Resources: Groundwater and Surface Water

The project area lies within an area that consists of rock bodies with little groundwater potential. However, the groundwater within the project is most likely to flow along fractured rocks or secondary porosity within the ML area. Due to the limited groundwater potential, the ML area is prone to moderate groundwater pollution. The Gamkab River runs through the northwest with several minor rivers traversing the ML. According to the data from Department of Water Affairs (DWA), the depth of the water table in the Aussenkher area is mostly like to be less than 40m below the ground level, (Ball, 2016). **Figure 9** shows the groundwater map of the project area

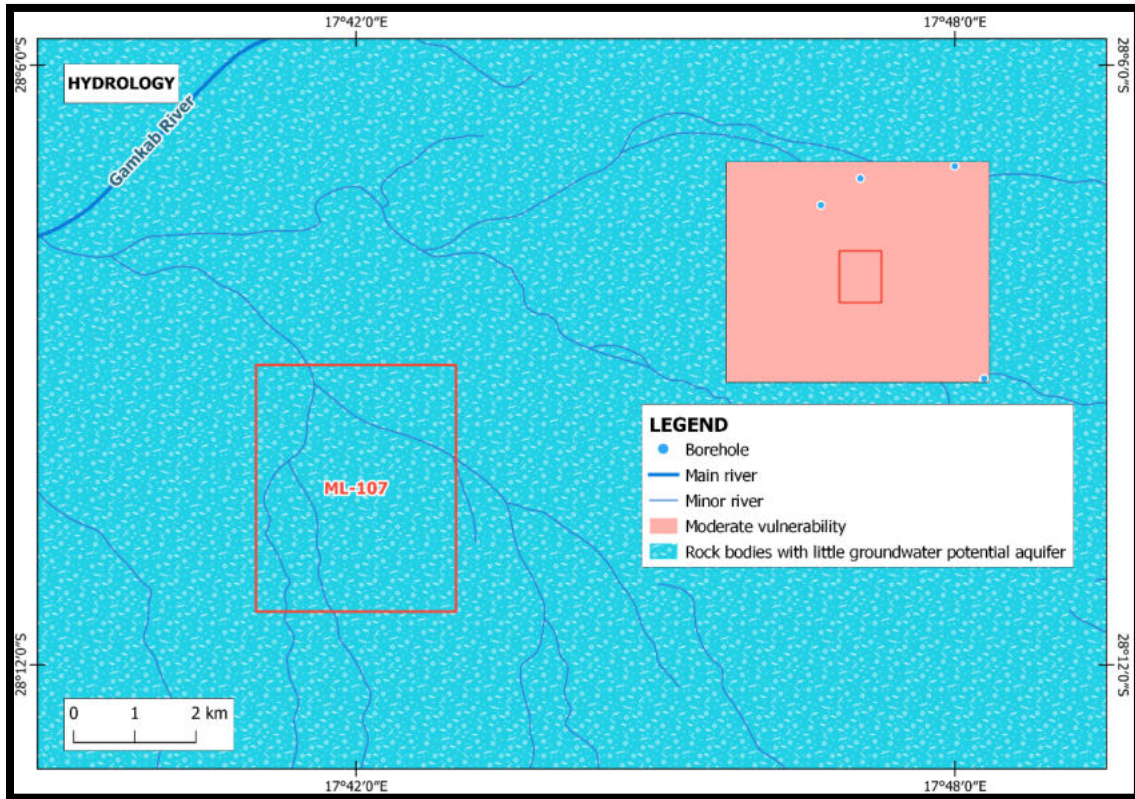


Figure 9: Hydrology map – ML 107

5.1.6 Flora and Fauna

5.1.6.1 Flora

Namibia is composed of five major terrestrial biomes classified according to vegetation type (Namib Desert, Nama Karoo, Succulent Karoo, tree and shrub savannah)

The project area within the Nama Karoo Biome is mainly characterized by Mountain Succulent Dwarf Shrubland and Dwarf Shrub Savanna, consisting of large (non-native) trees. Whilst the Succulent Karoo biome is an internationally recognized biodiversity hotspot, and is the world's only arid hotspot. The 116 000 km² biome extends from the south-west through the north-western areas of South Africa and into southern Namibia. The biome is home to 6 356 plant species, 40% of which are endemic and 936 (17%) of which are listed in the Red Data Book (UNESCO).

According to (Giess, 1998), the Dwarf shrub savanna vegetation type is dominated by Karoo shrubs and grasses and is found in the vast, arid, monotonous regions of southern Namibia.

Arborescent species such as *Acacia erioloba*, *A. karroo*, *Tanmrix usneoides*, *Euclea pseudebenus*, *Rhus lancea*, and others are found only along rivers. The *Parkinsonia africanu*, *Acacia nebrownii*, *Boscia foetida sttbsp. foetida*, *B. albitrunca vat. albitrunca* and *Catophractes alexandri* as well as smaller Karoo bushes such as *Pentzla spp.*, *Eriocephalus spp.*, and others are typical of this vegetation type. **Figure 10** below shows the vegetation map for the project area, and **Figure 9** shows the observed vegetation on the ML.

