



Excel Dynamic Solutions (Pty) Ltd

Environmental Scoping Assessment (ESA) for Base & Rare Metals, Industrial Minerals, Nuclear Fuel Minerals and Precious Metals on Exclusive Prospecting Licence (EPL) No. 7646 located southwest of Arandis in Erongo Region, Namibia

ENVIRONMENTAL ASSESSMENT REPORT: FINAL

ECC Reference No: 221024000166

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September 2022

EXECUTIVE SUMMARY

Betel Leaf Investment (Pty) Ltd (The Proponent), has been granted an Exclusive Prospecting Licence (EPL) No. 7646 by the Ministry of Mines and Energy (MME). The tenure of the EPL is from 22st May 2022 to 21th May 2023. The 19 994.169-hectare (ha) EPL is located about 67.40 km southwest of Arandis, in the Erongo Region.

The targeted commodities are **Base & Rare Metals, Industrial Minerals, Nuclear Fuel Minerals and Precious Metals.**

The EPL No. 7646 partly lies within the Naukluft National Park and covers (overlies) Farm Ruimte No. 123, Emeritus No. 123 and Onanis No. 121.

Prospecting and exploration related activities are among listed activities that may not be undertaken without an ECC under the Environmental Impact Assessment (EIA) Regulations. Subsequently, to ensure that the proposed activity is compliant with the national environmental legislation, the project Proponent, appointed an independent environmental consultant, Excel Dynamic Solutions (Pty) Ltd to undertake the required Environmental Assessment (EA) process and apply for the ECC on their behalf.

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 Exploration Methods

The Proponent intends to adopt a systematic prospecting and exploration approach of the following:

- 1. Non-invasive Technique:**

- **Desktop Study: Geological mapping:** This mainly entails a desktop review of geological maps and ground observations. This includes the review of geological maps of the area and on-site ground traverses and observations and an update where relevant, of the information obtained during previous geological studies of the area and aero-geophysics survey.
- **Lithology geochemical surveys:** Rock and soil samples shall be collected and taken for trace element analysis to be conducted by analytical chemistry laboratories to determine if enough target commodities are present. Also, trenches or pits may be dug depending on the commodity (in a controlled environment e.g., fencing off and labelling activity sites) adopting a manual or excavator to further investigate the mineral potential. Soil sampling consists of small pits being dug where 1kg samples can be extracted and sieved to collect 50g of material. As necessary, and to ensure adequate risk mitigations, all major excavations will both be opened and closed immediately after obtaining the needed samples or the sites will be secured until the trenches or pits are closed. At all times, the farm owners and other relevant stakeholders will be engaged to obtain authorization where necessary.
- **Geophysical surveys:** This will entail data collection of the substrata (in most cases service of an aero-geophysical contractor will be sourced), by air or ground, through sensors such as radar, magnetic and electromagnetic to detect any mineralization in the area to ascertain the mineralization. Ground geophysical surveys shall be conducted, where necessary using vehicle-mounted sensors or handheld by staff members, while in the case of air surveys the sensors will be mounted to an aircraft, which then flies over the target area.

2. Invasive Technique:

- **Detailed Exploration Drilling (Invasive Technique):** Should analyses by an analytical laboratory be positive, holes are drilled, and drill samples collected for further analysis. This will determine the depth of the potential mineralization. If necessary new access tracks to the drill sites will be created and drill pads will be cleared in which to set up the rig. Two widely used drilling options may be adopted, these are either Reverse Circulation (RC) drilling and/or diamond drilling. RC drilling uses a pneumatic hammer, which drives a rotating tungsten-steel bit. The technique produces an uncontaminated large volume sample, which is comprised of rock chips. It is relatively quicker and cheaper when compared to other techniques like Diamond Drilling. However, diamond drilling may also be considered for this exploration programme, for better geological control and to perform processing trials. A typical drilling site will consist of a drill-rig, and support vehicles as well as a drill core and geological samples store. A drill core equipment parking and maintenance yard may be set up (including a fuel and lubricants storage facility).

Public Consultation

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 proposed prospecting and exploration activities was done through the following means and in this order to ensure that the public is notified and afforded an opportunity to comment on the proposed project:

- A Background Information Document (BID) containing brief information about the proposed facility was compiled and emailed to relevant Authoritative Ministries, and upon request to all new registered Interested and Affected Parties (I&APs).
- Project Environmental Assessment notices were published in The Namibian (08 August 2022 and 15 August 2022) and New Era Newspapers (08 August 2022 and 15 August 2022), 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 I&APs on the 09th of September 2022 at Arandis Town Hall at 09h30. The consultation meeting minutes were recorded.
- The issues and concerns raised together with site assessments were noted and used to form a basis for the ESA Report and EMP.

Potential Impacts identified

The following potential negative 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 (Section 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 I&APs at

Arandis Town Hall, whereby they raised comments and concerns 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 their 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 with the aim of promoting environmental sustainability while ensuring a smooth and harmonious existence and purpose of the project activities in the community and environment at large. However, if an ECC is to be issued, the ECC should be issued on a condition that the provided management measures and action plans are effectively implemented on site and monitored. Most importantly, monitoring of the environmental components described in the impact assessment chapter should be conducted by the Proponent and applicable Competent Authority. This is to ensure that all potential impacts identified in this study and other impacts that might arise during the exploration are properly identified in time and addressed. Lastly, should the ECC be issued, the Proponent will be expected to be compliant with the ECC conditions as well as legal requirements governing the mineral exploration and related activities as stipulated in the National Policy on Prospecting and mining in Protected Areas, including;

- Furnishing the MEFT and MME with an environmental report every six (6) months
- Carrying out and submission of an annual Environmental Audit to the MEFT and MME

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 proposed prospecting and exploration 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 exploration activities have ceased are rehabilitated, as far as practicable, to their pre-exploration 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

Excel Dynamic Solutions (EDS) warrants that the findings and conclusion contained herein were accomplished in accordance with the methodologies set forth 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 for the purpose of identifying recognized environmental conditions. There is a possibility that even with the proper application of these methodologies there may exist the 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 exploration 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 set forth 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 upon 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)

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

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Appendix H: Archaeological and Heritage Specialist Report and NHC proof of submission

Appendix I: Ecological desktop Report

Appendix J: Application for transfer for EPL 7646

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
EPL	Exclusive Prospecting Licence
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
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 that would meet the same purpose and need of the proposal.
Baseline	Work done to collect and interpret information on the condition/trends of the existing environment.
Biophysical	That part of the environment that does not originate with human activities (e.g. biological, physical and chemical processes).
Cumulative Impacts/Effects Assessment	In relation to 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 which 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 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 environmental effects are to be mitigated, controlled and monitored.
Exclusive Prospecting Licence	Is a license that confers exclusive mineral prospecting rights over land of up to 1000 km ² in size for an initial period of three years, renewable twice for a maximum of two years at a time
Interested and Affected Party (I&AP)	In relation to the assessment of a listed activity includes - (a) any person, group of persons or organization interested in or affected by 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 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 that 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 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

Betel Leaf Investment (Pty) Ltd (The Proponent), has been granted an Exclusive Prospecting Licence (EPL) No. 7646 by the Ministry of Mines and Energy (MME). The tenure of the EPL is from 22st May 2022 to 21th May 2023. The 19 994.169-hectare (ha) EPL is located about 67.40 km southwest of Arandis, in the Erongo Region (**Figure 1**).

The EPL No. 7646 partly lies within the Naukluft National Park and covers (overlie) Farm Ruimte No. 123, Emeritus No. 123 and Onanis No. 121.

The target commodities are **Base & Rare Metals, Industrial Minerals, Nuclear Fuel Minerals and Precious Metals**.

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

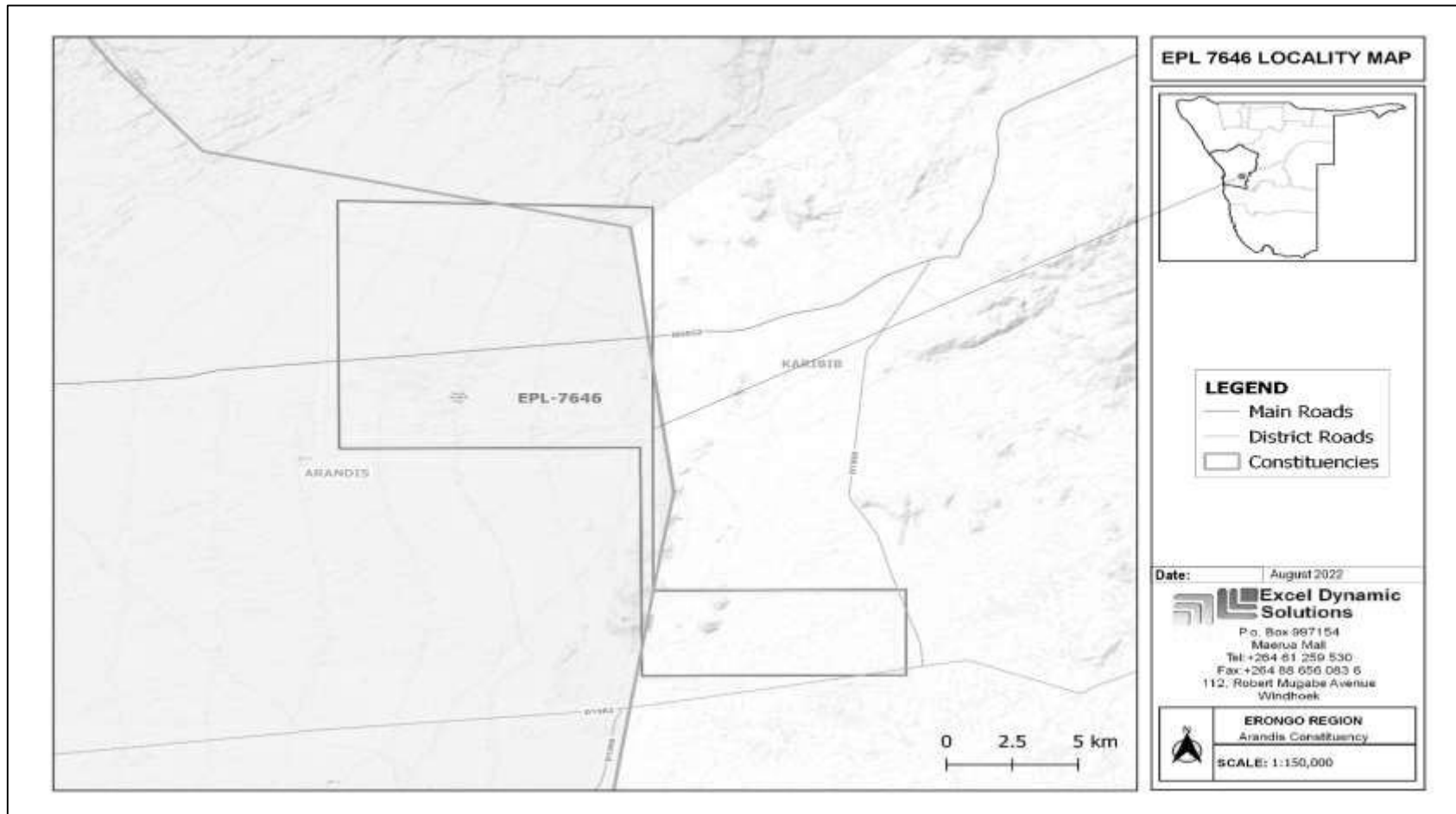


Figure 1: Locality map for EPL No. 7646 located near Arandis, Erongo Region

1.2 Terms of Reference, Scope of Works and Appointed EA Practitioner

To satisfy the requirements of the EMA and its 2012 EIA Regulations, The Proponent appointed EDS, to conduct the required EA process on their (Proponent's) behalf, and thereafter, apply for an ECC for exploration works on the EPL. There were no formal Terms of Reference (ToR) provided to EDS by the Proponent. The consultant, instead, relied on the requirements of the Environmental Management Act (No. 7 of 2007) (EMA) and its EIA Regulations (GN. No. 30 of 2012) to conduct the study.

The application for the ECC (**Appendix A**) was compiled and submitted to the 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) (**Appendix B**), an ECC for the proposed project may be considered by the Environmental Commissioner at the MEFT's Department of Environmental Affairs and Forestry (DEAF).

The EIA project is headed by Mr. Nerson Tjelos, a qualified and experienced Geoscientist and experienced EAP. The consultation process and reporting are done by Mr. Mandume Leonard and Reviewed by Mr. Silas David. Mr. Nerson Tjelos CV is presented in **Appendix C**.

1.3 Motivation for the Proposed Project

The mining industry is one of the largest contributors to the Namibian economy, it contributes to the improvement of local livelihoods. In Namibia, exploration for minerals is done mainly by the private sector. Exploration activities have a great potential to enhance and contribute to the development of other sectors and its activities do provide temporary employment, and taxes that fund social infrastructural development. The minerals sector yields foreign exchange and accounts for a significant portion of gross domestic product (GDP). Additionally, the industry produces a trained workforce and small businesses that can serve communities, and may initiate related businesses. Exploration activity fosters several associated activities such as manufacturing of exploration and mining equipment, and provision of engineering and environmental services. The mining sector forms a vital part of some of Namibia's development plans, namely: Vision 2030, National Development Plan 5 (NDP5), and Harambee Prosperity Plans (HPPs) I and II. Thus, mining is essential to the development goals of Namibia in contributing to meeting the ever-increasing global demand for minerals, and for national

prosperity. Therefore, successful exploration on EPL No. 7646 would lead to the mining of Base & Rare Metals, Industrial Minerals, Nuclear Fuel Minerals and Precious Metals, which would contribute towards achieving the goals of the national development plans; hence the need to undertake the proposed exploration activities on the EPL.