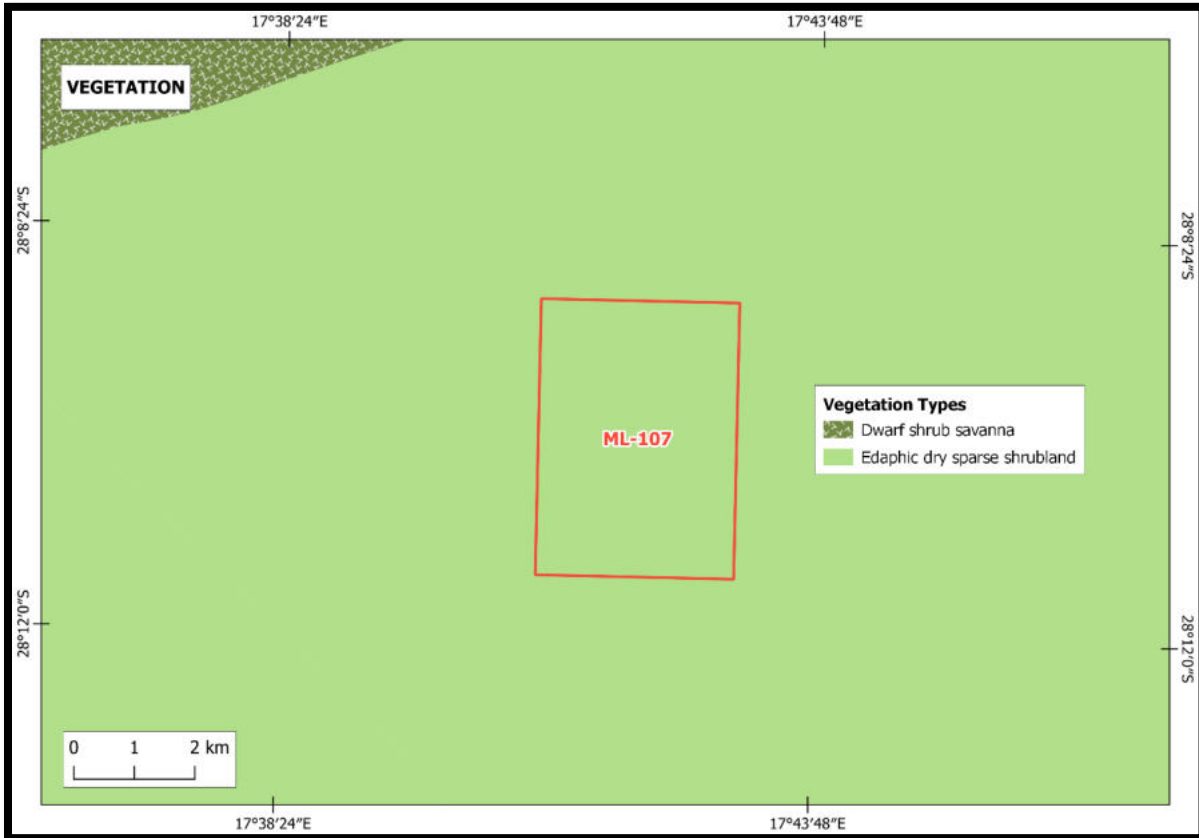


Figure 10: Vegetation map – ML 107

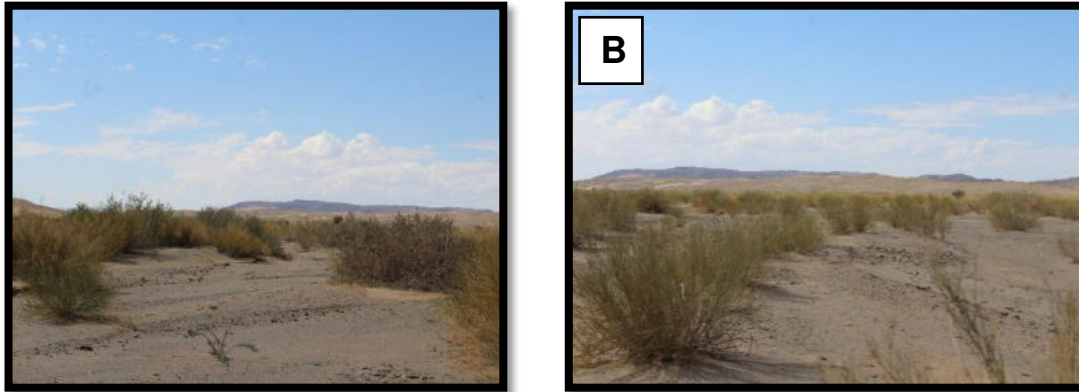


Figure 11: Vegetation observed on the ML

5.1.6.2 Fauna

In terms of fauna, the study area contains faunal species diversity as presented below.

	<u>Diversity</u>	<u>Endemism</u>
Mammal	61 - 75 Species	7 - 8 Species
Scorpion	16 - 17 Species	1 - 2 Species
Bird	81 - 110 Species	0 Species
Reptile	61 - 70 Species	13 - 16 Species
Frog	4 - 7 Species	N/A
Lizards	> 35 Species	6 - 8 Species
Termite	1 - 6 Genera	N/A
Snakes	20 - 24 Species	5 - 6 Species

Source: Ball, 2016

5.2 Heritage and Archaeology

5.2.1 Local Level and Archaeological Findings

Archaeological sites scattered along the //Karas Region confirm that the Karas coast has a long history of human occupation, with the earliest firm evidence being from about 800,000 years ago. People were then most likely nomadic, moving from one water source or good hunting area to another. While conditions along the Orange River have probably been conducive to human habitation for much of the time because of the availability of fresh water, early inhabitants were also attracted to rich supplies of food from the sea. These early inhabitants are likely to have been nomadic along the very arid coastline moving from one water source or good hunting area to

another. Several sites along the coast itself, including Elizabeth Bay, provide indications that people were living along stretches of the coast between 10,000 and 2,000 years ago.

Such occupations are within the framework of human and environmental interactions and associated socio-economic changes of hunter and gatherers occupations before the onset of early European settlers. During pre-colonial times, most of what is now known as Karasburg District was occupied by the Nama group of people, who were called the 'Bondelswarts'. When the German colonization began at the end of the 19th century, by 1903 most farms along the river were given to whites as private farmers. This ML covers one (1) farm only, and graves were recorded on Farm Bloukrans 363 as shown below in **Figures 12**.