1.4 Motivation for Exploration activities for EPL 7646 in a Protected Area: Naukluft National Park

The EPL 7646 lies within the Naukluft National Park which is of the largest national parks in Africa. Taking into account that the EPL 7646 lies within this protected area, the National Policy stipulated on Prospecting and exploration in Protected Areas is highly recommended. Rehabilitation will be highly recommended as required under the exploration and Prospecting in Protected Areas and National Monuments (1999).

EPL 7646 lies in close vicinity with active Mining Licence, such as, (ML) No. 140 and 172 which are owned by Langer Heinrich Uranium (Pty) Ltd (**Figure 2**). These active MLs also fall within the Naukluft National Park. The already occurring mineral exploration/mining activity in the area have proven that sustainable mineral exploration activity in the area may be possible, under conditions that the provided management measures and action plans are effectively implemented on site and monitored.



Figure 2: Mining Licences within the Naukluft National Park (Source: <https://maps.landfolio.com/Namibia/>)

Table 1 Presents different characteristics of Protected Areas as stipulated in the National Policy on Prospecting and mining in Protected Areas (2018) in relation to the area (EPL 7646). The Consultant understands that the policy is also aimed at establishing “no go areas” where exploration will not be permitted due to high conservation and/or aesthetic and tourism value, based upon the best available information.

Table 1: Characteristics of Protected Areas

Characteristic	Case with EPL 7646 (YES/NO/UNKNOWN)	Consultant comment
Biodiversity Priority Areas	YES	In the Naukluft National Park
High Value Tourism Areas	UNKNOWN	
Known Breeding Areas of Certain Species, Including Marine Species	NO	Inland exploration project
Important Wetland Areas	NO	Dryland
Areas with Existing Economic Activities That Would Be	UNKNOWN	Active mining activities known in the vicinity of the exploration EPL 7646

Compromised by Prospecting and/or Mining		
Areas with The Potential to Be Developed into Economically Viable Tourist or Other Compatible Operations	NO	

1.5 Namibia's Approach towards exploration and Mining in a National Park

Any mining development in a National Park must be balanced against the risk that it could jeopardize the potential for long-term sustainable development. Prospecting and mining of minerals, elements and rocks stated in the Minerals (Prospecting and Mining) Act of 1992 are permitted as such developments are in the national interest. The targeted commodity group are listed in the Minerals Act. The National Policy on Prospecting and Mining in Protected Areas developed in 2018 states that granting of an Exclusive Prospecting and Mining Licenses is permitted in Protected Areas and National Monuments upon presenting a plan of activities that will be carried out using best practice, taking into account long-term national benefits and conservation efforts.

The Policy of the Conservation of Biotic Diversity and Habitat Protection was drafted by the Ministry of Environment, Forest and Tourism in 1994 to ensure adequate protection of all species and subspecies, of ecosystems, and of natural life-support processes.

1.6 Namib Ecology Integrity

The ecological integrity and diversity of fauna and flora of the Western Namib is well addressed in the Strategic Environmental Management Plan (SEMP) developed in 2009 as a result of the Strategic Environmental and Socio-Economic Assessment of the Uranium industry "rush". The annual SEM report (2014) indicated that the integrity and diversity of the Western Namib biodiversity is not compromised by the exploration and mining activities. The report went further to explain that ecological integrity means that ecological processes are maintained, key habitats are protected, rare and endangered and endemic species are not threatened. The SEM limits are defined through Environmental Quality Objectives and aim to;

- Improve Namibia's and the Erongo Region's sustainable socio-economic development and outlook without undermining the growth potential of other sectors
- Promote local employment and integration of society;
- Ensure that key infrastructure is adequate and well maintained, thus enabling economic development, public convenience and safety;
- Ensure that the integrity of all aquifers remains consistent with the existing natural and operational conditions (baseline). This requires that both the quantity and quality of groundwater are not adversely affected by prospecting and mining activities;
- Ensure workers and the public do not suffer significant increased health risks from the exploration and mining activities;
- Safeguard the natural beauty of the desert and ensure its sense of place are not compromised unduly by the exploration and mining activities;
- Identify ways of avoiding conflicts between the tourism industry and prospecting/mining, so that both industries can coexist in the Western Namib;
- **Protect the ecological integrity and diversity of fauna and flora of the Central Namib. All efforts are taken to avoid impacts to the Namib and where this is not possible, disturbed areas are rehabilitated and restored to function after mining/development;**
- Maintain and enhance Namibia's international image because of environmentally, socially and financially responsible mining operations;
- Ensure that exploration and mining and all related infrastructure developments will have the least possible negative impact on archaeological and paleontological heritage resources.

2. PROJECT DESCRIPTION: PROPOSED EXPLORATION ACTIVITY

Prospecting and exploration of minerals are the first components of any potential mining project. This is done to acquire the necessary data required for further decision making and investment options. These activities are anticipated to last for about three years, with ground geophysical surveys done in stages on different parts of the EPL, lasting several weeks. The exploration

process includes three phases, namely: prospecting, exploration, and the decommissioning of works.

2.1 Prospecting Phase (Non- Invasive Techniques)

2.1.1 Desktop Study: Geological mapping

This mainly entails a desktop review of geological area maps and ground observations. This includes the review of geological maps of the area and on-site ground traverses and observations and an update where relevant, of the information obtained during previous geological studies of the area.

2.1.2 Geophysical surveys

Geophysical surveys entail data collection of the substrata by air or ground, through sensors such as radar, magnetic and/or electromagnetic sensors, to detect and ascertain any mineralization in the area. Ground geophysical surveys shall be conducted, where necessary, using vehicle-mounted sensors or handheld by staff members, while in the case of air surveys, the sensors are mounted to an aircraft, which navigates over the target area.

2.1.3 Lithology geochemical surveys

Rock and soil samples shall be collected and taken for trace element analysis to be conducted by analytical chemistry laboratories to determine if enough Base & Rare Metals, Industrial Minerals, Nuclear Fuel Minerals and Precious Metals are present. Additionally, trenches or pits may be dug depending on the commodity (in a controlled environment e.g., fencing off and labeling activity sites) adopting a manual or excavator to further investigate the mineral potential.

Soil sampling consists of small pits being dug, where 1kg samples can be extracted and sieved to collect about 50g of material. As necessary, and to ensure adequate risk mitigation, all major excavations will be opened and closed immediately after obtaining the needed samples, or the sites will be secured until the trenches or pits are closed. At all times, the landowner and other relevant stakeholders will be engaged to obtain authorization where necessary.

2.2 Exploration (Drilling) Phase

The selection of the potential mineralization model and exploration targets will be based on the local geology, and the trenching, drilling, and assay results of the samples collected. The planned exploration activities are aimed at delineating the mineral deposits and determining whether the deposits are economically feasible mining resources. **No explosives will be used during the exploration phase.**

2.2.1 Detailed Exploration (Drilling)

Should analyses by an analytical laboratory yield positive results, holes are drilled, and drill samples collected for further analysis. This will determine the depth of the potential mineralization. If necessary, new access tracks to the drill sites will be created and drill pads will be cleared in which to set up the rig. Two widely used drilling options may be adopted, these are the Reverse Circulation (RC) drilling method and/or the Diamond (Core) drilling method. The RC drilling method uses a pneumatic hammer, which drives a rotating tungsten-steel bit. The technique produces an uncontaminated large volume sample, which comprises rock chips. It is relatively quicker and cheaper when compared to other techniques like Diamond Drilling. However, Diamond drilling may also be considered for this exploration programme, for better geological control and to perform processing trials.

A typical drilling site consists of a drill-rig and support vehicles as well as a drill core and geological samples store. A drill equipment parking and maintenance yard may be set up (including a fuel and lubricants storage facility).

Other aspects of the proposed exploration operations include:

2.2.2 Accessibility to Site

The EPL is located near the Town of Arandis. It is accessible via the M0052 road from Arandis. Project-related vehicles will use existing roads to access the EPL. It is also anticipated that, if necessary, onsite new tracks to the different targeted exploration sites within the EPL may be created. However, it is highly recommended that the Proponent should use the already existing track within the National park. The Proponent may need to do some upgrading on the site access roads to ensure that it is fit to accommodate project related vehicles, such as heavy trucks.

2.2.3 Material and Equipment

The requirements of the exploration program in terms of vehicles and equipment include: (4X4) vehicles, a truck, water tanks, drill rigs and drilling machines, and a power generator. Equipment and vehicles will be stored at a designated area near the accommodation site or a storage site established within the EPL area.

2.2.4 Services and Infrastructure

- **Water:** Water for the exploration operations on the EPL will be obtained from the nearest existing boreholes, or the proponent will drill boreholes on the farms, upon obtaining necessary permits and signed agreements with the farmers (landowners). Estimated monthly water consumptions are at 4000 liters, but will not exceed 80 000 liters, which includes water for drinking, sanitation, cooking, dust control (if necessary), drilling, as well as washing of equipment.
- **Power supply:** Power required during the operation phase will be provided from diesel-generators. About 2000 litres of diesel will be used per day, a banded diesel bowser, which will be on site, will be filled 2 – 3 times a week.
- **Fuel (diesel for generators and other equipment):** The fuel (diesel) required for exploration equipment will be stored in a tank mounted on a mobile trailer, and drip trays will be readily available on this trailer and monitored to ensure that accidental fuel spills are cleaned up as soon as they have been detected/observed. Fuel may also be stored in jerry cans placed on plastic sheeting to avoid unnecessary contamination of the ground.

2.2.5 Waste Management

The site will be equipped with secured waste bins for each type of waste (i.e., domestic, hazardous, and recyclable). Depending on the amount generated, waste will be sorted and collected weekly or monthly and taken to the nearest certified landfill site. An agreement will need to be reached with different waste management facility operators/owners and authorization or permits will be obtained prior to utilizing these facilities, in the case of production of any hazardous waste.

- **Sanitation and human waste:** Portable ablution facilities will be used and the sewage will be disposed of as according to the approved disposal or treatment methods of the waste products.
- **Hazardous waste:** Drip trays and spill control kits will be available on site to ensure that oil/fuel spills and leaks from vehicles and equipment are captured on time and contained correctly before polluting the site.

2.2.6 Safety and Security

- **Storage Site:** Temporary storage areas for exploration material, equipment, and machinery will be required at the campsite and/or exploration sites. Security will be supplied on a 24-hour basis at the delegated sites for storage. A temporary support fence surrounding the storage site will be constructed to ensure people and domestic animals are not put at risk.
- **Fire management:** A minimum of basic firefighting equipment, i.e., two fire extinguishers will be readily available in vehicles, at the working sites and camps. The exploration crew is required to have the contact details of the nearest fire station at hand in case of a larger scale of fires at site.
- **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 first aid kits will be readily available on site to attend to potential minor injuries.

2.2.7 Accommodation

The exploration crew will be accommodated in Arandis, or a campsite will be set up for the exploration crew near the exploration sites. If the accommodation camp is to be set up on a farm, necessary arrangements will be made with the farm owner(s). Exploration activities will take place during daytime only and staff will commute to exploration site (s) from their place of accommodation.

2.3 Decommissioning and Rehabilitation Phase

Once the exploration activities on the EPL come to an end, the Proponent will need to put site rehabilitation measures in place. Decommissioning and rehabilitation are primarily reinforced through a decommissioning and rehabilitation plan, which consists of safety, health, environmental, and contingency aspects. An unfavorable economic situation or unconvincing exploration results might force the Proponent to cease the exploration program before predicted closure. Therefore, it is of best practice for the Proponent to ensure the project activities cease in an environmentally friendly manner and site is rehabilitated.

3 PROJECT ALTERNATIVES

Alternatives are defined as the “different means of meeting the general purpose and requirements of the activity” (EMA, 2007). This section highlights the different ways in which the project can be undertaken, and identifies alternatives that may be the most practical, but least damaging to the environment.

Once the alternatives have been established, these are examined by asking the following three questions:

- What alternatives are technically and economically feasible?
- What are the environmental effects associated with the feasible alternatives?
- What is the rationale for selecting the preferred alternative?

The alternatives considered for the proposed development are discussed in the following subsections.

3.1 Types of Alternatives Considered

3.1.1 The "No-go" Alternative

The “no action” alternative implies that the status quo remains, and nothing happens. Should the proposal of exploration activities on the EPL, be discontinued, none of the potential impacts (positive and negative) identified would occur. If the proposed project is to be discontinued, the current land use for the proposed site will remain unchanged.

This no-go option is considered and a comparative assessment of the environmental and socio-economic impacts of the “no action” alternative, is undertaken to establish what benefits might be lost if the project is not implemented. The key losses that may never be realized if the proposed project does not go ahead include:

- Loss of foreign direct investment.
- About 5-10 temporary job opportunities for community members will not be realized.
- No realization of local business supports through the procurement of consumable items such as Personal Protective Equipment (PPE), machinery spare parts, lubricants, etc.
- Loss of potential income to the local and national government through land lease fees, license lease fees, and various tax structures.

- Improved geological understanding of the site area regarding the targeted commodities.
- Socio-economic benefits such as skills acquisition to local community members would be not realized.

Considering the above losses, the “no-action/go” alternative may not necessarily be considered a viable option for this project.

3.1.2 Exploration Location

The prospecting/exploration location is dependent on the geological setting (regional and local), the economic geology, and the exploration and mining history of the EPL area. Therefore, finding an alternative location for the planned exploration activities is not possible. This means that the mineralization of the target commodities (Base & Rare Metals, Industrial Minerals, Nuclear Fuel Minerals and Precious Metals) are area-specific, and exploration 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.

Furthermore, the national mineral resources’ potential locations are also mapped and categorized by the Ministry of Mines and Energy, on exclusive prospecting licenses, mining licenses and claims, mineral deposit retention licenses, reconnaissance licenses, and exclusive reconnaissance licenses. Available information on EPL (**Figure 3**) and other licenses are available on the Namibia Mining Cadastral Map here <https://portals.landfolio.com/namibia/>



Figure 3: The location of EPL 7646 on the National Mining Cadastre

3.1.3 Exploration Methods

Invasive and non-invasive exploration activities are expected to take place. If an economically viable discovery is made, the project will proceed to the mining phase upon approval of a mining EIA and issuance of a mining license. If any other alternative viable exploration methods are found to achieve the purpose more effectively and/or efficiently without aggravating any environmental measures put in place, it can be implemented.