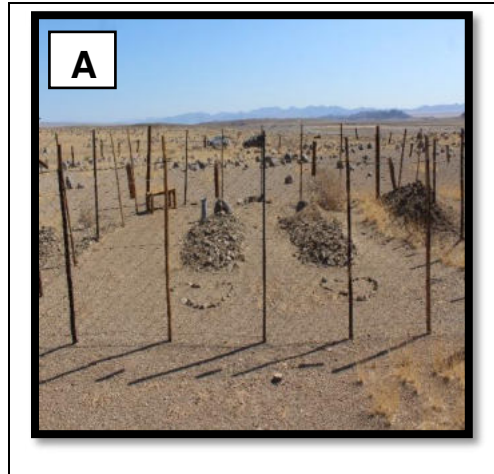


Figure 12: Old graves on farm Bloukrans

Old grave sites have been recorded during the site visit, archaeological significance may potentially be discovered during the mining phase. Therefore, the regulations stipulated in the National Heritage Act No. 27 of 2004 should be adhered to.

5.3 Surrounding Land Uses

The ML falls within commercial land area which cover (overlies) farms Bloukrans No. 363, Tafelkop No. 364 and Middlepos No. 252 as shown in **Figure 13**. The Proponent is required to secure a signed agreement from the affected landowners to gain access to the areas of interest for mining investigations as per Section 52 of the Minerals (Prospecting and Mining) Act No. 33 of 1992 and Section 2.2.3 of the Minerals Policy of Namibia.

1. Section 52 (1) The holder of the mineral license shall not exercise any rights conferred upon such holder by this Act or under any terms and conditions of such mineral license –
 - (a) In, on, or under any and until such holder has agreed in writing with the owner of such land containing terms and conditions relating to the payment of compensation, or the owner of such land has in writing waived any right to such compensation and has submitted a copy of such agreement or waiver to the Commissioner.

Section 2.2.3 of the Draft Minerals Policy of Namibia states that the License Holder and/or mineral explorers currently have to negotiate a contract with landowners to gain access for mining purposes.

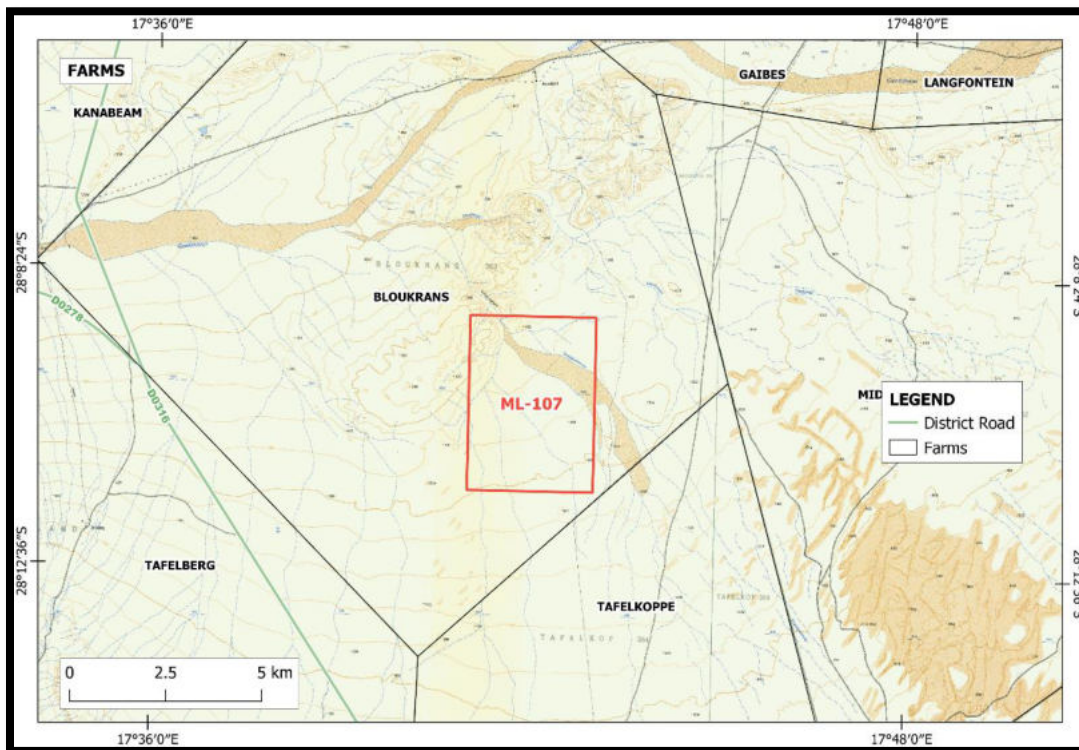
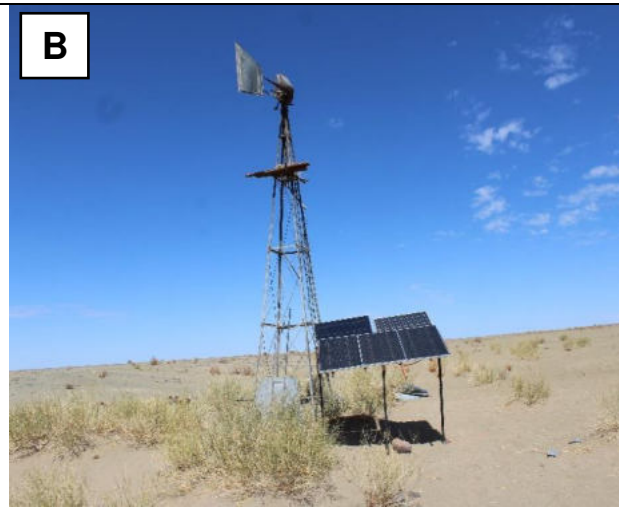


Figure 13: Land use (Farms) map – ML 107

During the site visit the consultants observed the following on farm bloukrans: **(A)** The sandstone mined for picture jasper production. **(B)** A borehole fitted with solar installations and a windmill to pump water on farm Bloukrans **(C)** An active borehole on farm Bloukrans **(D)** A water storage unit **(E)** A watering trough **(F)** Latrine toilet **(G)** A caravan on farm Bloukrans **(H)** Landscape on farm Bloukrans as shown in **Figure 14**.



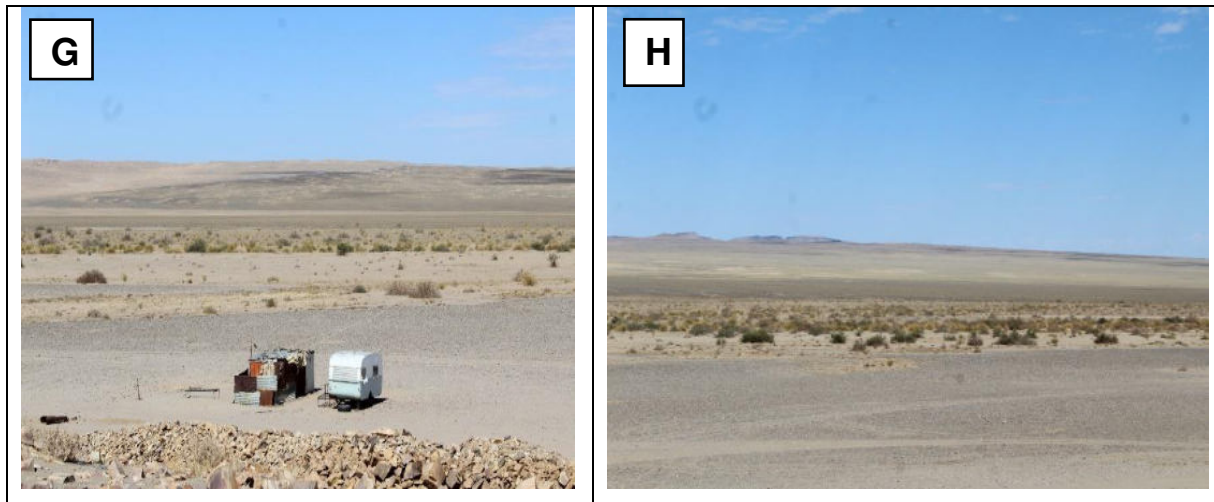


Figure 14: Infrastructure and landscape observed on Farm Bloukrans.

5.4 Socio-Economic conditions

Economic Activities

Aussenkehr is the hub for all agricultural activities in the southern part of the //Karas Region, and is linked to Namibia's road network, making it suitable for transportation between Namibia and South Africa. Aussenkehr produces some of the most sought after, highly rated grapes in the world, which is a lucrative market for the Namibian economy (Ball, 2016). It is reported that the grape industry employed 5 500 permanent and 6000 part-time workers in 2015, and the numbers have only increased since then.

Tourism

Private farms and conservancies in //Karas Region offer protection to wildlife, which attracts tourists to the Region. In addition to the table grape cultivation, there are signs of a tourist development of the settlement. About 50 km north of Aussenkehr is the Fish River Canyon. The Ai-Ais National Park is located to the west of the greater Aussenkehr while the Richtersveld National Park site of South Africa is located adjacent to Aussenkehr, in South Africa. These areas have altogether been classified as the Ai-Ais Richtersveld Transfrontier Park.

The Norotshama River Resort is ideally situated on the banks of the Orange River - a gateway to Southern Namibia's wealth of breath-taking natural landscapes.

6 PUBLIC CONSULTATION PROCESS

Public consultation is an important component of the Environmental Assessment (EA) process. It provides potential Interested and Affected Parties (I&APs) with an opportunity to comment on and raise any issues relevant to the project for consideration in part of the assessment process. Public input assists the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and the extent to which further investigations are necessary. Public consultation can also aid in the process of identifying possible mitigation measures. Public consultation for this scoping study has been done following the EMA and its EIA Regulations.

6.1 Pre-identified and Registered Interested and Affected Parties (I&APs)

Relevant and applicable national, regional, and local authorities and other interested members of the public were identified. Pre-identified I&APs were contacted directly, while other parties who contacted the Consultant after project advertisement notices in the newspapers, were registered as I&APs upon their request. Newspaper advertisements of the proposed mining activities were placed in two widely read national newspapers in the region (New Era Newspaper and The Namibian Newspaper). The project advertisement/announcement ran for two consecutive weeks inviting members of the public to register as I&APs and submit their comments. The summary of pre-identified and registered I&APs is listed in **Table 4** below and the complete list of I&APs is provided in **Appendix D**.

Table 4: Summary of Interested and Affected Parties (I&APs)

National (Ministries and State-Owned Enterprises)
Ministry of Environment, Forestry and Tourism
Ministry of Mines and Energy
Ministry of Health and Social Services
Regional, Local, and Traditional Authorities
//Karas Regional Council
Aussenkehr Settlement Office
General Public

Landowners /Interested members of the public

6.2 Communication with I&APs

Regulation 21 of the EIA Regulations details the steps to be taken during a public consultation process and these have been used in guiding this process. Communication with I&APs concerning the proposed development was facilitated through the following means and in this order:

- A Background Information Document (BID) containing brief information about the mining works was compiled and emailed to registered and Identified Interested and Affected Parties (I&APs);
- Project Environmental Assessment notices were published in the New Era Newspaper (**12 April 2023 and 19 April 2023**), and The Namibian Newspaper (**12 April 2023 and 19 April 2023**) briefly explaining the activity and its locality and inviting members of the public to register as I&APs and submit their comments/concerns.
- Public notice was placed at Aussenkehr Community Hall (**Figure 14**) to inform members of the public about the EIA process.
- Public meeting was scheduled and held on **18 April 2023 not 18 May 2023 as stated in the notice below**, at Assenkehr at 10h00 (**Figure 16**).