4 LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES

Prospecting and exploration activities have legal implications associated with certain applicable legal standards. A summary of applicable and relevant international policies and Namibian legislation, policies, and guidelines for the proposed development is given in this section (**Table 2**). This summary 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 prospecting and exploration activities.

4.1 The Environmental Management Act (No. 7 of 2007)

This EIA was carried out according to the Environmental Management Act (EMA) and its Environmental Impact Assessment (EIA) Regulations (GG No. 4878 GN No. 30).

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, 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 National Policy on Prospecting and Mining in Protected Areas

This Policy was developed in 2018 to complement various regulations and policies relevant to prospecting and mining, in order to ensure minimal negative impacts on the environment (referred to in **Table 2**).

Integrated Coastal Management Act (draft)

The core objective of this proposed Act is to establish a system of integrated coastal management in Namibia in order to promote the conservation of the coastal environment, maintaining the natural attributes of the coastal landscapes and seascapes, and ensuring the sustainable development and use of the natural resources within the coastal zone that is also socially, economically and ecologically justifiable. A permanent Coastal Management Authority will be established to realise this and other objectives. Functions and powers of the CMA would include, among other, to explore possible regulations for coastal zone use and enforcement capacity for such regulations.

Other legal obligations that are relevant to the proposed activities of EPL No. 7646 and related activities are presented in.

Table 2: Applicable local, national and international standards, policies and guidelines governing the proposed development

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The Constitution of the Republic of Namibia, 1990 as amended	<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 in conformant to the constitution in terms of environmental management and sustainability.</p> <p>Ecological sustainability will be main priority for the proposed development.</p>

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Nature Conservation Amendment Act, No. 3 of 2017	National Parks are established and gazetted in accordance with the Nature Conservation Ordinance, 1975 (4 of 1975), as amended. The Ordinance provides a legal framework with regards to 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 PA's and prohibits certain acts therein as well as the purposes for which permission to enter game parks and nature reserves may be granted.	The Proponent will be required to enhance the conservation of biodiversity and the maintenance of the ecological integrity of protected areas and other State lands
The National Policy on Prospecting and Mining in Protected Areas	Requires that, where necessary a Memorandum of Understanding is developed between prospecting and mining Companies, the MET and the MME to set out additional implementation mechanisms.	The Proponent should maintain the integrity of ecosystems and natural resources, and avoiding degradation of areas highly sensitive for their ecological, social and/or cultural heritage value.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The Parks and Wildlife Management Bill of 2008	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, in order to conserve biodiversity and in order to contribute to national development.	
Minerals (Prospecting and Mining) Act (No. 33 of 1992)	<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 written notice to be submitted to the Mining Commissioner in the event that the holder of a mineral license (which includes an EPL) intends to abandon the mineral license area.</p>	<p>The Proponent should enter into a written agreement with landowners before carrying out exploration on their land.</p> <p>The Proponent should carry out an assessment of the impact on the receiving environment.</p> <p>The Proponent should include as part of their application for the EPL, measures by which they will rehabilitate the areas where they intend to carry out mineral exploration activities.</p> <p>The Proponent may not carry out exploration activities within the areas limited by Section 52 (1) of this Act.</p>

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	<p>Section 68 stipulates that an application for an EPL shall contain the particulars of the condition of, and any existing damage to, the environment in the area to which the application relates and an estimate of the effect which the proposed prospecting operations may have on the environment and the proposed steps to be taken in order to prevent or minimize any such effect.</p> <p>Section 91 requires that rehabilitation measures should be included in an application for a mineral license.</p>	
Mine Health & Safety Regulations, 10th Draft	Makes provision for the health and safety of persons employed or otherwise present in mineral licenses area. These deal with among other matters; clothing and devices; design, use, operation, supervision and control of machinery; fencing and guards; and safety measures during repairs and maintenance.	The Proponent should comply with all these regulations with respect to their employees.
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that “No person shall possess [sic] or store any fuel except under authority of a license or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area”	The Proponent should obtain the necessary authorization from the MME for the storage of fuel on-site.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The Regional Councils Act (No. 22 of 1992)	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 point of view, 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, urbanisation patterns, natural resources, economic development potential, infrastructure, land utilisation pattern and sensitivity of the natural environment.	The relevant Regional Councils are considered to be I&APs and must be consulted during the Environmental Assessment (EA) process. The project site falls under the Erongo Regional Council; therefore, they should be consulted.
Local Authorities Act No. 23 of 1992	To provide for the determination, for purposes of traditional government, of traditional authority councils; the establishment of such traditional authority councils; to define the powers, duties and, functions of traditional authority councils; and to provide for incidental matters.	The Arandis Town council is the responsible local Authority of the area therefore they should be consulted.
Water Act 54 of 1956	The Water Resources Management Act 11 of 2013 is presently without regulations; therefore, the Water Act No 54 of 1956 is still in force: 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)).	The protection (both quality and quantity/abstraction) of water resources should be a priority.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	<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>Water Resources Management Act (No 11 of 2013)</p>	<p>The Act provides for the management, protection, development, use and conservation of water resources; and provides for the regulation and monitoring of water services and to provide 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 aquifer and water pollution control (Section 68).</p>	
<p>National Heritage Act No. 27 of 2004</p>	<p>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.</p>	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The National Monuments Act (No. 28 of 1969)	The Act enables the proclamation of national monuments and protects archaeological sites.	The Proponent should ensure compliance with these Acts requirements. The necessary management measures and related permitting requirements must be taken. This done by the consulting with the National Heritage Council of Namibia.
Soil Conservation Act (No 76 of 1969)	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.
Public Health Act (No. 36 of 1919)	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)	Details various requirements regarding health and safety of labors.	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Road Traffic and Transport Act, No. 22 of 1999	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 road transport across Namibia's borders; and for matters incidental thereto. Should the Proponent wish to undertake activities involving road transportation or access onto existing roads, the relevant permits will be required.	Mitigation measures should be provided for, if the roads and traffic impact cannot be avoided, the relevant permits must be applied for.
Labor Act (No. 6 of 1992)	The Ministry of Labor (MOL) is aimed at ensuring harmonious labor relations through promoting social justice, occupational health and safety and enhanced labor market services for the benefit of all Namibians. This ministry ensures effective implementation of the Labor Act no. 6 of 1992.	The Proponent should ensure that the prospecting and exploration activities do not compromise the safety and welfare of workers.

4.2 International Policies, Principles, Standards, Treaties and Conventions

The international policies, principles, standards, treaties, and conventions applicable to the project are as listed in **Table 3** below.

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

Statute	Provisions	Project Implications
Equator Principles	A financial industry benchmark for determining, assessing, and managing environmental and social risk in projects	These principles are an attempt to: '...encourage the development of

Statute	Provisions	Project Implications
	<p>(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 with 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>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>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>The International Finance Corporation</p>	<p>The International Finance Corporation's (IFC) Sustainability Framework articulates the Corporation's strategic</p>	<p>The Performance Standards are directed towards clients, providing</p>

Statute	Provisions	Project Implications
<p>(IFC) Performance Standards</p>	<p>commitment to sustainable development and is an integral part of 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 Standards on Environmental and Social Sustainability) that the IFC requires a 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>guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the Client (Borrower) in relation to project-level activities. In the case of its direct investments (including 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</p>

Statute	Provisions	Project Implications
	<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>Performance Standard 10: Stakeholder Engagement and Information</p> <p>A full description of the IFC Standards can be obtained from http://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards?cq_ck=1522164538151#ess1</p>	<p>overall development objectives.</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 project activities should not be such that they contribute to desertification.</p>

Statute	Provisions	Project Implications
	The convention 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 Nation Convention.	
Convention on Biological Diversity 1992	Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use. Promote the protection of ecosystems, natural habitats, and the maintenance of viable populations of species in natural surroundings.	Removal of vegetation cover and destruction of natural habitats should be avoided and where not possible minimised.
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 BASELINE

The proposed exploration programme will be undertaken in specific environmental and social conditions. Understanding the pre-project conditions of the environment will aid in laying down background "information" of the status quo and future projections of environmental conditions after proposed works on the EPL. This also helps the EAP in identifying the sensitive environmental features that may need to be protected through the recommendations and effective implementation of mitigation measures provided.

The baseline information presented below is sourced from a variety of sources including reports of studies conducted in the Erongo Region. Further information was obtained by the Consultant during the site visit.

5.1 Biophysical Environment

5.1.2 Climate

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

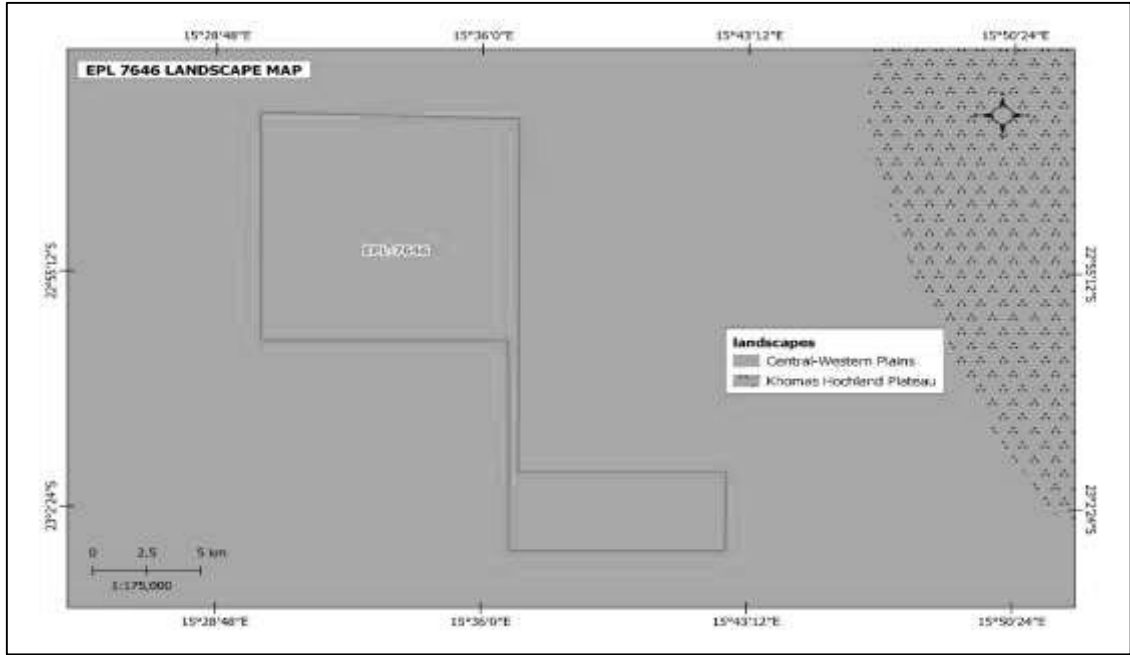
High temperatures around the project area are mainly experienced between February and June, at an average of 24.08 °C; and the lowest temperatures are experienced at an average of 14.14 °C in September. The highest average rainfall of 29.21 mm is experienced in March, and the lowest average rainfall of 0.34 mm is experienced in July. Moreover, January months experience the highest humidity of 78.61% and low humidity in July at 53.87%. **Figure 4** shows the climatic condition in Arandis.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Nov	Oct	Dec	Year
Record high °C (°F)	29.31 (84.76)	28.3 (82.94)	36.39 (97.5)	32.35 (90.23)	33.36 (92.05)	30.32 (86.58)	31.33 (88.39)	32.35 (90.23)	31.33 (88.39)	30.32 (86.58)	29.31 (84.76)	26.28 (79.3)	36.39 (97.5)
Average high °C (°F)	22.4 (72.32)	22.94 (73.29)	23.8 (74.84)	24.02 (75.24)	24.08 (75.34)	22.49 (72.48)	22.37 (72.27)	20.75 (69.35)	20.56 (69.01)	20.74 (69.33)	21.35 (70.43)	21.62 (70.92)	22.26 (72.07)
Daily mean °C (°F)	20.91 (69.64)	21.34 (70.41)	22.05 (71.69)	21.98 (71.56)	21.67 (71.01)	19.86 (67.75)	19.6 (67.28)	18.0 (64.4)	18.09 (64.56)	18.64 (65.55)	19.55 (67.19)	20.07 (68.13)	20.15 (68.27)
Average low °C (°F)	18.69 (65.64)	19.06 (66.31)	19.47 (67.05)	19.09 (66.36)	18.44 (65.19)	16.26 (61.27)	15.72 (60.3)	14.17 (57.51)	14.14 (57.45)	14.98 (58.96)	16.23 (61.21)	17.24 (63.03)	16.96 (62.53)
Record low °C (°F)	14.15 (57.47)	16.17 (61.11)	14.15 (57.47)	13.14 (55.65)	13.14 (55.65)	11.12 (52.02)	11.12 (52.02)	10.11 (50.2)	11.12 (52.02)	10.11 (50.2)	12.13 (53.83)	14.15 (57.47)	10.11 (50.2)
Average precipitation mm (inches)	16.66 (0.66)	27.75 (1.09)	29.21 (1.15)	10.38 (0.41)	5.16 (0.2)	0.37 (0.01)	0.34 (0.01)	0.54 (0.02)	3.51 (0.14)	2.9 (0.11)	4.92 (0.19)	12.84 (0.51)	9.55 (0.38)
Average precipitation days (≥ 1.0 mm)	3.49	3.77	3.95	2.48	0.45	0.09	0.09	0.09	0.56	0.65	1.1	2.11	1.57
Average relative humidity (%)	78.61	77.07	71.3	63.8	56.68	55.83	53.87	63.67	69.06	71.81	72.59	76.78	67.59
Mean monthly sunshine hours	11.58	11.59	11.62	11.35	11.13	11.01	11.03	11.28	11.59	11.68	11.69	11.66	11.43