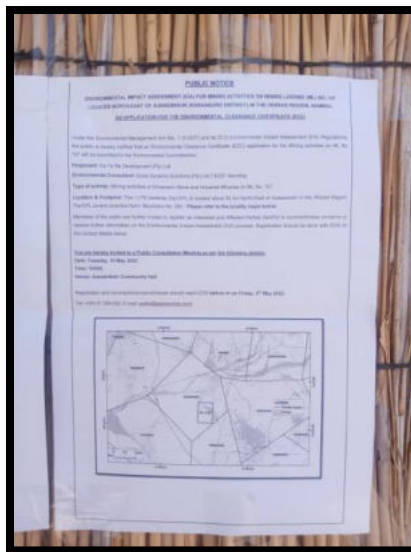


Figure 15: Public notice placed at Aussenkehr Community Hall.



Figure 16: Consultation meeting held on 18 April 2023, Aussenkehr Community Hall.

Issues raised by I&APs have been recorded and incorporated in the environmental report and EMP. The summarized issues raised during the public meeting are presented in **Table 5** below. The issues raised and responses by EDS are attached under **Appendix G**.

Table 5: Summary of main issues raised, and comments received during public meeting engagements

Issue	Concern
Employment creation and transfer of skills	The farmers do not believe that the proponent has the ability to create any job opportunities

7 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES

7.1 Impact Identification

Proposed developments/activities are usually associated with different potential positive and/or negative impacts. For an environmental assessment, the focus is placed mainly on the negative impacts. This is done to ensure that these impacts are addressed by providing adequate

mitigation measures such that an impact's significance is brought under control while maximizing the positive impacts of the development. The potential positive and negative impacts that have been identified from the prospecting activities are listed as follows:

Positive impacts:

- Creation of jobs for the locals (primary, secondary, and tertiary employment).
- Producing a trained workforce and small businesses that can service communities and may initiate related businesses.
- Boosting local economic growth and regional economic development.
- Open up other investment opportunities and infrastructure-related development benefits.

Negative impacts:

- Disturbance to grazing areas
- Land degradation and Biodiversity Loss
- Generation of dust
- Water Resources Use
- Soil & Water Resources Pollution
- Waste Generation
- Occupational Health & Safety risks
- Vehicular Traffic Use & Safety
- Noise & Vibrations
- Disturbance to Archaeological & Heritage Resources
- Impacts on local Roads
- Social Nuisance: local property intrusion & disturbance
- Social Nuisance: Job seeking & differing Norms, Culture & values
- Impacts associated with closure and decommissioning of mining works

7.2 Impact Assessment Methodology

The Environmental Assessment process primarily ensures that potential impacts that may occur from project activity are identified and addressed with environmentally cautious approaches and legal compliance. The impact assessment method used for this project is following Namibia's

Environmental Management Act (No. 7 of 2007) and its Regulations of 2012, as well as the International Finance Corporation (IFC) Performance Standards.

The identified impacts were assessed in terms of scale/extent (spatial scale), duration (temporal scale), magnitude (severity), and probability (likelihood of occurring), as presented in **Table 6**, **Table 7**, **Table 8**, and **Table 9** respectively.

To enable a scientific approach to the determination of the environmental significance, a numerical value is linked to each rating scale. This methodology ensures uniformity and that potential impacts can be addressed in a standard manner so that a wide range of impacts are comparable. It is assumed that an assessment of the significance of a potential impact is a good indicator of the risk associated with such an impact. The following process will be applied to each potential impact:

- Provision of a brief explanation of the impact.
- Assessment of the pre-mitigation significance of the impact; and
- Description of recommended mitigation measures.

The recommended mitigation measures prescribed for each of the potential impacts contribute towards the attainment of environmentally sustainable operational conditions of the project for various features of the biophysical and social environment. The following criteria were applied in this impact assessment:

7.2.1 Extent (spatial scale)

The extent is an indication of the physical and spatial scale of the impact. **Table 6** shows the rating of impact in terms of the extent of spatial scale.

Table 6: Extent or spatial impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
The impact is localized within the site boundary: Site only	The impact is beyond the site boundary: Local	Impacts felt within adjacent biophysical and social environments: Regional	Impact widespread far beyond site boundary: Regional	The impact extends National or international boundaries

7.2.2 Duration

Duration refers to the timeframe over which the impact is expected to occur, measured concerning the lifetime of the project. **Table 7** shows the rating of impact in terms of duration.

Table 7:Duration impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Immediate mitigating measures, immediate progress	The impact is quickly reversible, and short-term impacts (0-5 years)	Reversible over time; medium-term (5-15 years)	Impact is long-term	Long-term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

7.2.3 Intensity, Magnitude/severity

Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative. These ratings were also taken into consideration during the assessment of severity. **Table 8** shows the rating of impact in terms of intensity, magnitude, or severity.

Table 8:Intensity, magnitude, or severity impact rating

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
Qualitative	Very high deterioration, high quantity of deaths, injury or illness / total loss of habitat, total alteration of ecological processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat/diversity or resource, severe alteration or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat/biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.

7.2.4 Probability of occurrence

Probability describes the likelihood of the impacts occurring. This determination is based on previous experience with similar projects and/or based on professional judgment. **Table 9** shows impact rating in terms of probability of occurrence.

Table 9:Probability of occurrence impact rating

Low (1)	Medium/Low (2)	Medium (3)	Medium/High (4)	High (5)
Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.	Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards	A possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.	Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.	Definite (regardless of preventative measures), highly likely, and continuous. High risk or vulnerability to natural or induced hazards.

7.2.5 Significance

Impact significance is determined through a synthesis of the above impact characteristics. The significance of the impact “without mitigation” is the main determinant of the nature and degree of mitigation required. As stated in the introduction to this section, for this assessment, the significance of the impact without prescribed mitigation actions is measured.

Once the above factors (**Table 6**, **Table 7**, **Table 8**, and **Table 9**) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

$$\text{SIGNIFICANCE POINTS (SP)} = (\text{MAGNITUDE} + \text{DURATION} + \text{SCALE}) \times \text{PROBABILITY}$$

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate, or low significance, based on the following significance rating scale (**Table 10**).

Table 10:Significance rating scale

<i>Significance</i>	<i>Environmental Significance Points</i>	<i>Colour Code</i>
High (positive)	>60	H
Medium (positive)	30 to 60	M

Significance	Environmental Significance Points	Colour Code
Low (positive)	1 to 30	L
Neutral	0	N
Low (negative)	-1 to -30	L
Medium (negative)	-30 to -60	M
High (negative)	-60<	H

Positive (+) – Beneficial impact

Negative (-) – Deleterious/ adverse+ Impact

Neutral – Impacts are neither beneficial nor adverse

For an impact with a significance rating of high (-ve), mitigation measures are recommended to reduce the impact to a medium (-ve) or low (-ve) significance rating, provided that the impact with a medium significance rating can be sufficiently controlled with the recommended mitigation measures. To maintain a low or medium significance rating, monitoring is recommended for a period to enable the confirmation of the significance of the impact as low or medium and under control.

The assessment of the mining phases is done for pre-mitigation and post-mitigation.

The risk/impact assessment is driven by three factors:

Source: The cause or source of the contamination.

Pathway: The route taken by the source to reach a given receptor

Receptor: A person, animal, plant, ecosystem, property, or a controlled water source. If contamination is to cause harm or impact, it must reach a receptor.

A pollutant linkage occurs when a source, pathway, and receptor exist together. Mitigation measures aim firstly, to avoid risk and if the risk cannot be avoided, mitigation measures to minimize the impact are recommended. Once mitigation measures have been applied, the identified risk would reduce to lower significance (Booth, 2011).

This assessment focuses on the three project phases namely, planning, mining (and possible analysis), and decommissioning. The potential negative impacts stemming from the proposed activities of the ML are described and assessed and mitigation measures are provided thereof. Further mitigation measures in a form of management action plans are provided in the Draft Environmental Management Plan.

7.3 Assessment of Potential Negative Impacts

The main potential negative impacts associated with the operation and maintenance phase are identified and assessed below:

7.3.1 Disturbance to the grazing areas

The ML is overlying a commercial farm that have livestock and wildlife, activities such as site clearing, trenching, and drilling can potentially lead to the disturbance of grazing land. This will potentially affect the grazing land available to wildlife, and since the wildlife greatly depends on the little available flora, their livelihood will be impacted.

The effect of mining work on the land (when done over a wider spatial extent), if not mitigated, may hinder grazing areas. Under the status quo, the impact can consider being of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will be reduced to a lower significance. The impact is assessed in **Table 11** below.

Table 11: Assessment of the impacts of mining on grazing areas

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M: -4	M: -3	M: -4	M/H: 5	M: -55
Post mitigation	L/M: -2	L/M: -2	L/M: -4	L/M: 3	L: -24

7.3.2 Land Degradation and Loss of Biodiversity

Fauna: The trenching, pitting, and drilling activities carried out during mining would result in land degradation, leading to habitat loss for a diversity of flora and fauna ranging from microorganisms to large animals and trees. Endemic species are most at risk since even the slightest disruption in their habitat can result in extinction.

The presence and movement of the mining workforce and operation of project equipment and heavy vehicles would disturb livestock and wildlife present. The proposed activities may also carry the risk of the potential illegal hunting of local wildlife. This could lead to the reduction of specific faunal species, which may limit tourism (sightseeing and safari) activity in the area.

Additionally, if the sites are not rehabilitated, they could pose a high risk of injuries to animals by falling into holes and pits.

Flora: Direct impact of mining works on flora will mainly occur through clearing for mining access routes and associated infrastructure. The dust emissions from drilling may also affect surrounding vegetation through the fall of dust, if excessive. Some loss of vegetation is an inevitable consequence of the development. However, given a moderate abundance of vegetations and site-specific areas of mining on the ML, the impact will be localized, therefore manageable.

Under the status, the impact can be of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will be reduced to a low significance rating. The impact is assessed in **Table 12** below.

Table 12: Assessment of the impacts of mining on biodiversity

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M: -4	M: -4	M: -6	M/H: 4	M: -56
Post mitigation	L/M: -3	L/M: -3	L/M: -4	L/M: 3	L: -30

7.3.3 Generation of Dust (Air Quality)

Dust emanating from site access routes when transporting equipment and supply to and from the site may compromise the air quality in the area. Vehicular movements from heavy vehicles such as trucks would potentially create dust, even if it is not anticipated to be low. Additionally, activities carried out as part of the mining works such as drilling would contribute to the dust levels in the air. The medium significance of this impact can be reduced to a low significance rating by properly implementing mitigation measures. The impact is assessed in **Table 13** below.

Table 13: Assessment of the impacts of mining on air quality

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M: -3	M: -3	M/L: -4	M/H: 4	M: -40

Post mitigation	L - 2	L - 2	L - 2	L - 1	L - 6
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7.3.4 Water Resources Use

Water resources are impacted by project developments/activities in two ways - through pollution (water quality) or over-abstraction (water quantity) or at times both.