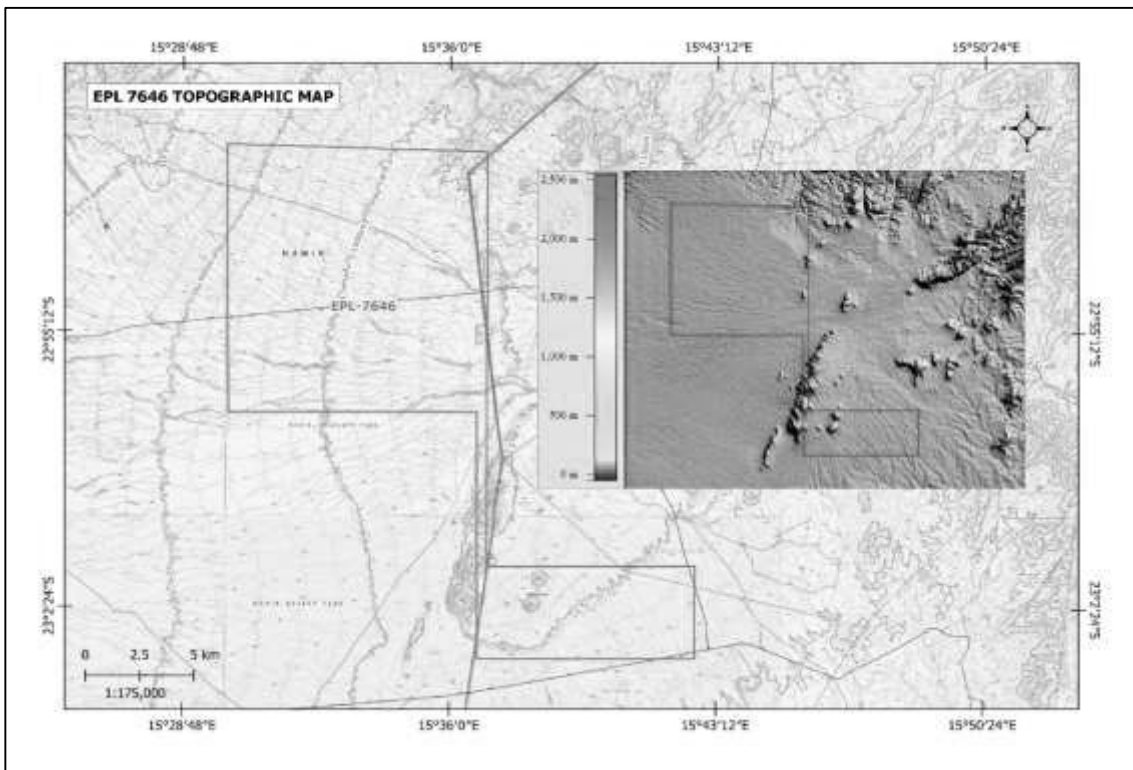
Figure 4: Shows the climate condition around the project area, Arandis (source: [Arandis climate: Climate-Data.org](#))

5.1.3 Landscape

The EPL area is dominated by the Central-Western plains landscapes. The Central-western Plains stretches back from the coast. This broad area of plains, extending inland for about 450 km in places. The plains were largely formed by erosion cutting into higher ground and carving out catchment areas, of several major rivers. The Khan River, Omaruru River, Swakop River, and Ugab River. The topography of the area is between 900 to 11000 m above the sea level, and consist of the metamorphic rocks, that were forced up out of the sea during the formation of the Gondwana continent some 500 million years ago, (Mendelsohn, 2003). **Figures 5a and 5b**, below show the landscape map and the topographic map, respectively.



(a)



(b)

Figure 5: 5a: Landscape of project area; & 5b Topographic map of project area near Arandis

5.1.4 Geology

The project area is underlain by the Damara Granites and Swakop Group. The area is particularly characterized by the Swakop group of the Damara Supergroup. The Swakop Group and other large area of the Central western formations can be traced to the period 550Ma at the formation of the Gondwana. The main lithology of the project area is the sand, gravel scree and calcrete, which are part of the Swakop Group and it also includes Aeolian sand, with mica schist, metagreywacke migmatite and monzogranite. The Swakop Group and other large areas of the western-central and coastal Namibia were formed from deep water deposit (Mendelsohn, 2003).

Figure 6 below shows the general geology map for the project.

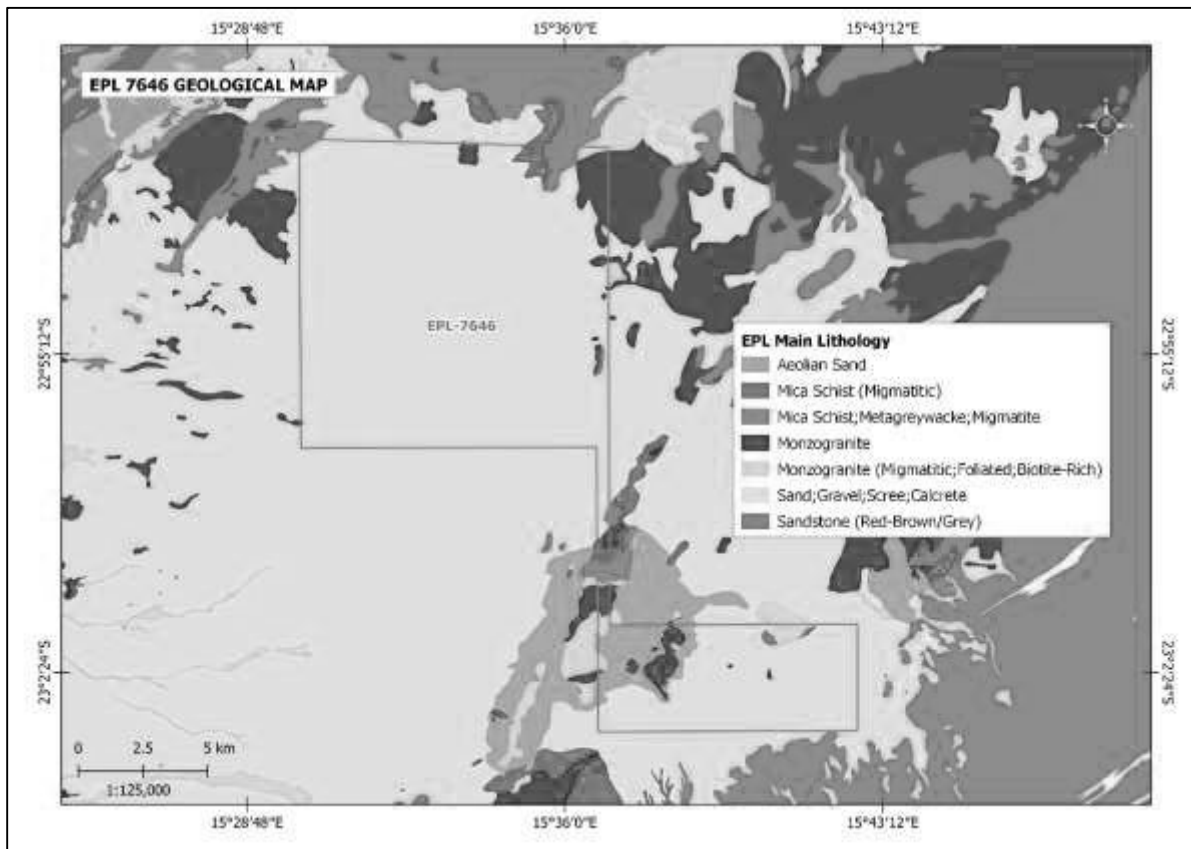


Figure 6: A map of the general geology of the project area

5.1.5 Soil

The EPL is dominated (covered) by Petric Calcisols soils and partly by the Rock Outcrops on the North-Eastern part of the EPL. The Petric Calcisols has a solid layer at a shallow depth that remains hard even when wet. Calcisols soils are found in depression or other low-lying areas of

the landscape and typically contains accumulation of Calcium Carbonate, often in a cemented form called Calcrete. Even though large white blocks of Calcrete often visible on the surface Calcrete is generally formed beneath the surface and it also often present in a soft powdery form. These soils are potentially fertile but Iron and Zinc may not be available to plants because of high concentration of Calcium (Mendelsohn, 2003). **Figure 7** below shows the soil types found within the EPL area.

During prospecting 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 way that does not promote soil erosions, which result in creation of gullies (refer to the EMP).

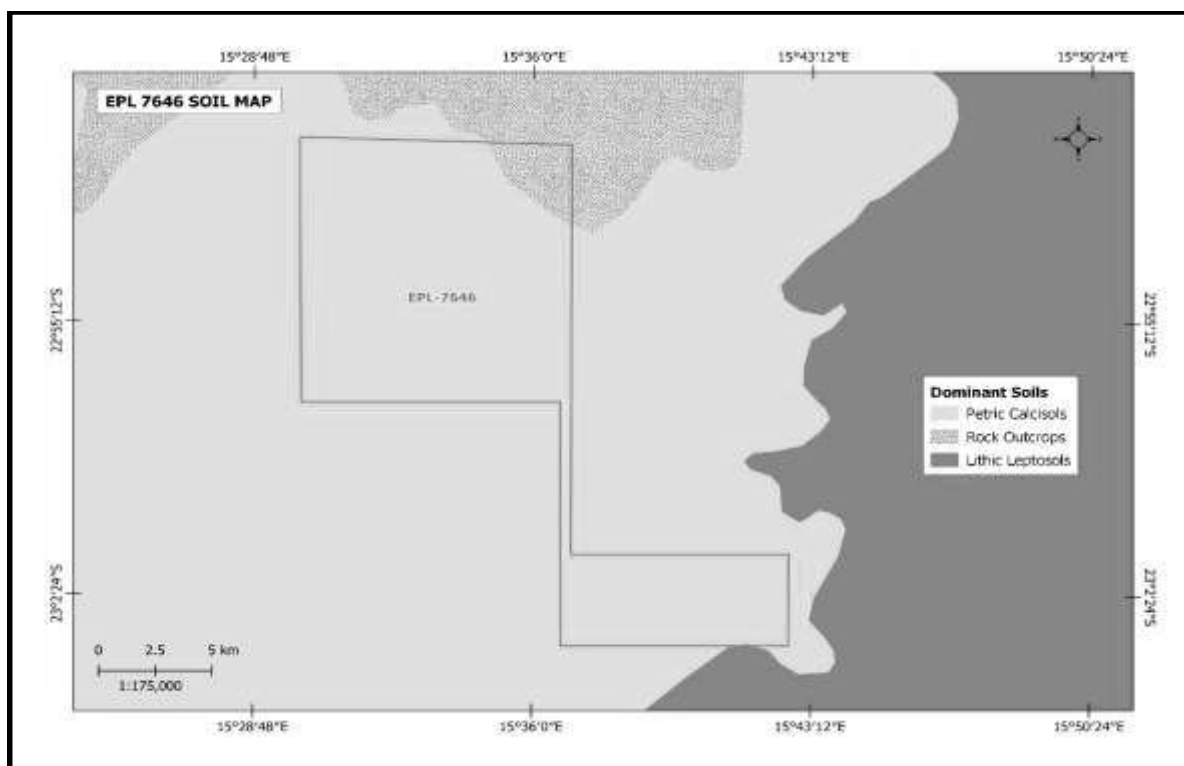


Figure 7: shows the dominant soil types found within the EPL

5.1.6 Hydrology, Water Resources and Groundwater Vulnerability to Pollution

The EPL contains few surface water systems running through the EPL such as the Tinkas River, Goages River, and the Onanis River. **Therefore, the Proponent is recommended to adhere to the regulation stipulated in the Minerals (Prospecting and Mining) Act (No. 33 of 1992), Section 52(1) when conducting exploration activities near boreholes and rivers.**

In terms of groundwater, the EPL is entirely covered by rock bodies with little groundwater potential. The rock bodies with little groundwater potential, potentially allows little storage, transmission and flow of groundwater. Therefore, the rocks bodies are poor aquifers.

Due to the nature of the rock bodies around the EPL; the EPL is mainly covered by moderate sensitivity to groundwater pollution. **Figure 8** shows the hydrological map and vulnerability of ground water resources map of the EPL area.

With regards to water abstraction, it is recommended that the Proponent should obtain an water abstraction permit, as required under the Water Act No. 54 of 1956 (enforced), and the Water Resources Management Act, No. 11 of 2013.