The abstraction of more water than can be replenished from low groundwater potential areas would negatively affect the local communities (communal and livestock) that depend on the same low potential groundwater resource (aquifer).

The impact of the project activities on the resources would be dependent on the water volumes required by each project activity. Mining activities use water, mainly for drilling. However, this depends on the type of methods employed (diamond drilling is more water-consuming compared to drilling methods such as reverse circulation for instance) and the type of mineral being explored.

The drilling method to be employed for this project's mining activities is Reverse Circulation. Given the low to medium groundwater potential of some project site areas, the Proponent may consider carting some of the water volumes from outside the area and stored in industry-standard water reservoirs/tanks on site. The exact amounts of water required for proposed operations would be dependent on the duration of the mining works and the number of water required to make a reliable interpretation of the commodities explored. The mining period is temporally limited, therefore, the impact will only last for the duration of the mining activities, and ceases upon their completion.

Without the implementation of any mitigation measures, the impact can be rated as medium, but upon effective implementation of the recommended measures, the impact significance would be reduced to low as presented in **Table 14** below.

Table 14: Assessment of the project impact on water resource use and availability

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 3	L/M - 4	M/H - 4	M - 40
Post mitigation	L/M - 1	L/M - 1	L - 2	L/M - 3	L - 12

7.3.5 Soil and Water Resources Pollution

The proposed mining activities are associated with a variety of potential pollution sources (i.e., lubricants, fuel, and wastewater) that may contaminate/pollute soils, and eventually, surface and groundwater. The anticipated potential source of pollution to water resources from the project activities would be hydrocarbons (oil) from project vehicles, machinery, and equipment as well as potential wastewater/effluent from mining-related activities.

The spills (depending on volumes spilled on the soils) from machinery, vehicles, and equipment could infiltrate into the ground and pollute the fractured or faulted aquifers on site, and with time reach further groundwater systems in the area. However, it should be noted that the scale and extent/footprint of the activities where potential sources of pollution will be handled is relatively small. Therefore, the impact will be moderately low.

Pre-implementation of the mitigation measures, the impact significance is medium to high and upon implementation, the significance will be reduced to moderate. The impact is assessed in **Table 15** below.

Table 15: Assessment of the project impact on soils and water resources (pollution)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 5	M/L - 3	M/L - 3	M - 4	M - 44
Post mitigation	L - 3	M - 3	L - 3	L/M - 3	L - 27

7.3.6 Waste Generation

During the mining program, domestic and general waste is produced on-site. If the generated waste is not disposed of responsibly, land pollution may occur on the ML or around the sites. The ML is in an area of moderate sensitivity to pollution. Improper handling, storage, and disposal of hydrocarbon products and hazardous materials at the site may lead to soil and groundwater contamination, in case of spills and leakages. Therefore, the mining program needs to have appropriate waste management for the site. To prevent these issues, any hazardous waste that may have an impact on animals, vegetation, water resources, and the general environment should be handled cautiously. Without any mitigation measures, the general impact of waste generation has a medium significance. The impact will reduce to low significance, upon implementing the mitigation measures. The assessment of this impact is given in **Table 16** below.

Table 16: Assessment of waste generation impact

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	M - 6	M - 5	M - 50
Post mitigation	L - 1	L - 1	L - 2	L/M - 2	L - 8

7.3.7 Occupational Health and Safety Risks

Project personnel (workers) involved in the mining activities may be exposed to health and safety risks. These may result from accidental injury, owing to either minor (i.e., superficial physical injury) or major (i.e., involving heavy machinery or vehicles) accidents. The site safety of all personnel is the Proponent's responsibility and should be adhered to as per the requirements of the Labour Act (No. 11 of 2007) and the Public Health Act (No. 36 of 1919). The heavy vehicle, equipment, and fuel storage area should be properly secured to prevent any harm or injury to the project workers or local animals.

The use of heavy equipment, especially during drilling, and the presence of hydrocarbons on sites may result in accidental fire outbreaks, which could pose a safety risk to the project personnel, equipment, and vehicles. It may also lead to widespread veld fires if an outbreak is not contained and if machinery and equipment are not properly stored, the safety risk may be a concern for project workers and residents.

The impact is probable and has a medium significance rating. However, with adequate mitigation measures, the impact rating will be reduced to low. This impact is assessed in **Table 17** below and mitigation measures are provided.

Table 17: Assessment of the impacts of mining on health and safety

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/L - 2	M - 6	M/H - 4	M - 44
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L - 12

7.3.8 Vehicular Traffic Use and Safety

The ML is accessible via the B1 road and diverges into the D0316, thereafter a 10km gravel road leading to the ML. These are some of the main transportation routes for all vehicular movement in the area and provide access to the ML and connect the project area to other towns. Traffic volume will therefore increase on these district roads during mining as the project would need delivery of supplies and services on site.

Depending on the project needs, trucks, medium-sized vehicles, and small vehicles will frequent the area to and from sites on the ML. This would potentially increase slow-moving heavy vehicular traffic along these roads and add additional pressure on the roads. However, transportation of materials and equipment is expected to occur on a limited schedule and only for the duration of the project. Therefore, the risk is anticipated to be short-term, not frequent, and therefore of medium significance. Before mitigation, the impact can be rated medium and with the implementation of mitigation measures, the significance will be low as assessed in **Table 18** below.

Table 18: Assessment of the impacts of mining on-road use (vehicular traffic)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 4	M/H - 3	L/M - 4	M/H - 5	M - 55
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L - 12

7.3.9 Noise and vibrations

Mining work may be a nuisance to surrounding communities due to the noise produced by the activities. Excess noise and vibrations can be a health risk to workers on site. The mining equipments used for drilling on site is of medium size and the noise level is bound to be limited to the site only, therefore, the impact likelihood is minimal. Without any mitigation, the impact is rated as of medium significance. To change the impact significance from the pre-mitigation significance to a low rating, mitigation measures should be implemented. This impact is assessed in **Table 19** below.