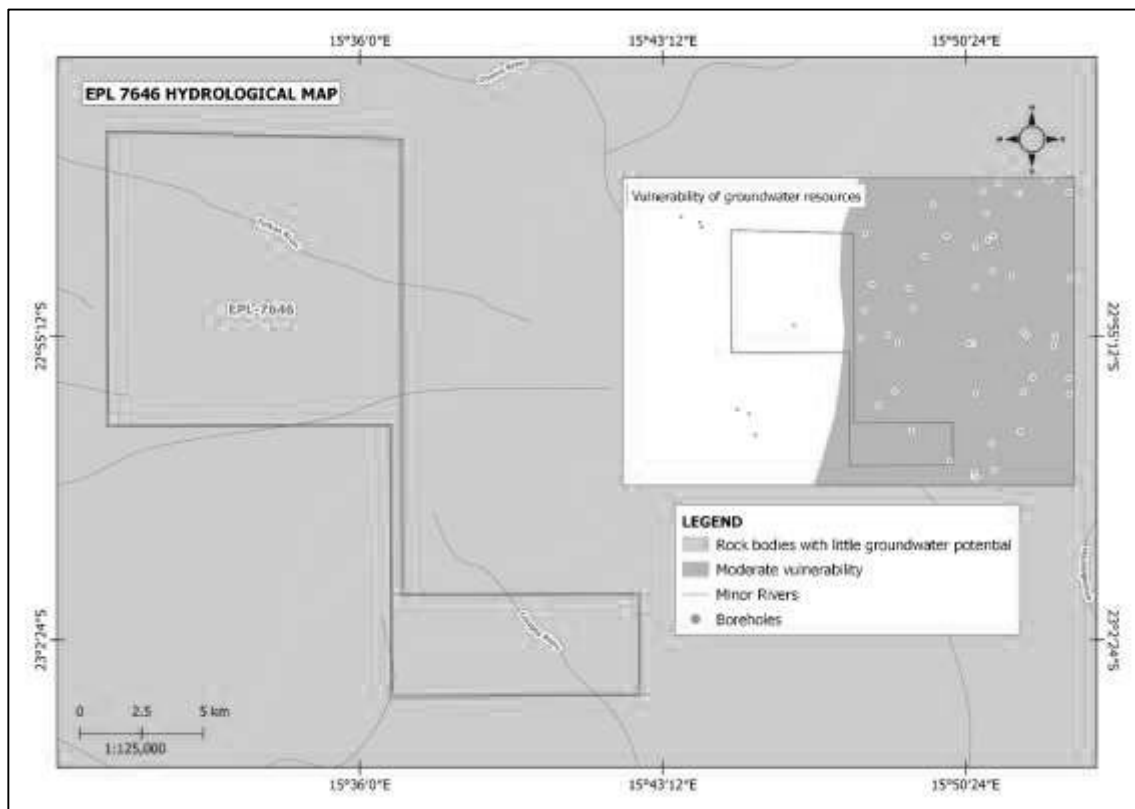


Figure 8: shows the hydrology and groundwater vulnerability map of the project area

5.1.6 Flora and Fauna

Flora

According to ecological specialist report conducted for this study by Peter Cunningham (2022), the following species (**Table 4**) are expected to occur in the area of EPL 7646.

Table 4: Tree and shrub diversity known and/or expected to occur in the general EPL 7646 (source: Mannheimer and Curtis (2018))

Species: Scientific name	Namibian conservation and legal status	International status (IUCN 2022)
<i>Acacia erioloba</i>	Protected (F#)	LC
<i>Acacia reficiens</i>		
<i>Acacia tortilis</i>		
<i>Adenia pechuelii</i>	End; Protected (F#)	LC
<i>Adenolobus garipensis</i>		
<i>Adenolobus pechuelii</i>		
<i>Aloe dichotoma</i>	Protected (F#); N-end; NC, C2	
<i>Boscia albitrunca</i>	Protected (F#)	LC
<i>Boscia foetida</i>		
<i>Cadaba aphylla</i>		
<i>Combretum imberbe</i>	Protected (F#)	LC
<i>Commiphora dinteri</i>	End; Protected (F#)	
<i>Commiphora glaucescens</i>	N-end	LC
<i>Commiphora oblanceolata</i>	Protected (F#); N-end	
<i>Commiphora saxicola</i>	End; Protected (F#)	
<i>Commiphora tenuipetiolata</i>		
<i>Commiphora virgata</i>	End; Protected (F#)	

<i>Cordia sinensis</i>		
<i>Euclea pseudebenus</i>	Protected (F#)	LC
<i>Euphorbia damarana</i>	End; C2	
<i>Euphorbia guerichiana</i>	C2	LC
<i>Euphorbia virosa</i>	C2	
<i>Faidherbia albida</i>	Protected (F#)	LC
<i>Ficus cordata</i>	Protected (F#)	LC
<i>Ficus sycomorus</i>	Protected (F#)	LC
<i>Gossypium herbaceum</i>		
<i>Grewia tenax</i>		
<i>Gymnosporia senegalensis</i>		
<i>Laggera decurrens</i>		
<i>Lycium bosciifolium</i>		
<i>Lycium cinereum</i>		
<i>Lycium tetrandrum</i>		
<i>Maerua schinzii</i>	Protected (F#)	
<i>Moringa ovalifolia</i>	Protected (F#); N-end	LC
<i>Parkinsonia africana</i>		
<i>Pechuel-Loeschea leubnitziae</i>		
<i>Phaeoptilum spinosum</i>		
<i>Salsola</i> spp.		
<i>Salvadora persica</i>		
<i>Searsia marlothii</i>		

<i>Sterculia africana</i>	Protected (F#)	LC
<i>Tamarix usneoides</i>	Protected (F#)	
<i>Zygophyllum stapffii</i>	End	

End = Endemic; **N-End** = Near-endemic (Mannheimer and Curtis 2018)

Protected F# = Forest Act No 12. of 2001

NC – Nature Conservation Ordinance No. 4 of 1975

C2 – CITES Appendix 2 species

LC = Least Concern (IUCN 2022)

Fauna

According to ecological specialist report conducted by Peter Cunningham (2022), about 54 species of reptiles are expected to occur in the general area with 29 species being endemic – i.e. 53.7% endemic. Two species expected to occur in the area (*Stigmochelys pardalis* and *Varanus albigularis*) are classified as vulnerable and protected game although both, especially *S. pardalis*, probably only occasionally passes through the general area as a vagrant and not expected to occur permanently in the area due to the overall arid conditions. *Pelomedusa subrufa* is only expected to occur in drainage lines in the area (e.g. Swakop River and its tributaries) with suitable habitat – i.e. long lasting water holes. *Lycophidion capense* and *Lycophidion namibianum* only marginally occur in the Namib-Naukluft Park (Griffin 1998a) and potentially could occur in the general area. The *Afroedura africana africana* is classified as insufficiently known and rare (Griffin 2003) and probably the reptile of most concern in the general area. Another important species from the general area is *Pedioplanis husabensis* which although secure (Griffin 2003) is associated with the Husab Mountains and surrounding area only (Cunningham et al. 2012).

The 54 species expected to occur in the general area consist of at least 18 snakes (2 thread snakes, 1 quill snouted and 15 typical snakes) of which 8 species (44.4%) are endemic, 1 tortoises, 1 terrapin, 14 lizards of which 6 species classified as endemic (42.9% endemic), 1 plated

lizards, 1 monitor, 1 agama, 1 chameleon and 15 geckos of which 13 species classified as endemic (i.e. 86.7% endemic).

Gecko's (15 species with 13 species being endemic) and snakes (18 species with 8 species being endemic) are the most important groups of reptiles expected from the general area followed by lizards (14 species with 6 species being endemic). Namibia with approximately 129 species of lizards (Lacertilia) has one of the continents richest lizard fauna (Griffin 1998a). Geckos expected and/or known to occur in the general area have the highest occurrence of endemics (86.7%) of all the reptiles in this area. Griffin (1998a) confirms the importance of the gecko fauna in Namibia.

The endemic *Afroedura africana* (African flat gecko) and *Pedioplanis husabensis* (Husab sand lizard) are viewed as the most important reptiles potentially occurring in the area. *Pedioplanis husabensis* is very habitat specific and mainly occurs on "white/grey" geology in the general Husab Mountain area (Cunningham et al. 2012) to the west of the EPL 7646. *Leptotyphlops occidentalis* (western thread snake) and *Lycophidion namibianum* (Namibian wolf snake) are the snakes viewed as the most important in the area.

Sensitive Areas within EPL 7646: No-go exploration areas

The areas presented below are regarded as sensitive within the EPL during exploration phase:

Swakop River: The ephemeral Swakop River with a catchment area of 30, 100km², to the north of the EPL 7646, is viewed as a site of special ecological importance due to biotic richness, large desert dwelling mammals and a high value for human subsistence and tourism (Curtis and Barnard, 1998).

Ephemeral drainage lines: The various other smaller ephemeral drainage lines which form part of the Swakop River tributaries such as the Onanis and Tinkas Rivers and even the origin of the Tumas River, drains the general area westwards towards the coast. These, often well vegetated drainage lines, are virtual lifelines for most vertebrate fauna, especially ungulates, small mammals and birds that forage along these vegetated areas, (Cunningham, 2022).

Langer Heinrich Mountains: The Langer Heinrich Mountain is viewed as a biodiversity red flag area (i.e. inselberg with particularly high biodiversity; important area for mountain zebra), (Cunningham, 2022).

Marble/Granite ridges (i.e. light coloured “white and grey” geology): The endemic and restricted range species, *Pedioplanis husabensis* (Husab sand lizard), occurs on “light coloured” geology (marble/granite ridges) in the general area (Cunningham *et al.* 2012). The Langer Heinrich Mountains and associated hills/ridges with suitable geology are prime habitat to this important species, (Cunningham, 2022).

Rocky outcrops/ridges and inselbergs: Ridges, outcrops and inselbergs are generally viewed as unique habitat for vertebrate fauna not necessarily associated with the surrounding areas. Various geckos are rock and crevasse dwelling species associated with these landforms. Caves and crevasses also serve as roosting site for bats and owls – e.g. Cape and spotted eagle owl, etc. The important trees – e.g. *Adenia pechuellii*, various *Commiphora* spp., *Moringa ovalifolia*, etc. – are also associated with the rocky areas, (Cunningham, 2022).

Lappet-faced vulture nesting sites: Lappet-faced vulture nesting sites are known to occur throughout the general area where they usually nest on the larger, and often isolated, *Acacia erioloba* trees. These sites are viewed as important as they are classified as endangered by the IUCN (2022) with population trends decreasing throughout their range. With an estimated of only 5,700 mature individuals, human intrusion and disturbances; utility and service lines and ecosystem modifications are viewed as threats. Furthermore, disturbances around these nesting sites should be avoided as lapped-faced vultures are known to abandon their nests when disturbed, (Cunningham, 2022).

Figure 9 below shows the sensitive areas within the EPL 7646, which are viewed as the Onanis and Tinkas Rivers, tributaries of the Swakop River located further to the north (solid blue arrows) and various rocky areas – e.g. various outcrops/ridges/inselbergs, etc. (dotted white circles/oblongs). The direction of the Langer Heinrich Mountains is indicated by the bold orange arrow. In addition, identified sensitive areas are regarded as no-go zone areas during exploration phase. The green circles represent the non-sensitive areas (alternative exploration areas).

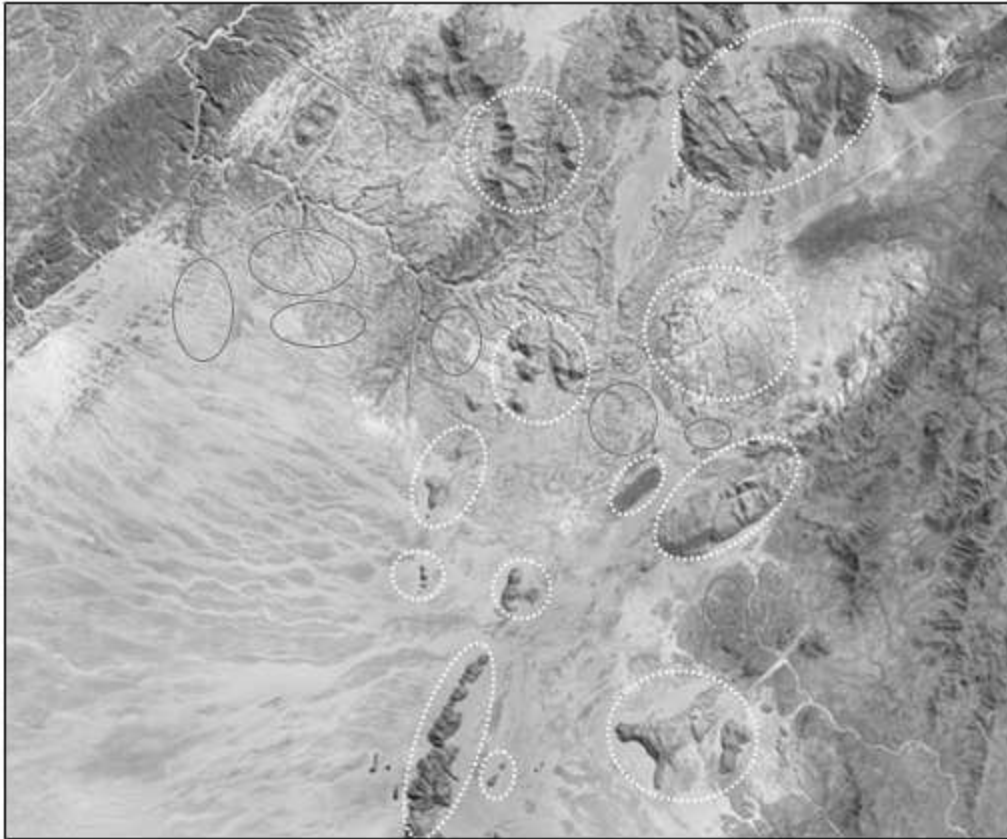


Figure 9: Sensitivity (no-go zone and exploration alternatives areas) of EPL 7646

5.2 Heritage and Archaeology

5.2.1 Local Level and Archaeological Findings

Archaeological sites in Namibia are protected under the National Heritage Act of 2004 (No. 27 of 2004). Evidence shows that, the emergence of modern humans and their ancestors have lived in Namibia for more than one million years, and there are fossil remains of lineal hominin ancestors as early as the Miocene Epoch (Kinahan, 2017). Namibia has a relatively complete sequence covering the mid-Pleistocene to Recent Holocene period, represented by thousands of archaeological sites mainly concentrated in the central highlands, escarpment, and Namib Desert. Abundant evidence has been found of human occupation since at least the mid-Pleistocene (Shackley, 1985). The Erongo region is among the archaeological sensitive landscapes in

Namibia, the region is home to 37 declared national monuments in the country and other non-designated archaeological sites, and thus make it archaeologically and historically sensitive.

During the site assessment, Archaeological historical significance such as historical handmade tools (stone artefacts) were found within the EPL area, and more archaeological significant may potentially be discovered during the exploration phase. Therefore, the regulations stipulated in the National Heritage Act No. 27 of 2004 should be adhered to. **Figure 11** shows archaeological significant observed on site.