Table 19: Assessment of the impacts of noise and vibrations from mining

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
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Pre mitigation	L/M - 2	L/M - 2	M - 6	M/H - 3	M – 30
Post mitigation	L - 1	L/M - 2	L - 2	L/M - 2	L - 10

7.3.10 Disturbance to Archaeological and Heritage Resources

The specialist archaeological assessment conducted, indicates that Karas Region is sensitive and contains archeological/cultural significant sites, and there is a possibility of unveiling/discovering new archeological and/or cultural materials in the proposed project area. If such Materials are found the areas must be mapped out and coordinates taken to establish “No-Go-Areas”, due to their sensitivity and then documented. They may be protected either by fencing them off or demarcation for preservation purposes, or excluding them from any development i.e., no mining activities should be conducted near these recorded areas through the establishment of buffer zones.

This impact can be rated as medium significance if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact significance will be reduced to a lower rating. The impact is assessed in **Table 20**.

Table 20: Assessment of the impacts of mining on archaeological & heritage resources

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	M - 6	M/H - 4	M – 52
Post mitigation	L/M - 2	L/M - 2	L - 2	L/M - 2	L - 12

7.3.11 Impact on Local Roads/Routes

Mining projects are usually associated with the movements of heavy trucks and equipment or machinery that use local roads. Heavy vehicles traveling on local roads exert pressure on the roads and may make the roads difficult to use. This will be a concern if maintenance and care is not taken during the mining phase. The impact would be short-term (during mining only) and therefore, manageable.

Without any management and or mitigation measures, the impact can be rated as medium and to reduce this rating to low, the measures will need to be effectively implemented. The assessment of this impact is presented in **Table 21**.

Table 21: Assessment of mining of local services (roads and water)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M/H - 4	M - 3	M - 6	M - 3	M – 39
Post mitigation	L - 1	L - 1	M/L - 4	M/L -2	L - 12

7.3.12 Social Nuisance: Local Property intrusion and Disturbance/Damage

The presence of some non-resident workers may lead to social annoyance to the local community. This could particularly be a concern if they enter or damage local private property. The private properties of the locals may include houses, fences, vegetation, livestock, wildlife, or any properties of economic or cultural value to land users. The damage or disturbance to properties may not only be private but local public properties. The unpermitted and unauthorized entry to private property may cause clashes between the affected property (land) owners and the Proponent.

The impact is rated as of medium significance. However, upon mitigation (post-mitigation), the significance will change from a medium to a low rating. The impact is assessed below (**Table 22**).

Table 22: Assessment of the social impact of community property damage or disturbance

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 2	M - 3	M - 4	M/H - 3	M – 27
Post mitigation	L - 1	L - 1	M/L - 4	M/L -2	L - 12

7.4 Cumulative Impacts Associated with Proposed Activities

According to the International Finance Corporation (2013), cumulative impacts are defined as “impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as “developments”) when added to other existing, planned, and/or reasonably anticipated future impacts”.

Like many other mining projects, some cumulative impacts to which the proposed project and associated activities potentially contribute, are the:

- **Impact on road infrastructure:** The proposed mining activity contributes cumulatively to various activities such as farming activities and traveling associated with tourism and local daily routines. The contribution of the proposed project to this cumulative impact is however not considered significant, given the short duration, and spatial extent of the intended mineral activities.
- **Use of water:** While the contribution of this project will not be significant, mitigation measures to reduce water consumption during mining are essential.

8 RECOMMENDATIONS AND CONCLUSION

8.1 Recommendations

The potential positive and negative impacts of the proposed activities on ML No. 107 were identified and assessed and appropriate management and mitigation measures (to negative impacts) were made thereof for implementation by the Proponent, their contractors, and project-related employees.

Mitigation measures for identified issues have been provided in the Environmental Management Plan, for the Proponent to avoid and/or minimize their significant impacts on the environmental and social components. Most of the potential impacts were found to be of medium-rating significance. With effective implementation of the recommended management and mitigation measures, a reduced rating in the significance of adverse impacts is expected from Medium to Low. To maintain the desirable rating, the implementation of management and mitigation measures should be monitored by the Proponent directly, or their Environmental Control Officer (ECO). The monitoring of implementation will not only be done to maintain a low rating but also to ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed right away.

The Environmental Consultant is confident that the potential negative impacts associated with the proposed project activities can be managed and mitigated by the effective implementation of the recommended management and mitigation measures and with more effort and commitment put into monitoring the implementation of these measures.

It is, therefore, recommended that in the case of granting an ECC for this project, the mining activities may be granted an ECC, provided that:

- All the management and mitigation measures provided in the EMP are effectively and progressively implemented.
- All required permits, licenses, and approvals for the proposed activities should be obtained as required. These include permits and licenses for land use access agreements to explore and ensure compliance with these specific legal requirements.
- The Proponent and all project workers and contractors must comply with the legal requirements governing the project and ensure that all required permits and or approvals are obtained and renewed as stipulated by the issuing authorities.
- Site areas where mining activities have ceased are rehabilitated, as far as practicable, to their pre-mining state.

8.2 Conclusion

It is crucial for the proponents and their contractors to effectively implement the recommended management and mitigation measures, to protect the biophysical and social environment throughout the project duration. This would be done to promote environmental sustainability while ensuring a smooth and harmonious existence and purpose of the project activities in the community and environment at large. It is also to ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed accordingly. Lastly, should the ECC be issued, the Proponent will be expected to be compliant with the ECC conditions as well as legal requirements governing mining and related activities.

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