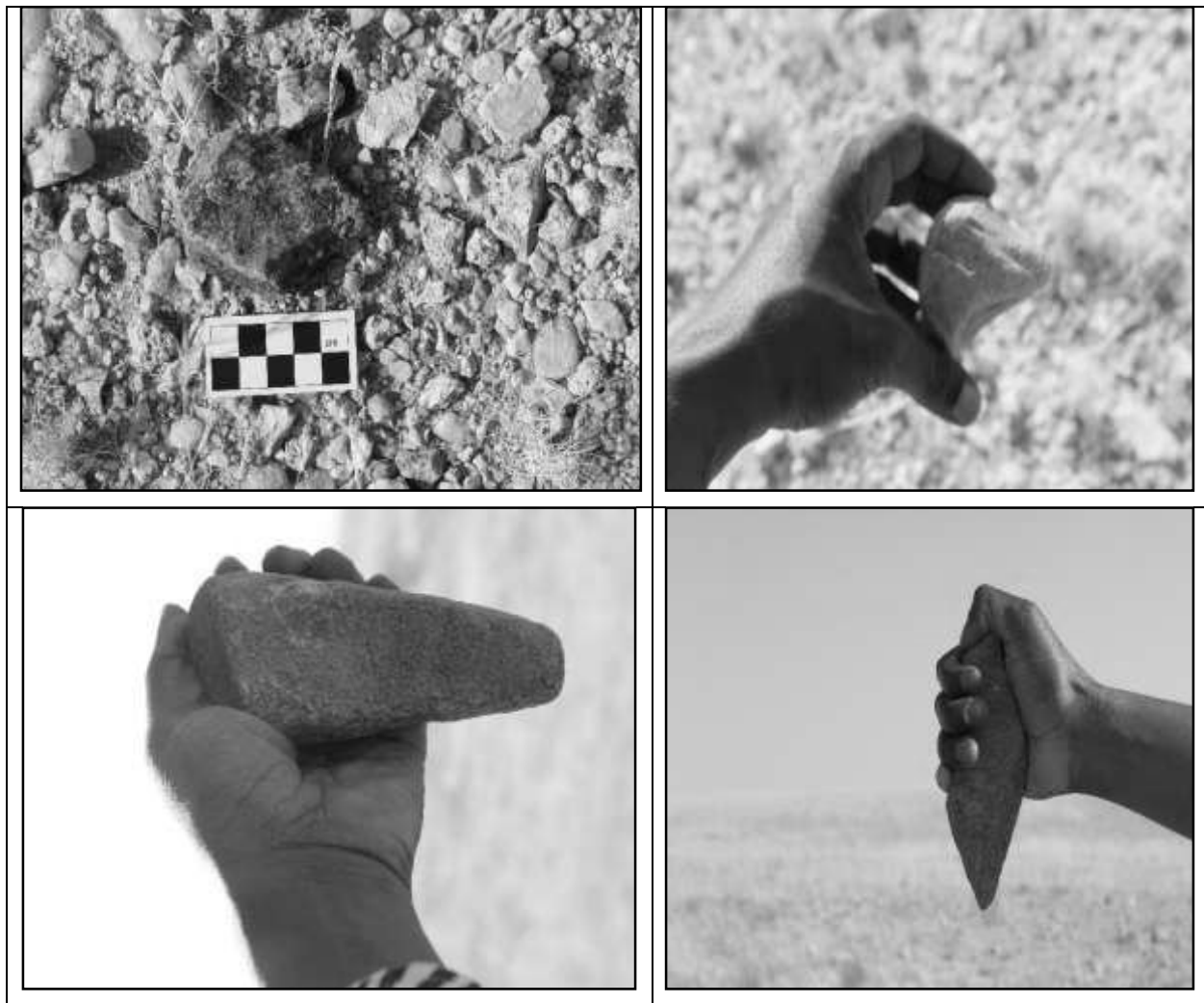


Figure 10: Shows archaeological significant (Artefacts) observed during site visit within the EPL

5.2.2 Surrounding Land Uses

The EPL falls within Commercial Farm and also covers the Naukluft National Park as shown in **Figure 12**. The Proponent is required to secure a signed agreement from the affected landowners (MEFT) and farmers to gain access to the areas of interest for prospecting and exploration investigations as per the 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 mineral licence 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 time as such holder has entered into an agreement 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 waked 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 Licence Holder and/or mineral explorers currently have to negotiate a contract with landowners to gain access for or mining purposes.

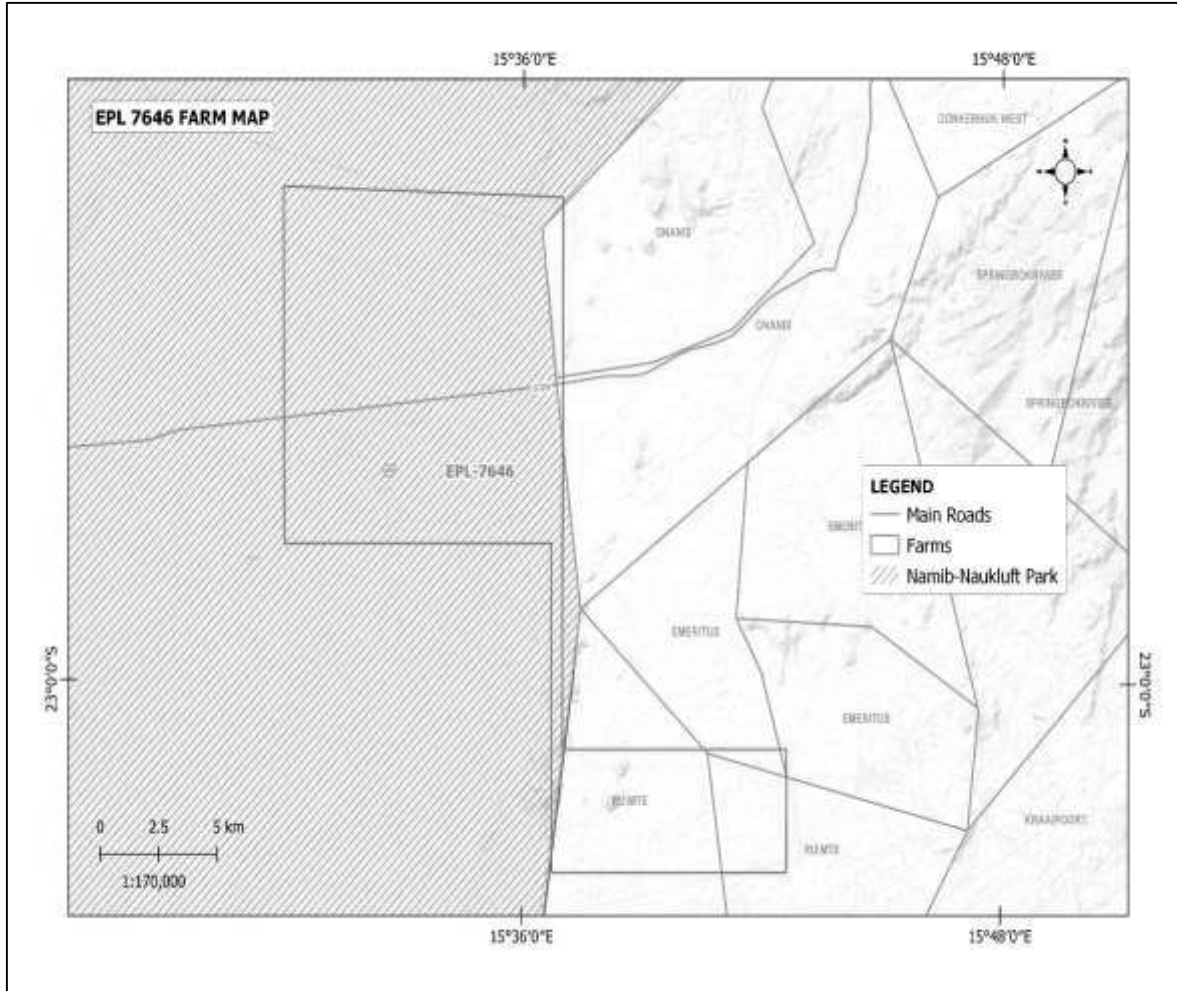


Figure 11: Map showing land use within and surrounding the EPL

7 Socio-Economic conditions

The statistics shown in the **Table 4** below are derived from the 2011 Namibia Population and Housing Census (NSA, 2011), and presented from a local and regional perspective.

Table 4: Statistics of the Project area

Erongo Region	
Population	150, 809
Population aged 60 years and above	6%
Population aged 5 to 14 years	17%

Population aged 15 to 59 years	67%
--------------------------------	-----

Arandis	
Attribute	Indicator
Population	10, 093
Females	4, 852
Males	5, 241
Population under 5 years	10%
Population aged 5 to 14 years	19%
Population aged 15 to 59 years	64%
Population aged 60 years and above	8%
Female: Male Ratio	100:108
Population employed	72%
Homemakers	5%
Students	49%
Retired or Old age income recipients	46%
Income from pension	10%
Income from cash remittance	3%
Wages and Salaries	72%

8 PUBLIC CONSULTATION PROCESS

Public consultation forms an important component of an 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 as part of the assessment process, thus assisting the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and to what extent 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 in accordance with the EMA and its EIA Regulations.

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

Relevant and applicable national, regional, and local authorities, local leaders, 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 exploration activities were placed in two widely-read national newspapers in the region (The Namibian Newspaper and New Era 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 5: 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
Erongo Regional Council
Arandis Town
General Public
Land owners /Interested members of the public

Namibia Community Based Tourism Association

7.2 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 with regards to the proposed development was facilitated through the following means and in this order:

- A Background Information Document (BID) containing brief information about the proposed exploration works was compiled (**Appendix E**) and delivered to relevant Authoritative Ministries, and upon request to all new registered Interested and Affected Parties (I&APs);
- Project Environmental Assessment notices were published in The Namibian newspaper (**8th of August 2022** and **15th of August 2022**) and New Era (**8th of August 2022** and **15th of August 2022**) (**Appendix F**), briefly explaining the activity and its locality, inviting members of the public to register as I&APs and submit their comments/concerns;
- Public notices were placed at frequented places at Arandis Town Hall (**Figure 15**) to inform members of the public of the EIA process and register as I&APs, as well as submit comments.
- A public meeting was scheduled and held on **09 September 2022**, at Arandis Town Hall in Arandis at 09h30-10:00 (**Figure 20**).

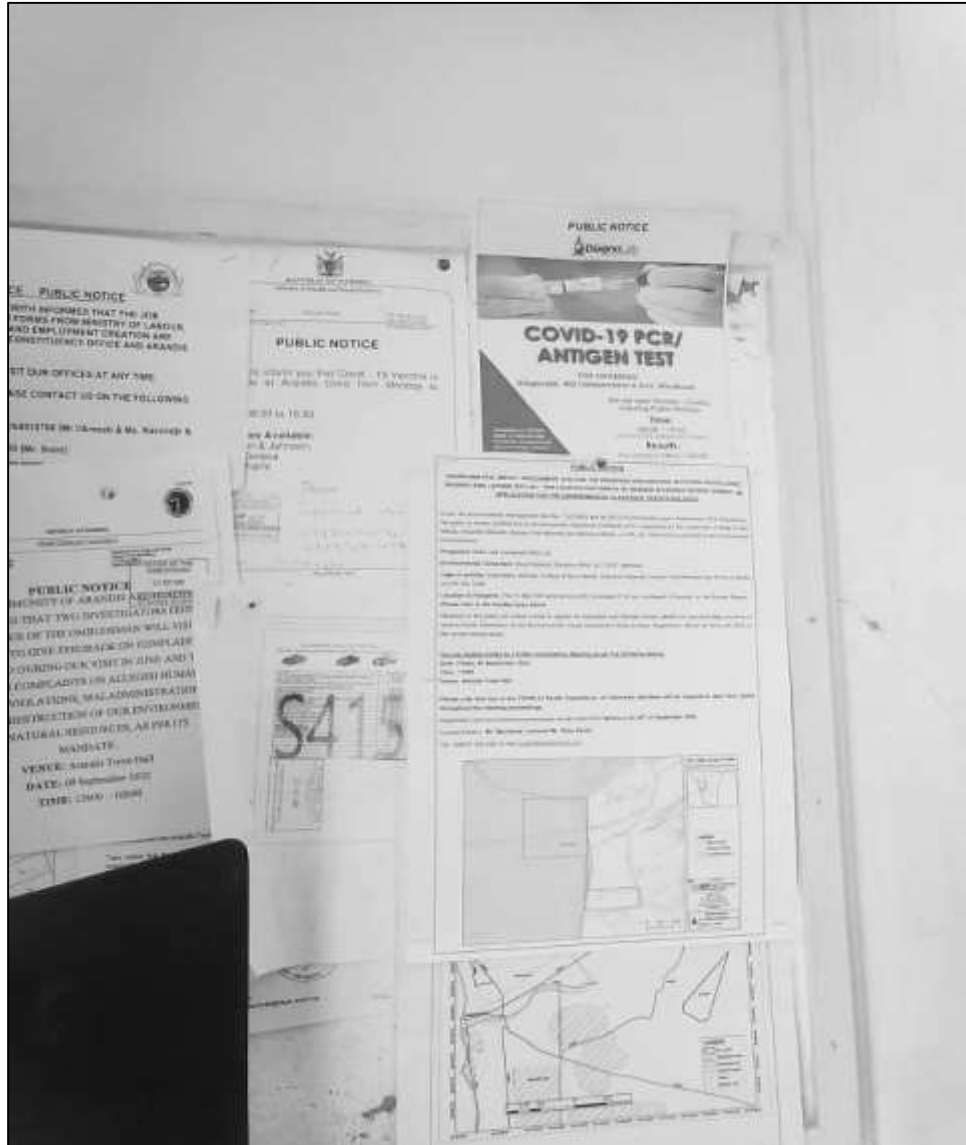


Figure 12: Public notices placed at Arandis Town Hall in Arandis Town, Erongo Region



Figure 13: Consultation meeting held on the 09th August 2022, Arandis Town Hall, in Arandis, Erongo Region.

Issues were raised by I&APs and these issues 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** and **H**

Table 6: Summary of main issues and comments received during the first public meeting engagements

Issue	Concern
Employment	Will the Proponent hire the local people of Arandis?
Rehabilitation	Will the Proponent rehabilitate the explored sites?
Access agreement	Will the proponent inform the farmers that they have been granted the ECC?

9 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES

8.1 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 follow:

Positive impacts:

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

Negative impacts:

- Disturbance to the grazing area
- 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 associate with closure and decommissioning of exploration works

8.2 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 in accordance with 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 7**, **Table 8**, **Table 9** and **Table 10**, respectively.

In order 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:

8.2.1 Extent (spatial scale)

Extent is an indication of the physical and spatial scale of the impact. **Table 7** shows rating of impact in terms of extent of spatial scale.

Table 7: Extent or spatial impact rating

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

8.2.2 Duration

Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project. **Table 8** shows the rating of impact in terms of duration.

Table 8: Duration impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Immediate mitigating measures, immediate progress	Impact is quickly reversible, 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

8.2.3 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 9** shows the rating of impact in terms of intensity, magnitude or severity.

Table 9: 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 of illness / total loss of habitat, total alteration of ecological	Substantial deterioration, death, illness or injury, loss of habitat / diversity or resource, severe alteration or	Moderate deterioration, discomfort, partial loss of habitat / biodiversity or resource,	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in	Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
	processes, extinction of rare species	disturbance of important processes	moderate alteration	species numbers	very little quality deterioration.

8.2.4 Probability of occurrence

Probability describes the likelihood of the impacts actually occurring. This determination is based on previous experience with similar projects and/or based on professional judgment. **Table 10** shows impact rating in terms of probability of occurrence.

Table 10: 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	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, continuous. High risk or vulnerability to natural or induced hazards.

8.2.5 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 7**, **Table 8**, **Table 9** and **Table 10**) 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 11).

Table 11: Significance rating scale

Significance	Environmental Significance Points	Colour Code
High (positive)	>60	H
Medium (positive)	30 to 60	M
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 of time to enable the confirmation of the significance of the impact as low or medium and under control.

The assessment of the exploration 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, eco-system, 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, 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; the prospecting, exploration (and possible analysis) and decommissioning. The potential negative impacts stemming from the proposed activities of the EPL are described, assessed and mitigation measures provided thereof. Further mitigation measures in a form of management action plans are provided in the Draft Environmental Management Plan.

8.3 Assessment of Potential Negative Impacts

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

8.3.1 Disturbance to the grazing areas

The EPL is overlying a National park and commercial farms that practice livestock and game farming. Exploration 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 livestock and wildlife, and since the farmers greatly depend on these types of farming for subsistence and commercial purposes, this would have an impact on their livelihood through potential feeding/grazing for animals and eventual losses.

The effect of exploration work on the land (when done over a wider spatial extent), if not mitigated, may hinder animal husbandry in the area and its surrounding. The project area might experience loss of its pastoral system over time. Losing grazing pastures for livestock and wildlife minimizes the number of animals on the farms and overall farming activity in the area, and lead to loss of livelihoods. Under the status quo, the impact can be 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 12** below.

Table 12: Assessment of the impacts of exploration on grazing areas

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
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Pre mitigation	M: -4	M: -3	M: -5	M/H: 5	M: -60
Post mitigation	L/M: -2	L/M: -2	L/M: -4	L/M: 3	L: -24

Mitigations and recommendations to lower the possibility of disturbance and loss of the Pastoral system

- Any unnecessary removal or destruction of grazing land, due to exploration activities should be avoided.
- Vegetation found on the site, but not in the targeted exploration areas should not be removed but left to preserve biodiversity and grazing land.
- Workers should refrain from driving off road and creating unnecessary tracks that may contribute to the loss of grazing land.
- Environmental awareness on the importance of the preservation of grazing land for local livestock should be provided to the workers.

8.3.2 Land Degradation and Loss of Biodiversity

Fauna: The trenching, pitting and drilling activities done for detailed exploration would result in land degradation, leading to habitat loss for a diversity of flora and fauna ranging from microorganisms to large animals and vegetation. Endemic species are most severely affected since even the slightest disruption in their habitat can result in extinction or put them at high risk of being wiped out.

The presence and movement of the exploration workforce and operation of project equipment and heavy vehicles would disturb not only the domestic animals (livestock) grazing at the explored sites of the EPL, but also the wildlife present on the explored farms. Not only the disturbance due to human and vehicle movements, but also potential illegal hunting (poaching) of local wildlife by project related workers. This could lead to loss or number reduction of specific faunal species which also impacts tourism in the community (for tourists who are interested in wildlife seeing when driving through the area).

Another potential activity that will impact the faunal community is the un-rehabilitated and/or unfenced boreholes, trenches and pits used for exploration (once they are no longer in use). If these holes and pits/trenches are not fenced off or closed off by rehabilitating them, they could

pose a high risk of site domestic and wild animals falling into these holes and pits, causing injuries and potentially mortalities.

Flora: The direct impacts of exploration works on flora and vegetation communities will mainly occur through clearing for the exploration access roads and associated infrastructure. The dust emissions from drilling may affect surrounding vegetation through the fall of dust. Some loss of vegetation is an inevitable consequence of the development. However, given the abundance of the shrubs and site-specific areas of exploration on the EPL, 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 13** below.

Table 13: Assessment of the impacts of exploration 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

Mitigations and recommendations to minimize the loss of biodiversity

- The Proponent should avoid unnecessary removal of vegetation, thus promoting a balance between biodiversity and their operations.
- Vegetation found on the site, but not in the targeted exploration site areas should not be removed but left to preserve biodiversity on the site.
- Shrubs or trees found along trenching, drilling, or sampling spots on sites should not be unnecessarily removed.
- Protected and threatened plants along trenching, drilling, or sampling spots on sites should not be unnecessarily removed.
- Movement of vehicle and machinery should be restricted to existing roads and tracks to prevent unnecessary damage to the vegetation.
- No onsite vegetation should be cut or used for firewood related to the project's operations. The Proponent should provide firewood for his onsite camping workers from authorized firewood producer or seller.

- Design access roads appropriately in a manner that disturbs minimal land areas as possible.
- Avoid introducing dogs and cats as pets to camp sites as these can cause significant mortalities to local fauna (cats) and even stock losses (dogs);
- Vegetation clearing to be kept to a minimum. The vegetation of the site is largely low and open and therefore whole-sale vegetation clearing should only be applied where necessary and within the EPL footprint.
- Formulate and implement suitable and appropriate operational management guidelines for the cleared areas. Incorporated in the guidelines are the progressive rehabilitation measures.
-
- Workers should refrain from disturbing, killing or stealing farm animals and killing small soil and rock outcrops' species found on sites.
- Prevent the killing of species viewed as dangerous – e.g. various snakes – when on site;
- Prevent the setting of snares for ungulates (i.e. poaching) or collection of veld foods (e.g. tortoises) and unique plants (e.g. Aloe and Lithop spp.) or any form of illegal hunting activities;
-
- Poaching (illegal hunting) of wildlife from the area is strictly prohibited.
- Environmental awareness on the importance of biodiversity preservation should be provided to the workers.
- Avoid the removal and/or damaging of protected flora potentially occurring in the general area – e.g. *Adenia pechuelii*, *Aloe* spp., *Commiphora* spp., *Lithop* spp. and *Welwitschia mirabilis*.

8.3.3 Generation of Dust (Air Quality)

Dust emanating from site access roads when transporting exploration equipment and supply (water) to and from site (time-to-time) may compromise the air quality in the area. Vehicular movements from heavy vehicles such as trucks would potentially create dust even though it is not always so severe. Additionally, activities carried out as part of the exploration 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 14** below.

Table 14: Assessment of the impacts of exploration 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

Mitigations and recommendations to minimize dust

- Exploration vehicles should not drive at a speed more than 40 km/h to avoid dust generation around the area.
- The Proponent should ensure that the exploration schedule is limited to the given number of hours and days of the week. This will keep the vehicle-related dust level minimal in the area.
- When and if the project reaches the advanced stages of exploration producing high dust levels, a reasonable amount of water should be used on gravel roads, using regular water sprays on gravel routes and near exploration sites to suppress the dust that may be emanating from certain exploration areas on the EPL.

8.3.4 Water Resources Use

Water resources is 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 would negatively affect the local communities (communal farmers 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. Commonly, exploration activities use a lot of water, mainly drilling. However, this depends on the type of drilling 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 for.

The drilling method to be employed for this project's exploration activities is Reverse Circulation. The water required for exploration is about 4000 litres per month. This water will be used for drilling purposes, drinking and other domestic purposes. Given the low to medium groundwater

potential of the project site area, the Proponent may consider carting some of the water volumes from outside the area and store it in industry standard water reservoirs/tanks on site, if necessary. Although exploration may be requiring this much water, this would also be dependent on the duration of the exploration works and number of exploration boreholes required to make reliable interpretation on the commodities explored for. The exploration period is limited time-wise, therefore, the impact will only last for the duration of the exploration activities and ceases upon 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 the **Table 15** below.

Table 15: 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

Mitigations and recommendations to manage water use

- Water abstracted from boreholes or supplied by carting should be used efficiently, and recycling and re-using of water on certain site activities should be encouraged, where necessary and possible.
- Water reuse/recycling methods should be implemented as far as practicable. Water used to cool off exploration equipment should be captured and used for the cleaning of project equipment, if possible.
- Water storage tanks should be inspected daily to ensure that there are no leakages, resulting in wasted water on site.
- Water conservation awareness and saving measures training should be provided to all the project workers.

8.3.5 Soil and Water Resources Pollution

The proposed exploration activities are associated with a variety of potential pollution sources (i.e., lubricants, fuel, and wastewater) that may contaminate/pollute soils and eventually groundwater and surface water. 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 exploration 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-mitigation measure implementation, the impact significance is low to moderate and upon implementation, the significance will be reduced to low. The impact is assessed in **Table 16** below.

Table 16: Assessment of the project impact on soils and water resources (pollution)

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 4	M/H - 3	M - 6	M - 4	M - 52
Post mitigation	L - 2	M - 3	L - 3	L/M - 3	L - 24

Mitigations and recommendations to manage soil and water pollution

- Spill control preventive measures should be in place on site to manage soil contamination, thus preventing and/or minimizing the contamination from reaching surface and ground water bodies. Some of the soil control preventive measures that can be implemented include:
 - Identification of oil storage and use locations on site, and allocate drip trays and polluted soil removal tools suitable for that specific surface (soil or hard rock cover) on the sites.
 - Maintain equipment and fuel storage tanks to ensure that they are in good condition thus preventing leaks and spills.
 - The oil storage and use locations should be visually inspected for container or tank condition and spills.
- All project employees should be sensitized about the impacts of soil pollution and advised to follow appropriate fuel delivery and handling procedures.

- The Proponent should develop and prepare countermeasures to contain, clean up, and mitigate the effects of an oil spill. This includes keeping spill response procedures and a well-stocked cache of supplies easily accessible.
- Ensure employees receive basic Spill Prevention, Control, and Countermeasure (SPCC) Plan training, and mentor new workers as they get hired.
- Project machinery and equipment should be equipped with drip trays to contain possible oil spills when operated on site.
- Polluted soil should be removed immediately and put in a designated waste type container for later disposal.
- Drip trays must be readily available and monitored to ensure that accidental fuel spills along the tank trailer path/route around the exploration sites are cleaned on time (soon after the spill has happened).
- Polluted soil must be collected and transported away from the site to an approved and appropriately classified hazardous waste treatment facility.
- Washing of equipment contaminated by hydrocarbons, as well as the washing and servicing of vehicles should take place at a dedicated area, where contaminants are prevented from contaminating soil or water resources.

8.3.6 Waste Generation

During the prospecting and exploration phase, domestic and general waste is produced on site. If the generated waste is not disposed of in a responsible way, land pollution may occur on the EPL or around the sites. The EPL are 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 exploration programme needs to have appropriate waste management for the site. To prevent these issues, biodegradable and non-biodegradable wastes must be stored in separate containers and collected regularly for disposal at a recognized landfill/dump site. Any hazardous waste that may have an impact on the 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 17**.

Table 17: 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

Mitigations and recommendations to waste management

- Workers should be sensitized to dispose of waste in a responsible manner and not litter.
- After each daily works, the Proponent should ensure that there is no waste left on the sites.
- All domestic and general operational waste produced daily should be contained onsite until such that time it will be transported to designated waste sites.
- No waste may be buried or burned on site or anywhere else.
- The exploration site should be equipped with separate waste bins for hazardous and general/domestic waste.
- Sewage waste should be stored as per the portable chemical toilets supplied on site and regularly disposed of at the nearest treatment facility
- Oil spills should be taken care of by removing and treating soils affected by the spill.
- A penalty system for irresponsible disposal of waste on site and anywhere in the area should be implemented.
- Careful storage and handling of hydrocarbons on site is essential.
- Potential contaminants such as hydrocarbons and wastewater should be contained on site and disposed of in accordance with municipal wastewater discharge standards so that they do not contaminate surrounding soils and eventually groundwater.
- An emergency plan should be available for major/minor spills at the site during operation activities (with consideration of air, groundwater, soil, and surface water) and during the transportation of the product(s) to the sites.

8.3.7 Occupational Health and Safety Risks

Project personnel (workers) involved in the exploration 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 are 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 Proponent's personnel or local domestic animals.

The use of heavy equipment, especially during drilling and the presence of hydrocarbons on sites may result in accidental fire outbreaks. This 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 and packed, 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 18** below and mitigation measures provided.

Table 18: Assessment of the impacts of exploration 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

Mitigations and recommendations to minimize health and safety issues

- The Labour Act's Health and Safety Regulations should be complied with.
- The Proponent should commit to, and make provision for full medical check-up for all the workers at site to monitor the impact of project related activities on them (workers).
- As part of their induction, the project workers should be provided with an awareness training of the risks of mishandling equipment and materials on site as well as health and safety risk associated with their respective jobs.
- When working on site, employees should be properly equipped with adequate personal protective equipment (PPE) such as coveralls, gloves, safety boots, earplugs, dust masks, safety glasses, and hard hats.
- Heavy vehicle, equipment and fuel storage site should be properly secured, and appropriate warning signage placed where visible.

- Drilled boreholes that will no longer be in use or to be used later after being drilled should be properly marked for visibility and capped/closed off.
- Ensure that after completion of exploration holes and trenches, drill cuttings are put back into the hole and the holes filled and levelled, and trenches backfilled respectively.
- An emergency preparedness plan should be compiled, and all personnel appropriately trained.
- Workers should not be allowed to consume alcohol or any other intoxicants prior to and during working hours nor allowed on site when under the influence, as this may lead to mishandling of equipment which results into injuries and other health and safety risks.
- The site areas that are considered temporary risks should be equipped with "danger" or "cautionary" signs.

8.3.8 Vehicular Traffic Use and Safety

The district roads are the main transportation routes for all vehicular movement in the area and provide access to the EPL and connect the project area to other towns such as Swakopmund, Walvis Bay and Arandis Town. Therefore, traffic volume will increase on these district roads during exploration as the project would need a delivery of supplies and services on site. These service and supplies will include but are not limited to water, waste removal, procurement of exploration machinery, equipment, and others.

Depending on the project needs, trucks, and medium and small vehicles will be frequenting the area to and from exploration sites on the EPL. This would potentially increase slow moving heavy vehicular traffic along these roads. The impact would be felt by the local road users such as those accessing farms (via local access gravel and single-track roads). This would add additional pressure on the roads.

However, the exploration related heavy trucks will only be transporting materials and equipment to and from site, limited number of times a month during exploration. Therefore, the risk is anticipated to be short-term, not frequent, and therefore of medium significance. Pre-mitigation, the impact can be rated medium and with the implementation of mitigation measures, the significance will be low as assessed in **Table 19** below.

Table 19: Assessment of the impacts of exploration 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
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Mitigations and recommendations to minimize impact on road safety and related vehicular traffic issues.

- The transportation of exploration materials, equipment and machinery should be limited to once or twice a week only, but not every day to reduce the pressure on local roads.
- The heavy truck loads should comply with the maximum allowed speed limit for respective vehicles while transporting materials and equipment/machinery on the public and access roads (40km/h).
- The potential carted water to the site (from other source of water supply) should be done on limited occasions in containers that can supply and store water for as long as possible, thus reducing the number of water-carting trucks on the road daily.
- Drivers of all project phases' vehicles should be in possession of valid and appropriate driving licenses and adhere to the road safety rules.
- Drivers should drive slowly (40km/hour or less) and be on the lookout for livestock and wildlife as well as residents/travelers.
- The Proponent should ensure that the site access roads are well equipped with temporary road signs conditions to cater for vehicles travelling to and from site throughout the project's life cycle.
- Project vehicles should be in a road worthy condition and serviced regularly to avoid accidents owing to mechanical faults.
- Vehicle drivers should only make use of designated site access roads provided and as agreed.
- Vehicle drivers should not be allowed to operate vehicles while under the influence of any intoxicants.
- No heavy trucks or project related vehicles should be parked outside the project site boundary or demarcated areas for such purpose.
- To control traffic movement on site, deliveries from and to site should be carefully scheduled. This should optimally be during weekdays and between the hours of 8am and 5pm.
- The site access road(s) should be upgraded to an unacceptable standard to be able to accommodate project related vehicles as well as farm vehicles.

8.3.9 Noise and vibrations

Prospecting and exploration work (especially drilling) may be a nuisance to surrounding communities due to the noise produced by the activity. Excessive noise and vibrations can be a health risk to workers on site. The exploration equipment 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 low rating, the mitigation measures should be implemented. This impact is assessed in **Table 20** below.

Table 20: Assessment of the impacts of noise and vibrations from exploration

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
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

Mitigations and recommendations to minimize noise

- Noise from operations' vehicles and equipment on the sites should be at acceptable levels.
- The exploration operational times should be set such that no exploration activity is carried out during the night or very early in the mornings.
- Exploration hours should be restricted to between 08h00 and 17h00 to avoid noise and vibrations generated by exploration equipment and the movement of vehicles before or after hours.
- When operating the drilling machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce exposure to excessive noise.

8.3.10 Disturbance to Archaeological and Heritage resources

The specialist archaeological assessment conducted, indicates that some sections and within the boundaries of the proposed project site area are highly sensitive and archaeologically significant in terms of heritage resources that characterizes the need of a detailed investigation of any other existing archaeological cultural materials in the areas. This area was mapped out, and coordinates taken to establish "No-Go-Areas", due to their sensitivity the areas were documented, and they should be protected either by fencing them off or demarcation for preservation purposes or excluded from any development i.e., no exploration activities should be conducted near these recorded areas through establishment of buffer zones.

Therefore, 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 21**.

Table 21: Assessment of the impacts of exploration 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

Mitigations and recommendations to minimize impact on archaeological and heritage resources

- If any archaeological material or human burials are uncovered during prospecting or exploration activities, then work in the immediate area should be halted, the finds would need to be reported to the heritage authorities and may require inspection by an archaeologist.
- Buffer zones should be maintained around known significant archaeological, historical or cultural heritage sites as far as possible.
- A “No-Go-Area” should be put in place where there is evidence of sub-surface archaeological materials, archaeological site, historical, rock paintings, cave/rock shelter or past human dwellings. It can be a demarcation by fencing off or avoiding the site completely by not working closely or near the known site. The ‘No-Go Option’ might have a NEUTRAL impact significance.
- On-site personnel (s) and contractor crews must be sensitized to exercise and recognize “chance finds heritage” in the course of their work.
- During the prospecting and exploration works, it is important to take note and recognize any significant material being unearthed and making the correct judgment on which actions should be taken.
- If there is a possibility of encountering or unearthing of archaeological materials, then it is better to change the layout design to avoid the destruction that can occur.
- Direct damage to archaeological or heritage sites should be avoided as far as possible and, where some damage to significant sites is unavoidable, scientific/historical data should be rescued.

- All ground works should be monitored and where any stratigraphic profiles in context with archaeological material are exposed, these should be recorded, photographed and coordinates taken.
- The footprint impact of the proposed prospecting and exploration activities should be kept to minimal to limit the possibility of encountering chance finds within the EPL boundaries.
- A landscape approach of the site management must consider culture and heritage features in the overall planning of exploration infrastructures within and beyond the license / EPL boundaries.
- Subject to the recommendations herein made and the implementation of the mitigation measures, adoption of the project HMP/EMP should be complied.
- An archaeologist, Heritage specialist or a trained Site manager should be on-site to monitor all significant earth moving activities that may be implemented as part of the proposed project activities.
- When there is removal of topsoil and subsoil on the site for exploration purposes, the site should be monitored for subsurface archaeological materials by a qualified Archaeologist or Site manager.
- Show overall commitment and compliance by adapting “minimalistic or zero damage approach” throughout the exploration activities.
- In addition to these recommendations above, there should be a controlled movement of the exploration crew, in order to limit proliferation of informal pathways, gully erosion and disturbance to surface and sub-surface artifacts such as stone tools and other buried materials.
- There should be controlled movement of heavy loads such as abnormal vehicles and kinds of heavy-duty machineries within the EPL. This means avoiding chances of crossing paths that may lead to the destruction of on and sub-surface archaeological materials
- It is essential that cognizance be taken of the larger historical landscape of the area to avoid the destruction of previously undetected heritage sites. Should any previously undetected heritage or archaeological resources be exposed or uncovered during exploration phases of the proposed project, these should immediately be reported to the heritage specialist or heritage authority (National Heritage Council of Namibia).
- The Proponent and Contractors should adhere to the provisions of Section 55 of the National Heritage Act in event significant heritage and culture features are discovered during exploration works.

- Whoever is going to oversee mitigation and monitoring measures should have the authority to stop any exploration or construction activities that is in contravention with the National Heritage Act of 2004 and National Heritage Guidelines as well as the overall project EMP.

8.3.11 Impact on Local Roads/Routes

These types of projects are usually associated with movements of heavy trucks and equipment or machinery that use local roads frequently. The heavy trucks travelling on the local roads and exert more pressure on roads. The local roads may not be in a good condition for heavy vehicles, which may make it worse and difficult to be used by all vehicle types. This will be a concern if maintenance and care is not done during the exploration phase. The impact would be short-term (during exploration 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 22**.

Table 22: Assessment of exploration on 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

Mitigations and recommendations to minimize the impact on local services

- Heavy trucks transporting materials and services to site should be scheduled to travel at least twice or thrice a week to avoid daily travelling to site, except in cases of emergencies.
- The Proponent should consider frequent maintenance of local roads on the farms to ensure that the roads are in a good condition for use.
- Avoid unnecessary affecting areas viewed as important habitat – i.e. ephemeral rivers; rocky outcrops; clumps of protected tree species; lappet-faced vulture nesting sites.
- Make use of existing tracks/roads as much as possible throughout the area;
- Do not drive randomly throughout the area (could cause mortalities to vertebrate fauna and unique flora; accidental fires; erosion related problems, etc.);
- Avoid off road driving at night as this increases mortalities of nocturnal species;

- Implement and maintain off-road track discipline with maximum speed limits (e.g. 30km/h) as this would result in fewer faunal mortalities and limit dust pollution;
- Where tracks have to be made to potential exploration sites off the main routes, the routes should be selected causing minimal damage to the environment – e.g. use the same tracks; cross drainage lines at right angles; avoid placing tracks within drainage lines; avoid collateral damage (i.e. select routes that do not require the unnecessary removal of trees/shrubs, especially protected species);
- Rehabilitate all new tracks created.

8.3.12 Social Nuisance: Local Property intrusion and Disturbance or Damage

The presence of some non-resident workers (workers from outside the local area) may lead to social annoyance to the local community. This could particularly be a concern if workers enter or damage private property. The private property referred to herein could be houses, fences, vegetation, or domestic and wild animals (livestock and wildlife) or any properties of economic or cultural value to the farm/landowners or occupiers of the land. The damage or disturbance to properties might occur to private and public properties. The unpermitted and unauthorized entry to private properties may cause clashes between the affected property (land) owners and the Proponent.

Pre-implementation of mitigation measures, the impact is rated as of medium significance. However, upon mitigation (post-mitigation), the significance will change from medium to low rating. The impact is assessed below (**Table 23**).

Table 23: Assessment of 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

Mitigations and recommendations to minimize the issue of damage to or intrusion of properties

- The Proponent should inform their workers on the importance of respecting the farmers' properties by not intruding or damage their property or snaring and killing their livestock and wildlife.

- Any workers or site employees that found guilty of intruding privately owned properties, should face disciplinary action or be dealt with as per their employer' (Proponent)'s code of employment conduct
- The project workers should be advised to respect the community and local's private properties, values, and norms.
- No worker should be allowed to wander or loiter on private property without permission.
- The project workers are not allowed to kill or in any way disturb local livestock and wildlife on farms.
- The cutting down or damaging of vegetation belonging to the affected farmers or neighbouring farms is strictly prohibited.

8.4 Cumulative Impacts Associated with Proposed Exploration

According to the International Finance Corporation (2013), cumulative impacts are defined as “those 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 ones”.

Similar to many other exploration projects, one cumulative impact to which the proposed project and associated activities potentially contribute is the:

- **Impact on road infrastructure:** The proposed exploration activities contributes cumulatively to various activities such as farming activities and travelling 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 local extent (site-specific) of the intended mineral exploration activities.
- **The use of water:** While the contribution of this project will not be significant, mitigation measures to reduce water consumption during exploration are essential.

8.5 Mitigations and Recommendations for Rehabilitation

The rehabilitation of explored (disturbed) sites will include but not be limited to the following:

- Backfilling of trenches and or pits in such a way that subsoil is replaced first, and topsoil replaces last.

- Levelling of stockpiled topsoil, to ensure that the disturbed land sites are left as close to their original state as much as possible.
- Closing off and capping of all exploration drilling boreholes to ensure that they do not pose a risk to people and animals in the area. The boreholes should not only be filled with sand alone, as wind will scour the sand and re-establish the holes.
- Removal of exploration equipment and vehicles from the site. Transporting all machinery and equipment as well as vehicles to designated offsite storage facilities.
- Clean up of site working areas and transporting the recently generated waste to the nearby approved waste management facility (as per agreement with the facility operator/owner).

9 CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusion

In conclusion, it is crucial for the Proponent and their contractors to effectively implement the recommended management and mitigation measures, in order to protect both the biophysical and social environment throughout the project duration. All these would be done with the aim of promoting environmental sustainability while ensuring a smooth and harmonious existence and purpose of the project activities in the host community and environment at large. This is 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. Lastly, should the ECC be issued, the Proponent will be expected to be compliant with the ECC conditions as well as legal requirements governing the mineral exploration and related activities.

9.2 Recommendations

The potential positive and negative impacts stemming from the proposed exploration activities on EPL No. 7646 were identified, assessed and appropriate management and mitigation measures (to negative impacts) made thereof for implementation by the Proponent, their contractors and project related employees.

Most of the potential impacts were found to be of medium rating significance. With the effective implementation the recommended management and mitigation measures, this will particularly see the 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 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 on monitoring the implementation of these measures.

It is therefore, recommended that the proposed prospecting and exploration activities may be granted an Environmental Clearance Certificate 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 ensuring 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 exploration activities have ceased are rehabilitated, as far as practicable, to their pre-exploration state.

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