ENVIRONMENTAL ASSESSMENT (EIA) REPORT FOR EXCLUSIVE PROSPECTING LICENSES (EPLS) NO. 7588 & 7653, IN KHORIXAS DISTRICT IN THE KUNENE REGION, NAMIBIA.

REPORT VERSION: FINAL

APP Number: 001574

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EXECUTIVE SUMMARY

Golden Empire Mineral Mining CC (hereinafter referred to as The Proponent), has an interest in Exclusive Prospecting Licenses (EPLs) 7588 & 7653. These EPLs were granted to the Proponent by the Ministry of Mines and Energy (MME). The tenure of these licences is from 22 November 2019. The covered areas are prospective for five (5) groups of commodities, upon which detailed prospecting and exploration activities will be conducted. The f 5 commodity groups covered by the licenses are:

- Base Metals and Rare Metals (main targeted commodities)
- Dimension Stones
- Precious Metals
- Semi- Precious Metals
- Industrial Minerals

The tenement is situated about 35.176 km northeast of Khorixas Townland, in the Kunene Region and cover a combined surface area of 111 922, 5025 hectares (ha). The approximate locations of the EPLs are shown in Figure 1 (coordinates: 20.90°S, 15.239°E). Golden Empire Mineral Mining CC plans to conduct prospecting and exploration activities leading to the estimation and delineation of the target resource. Prospecting and exploration form part of the listed activities that may not be undertaken without an Environmental Clearance Certificate (ECC).

Project Description

The prospecting and exploration activities entail the following five mineral commodity groups: (i) Base and rare metals, (ii) dimension stones, (iii) precious metals, (iv) semi-precious metals, and (v) industrial minerals. Base and rare metals are the main target for the planned exploration activities. The selection of the commodities applied for, the potential mineralization model and exploration targets was based on the regional and local geology. According to the information obtained from the exploration archives at the Ministry of Mines and Energy (MME), the EPLs 7588 & 7653 have a potential for base metals mineralization. The objective of the planned prospecting and exploration is to delineate the mineral deposits and determine whether the deposits are economically viable. The scoping process will identify sensitive environmental features that might be affected by the proposed prospecting and exploration activities. The level and magnitude of planned exploration work is not clear at this stage. However, both invasive and non-invasive exploration activities are expected to take place upon issuance of an environmental clearance certificate. Non-invasive activities include geological field mapping and geophysical ground-based

survey work. Invasive activities involve soil and rock sampling, trenching and drilling. The prospecting and exploration activities entail the following two mineral commodity groups: (i) Base and rare metals, (ii) precious metals. Base metal (i.e. copper) is the main target for the planned exploration work. The Proponent plans to conduct a staged exploration approach as follows:

Prospecting (Construction/Initiation Phase)

Prospecting phase include reviewing existing reports and composite stratigraphic, lithological-geochemical maps of the targeted areas to identify prospective lithostratigraphic packages. In addition to literature review, field work (lithological (soil/rock) mapping and sampling) will be conducted to verify desktop work. Up to this point no physical disturbance is required.

The selection of the potential mineralization model and exploration targets has been specially selected based on the regional and likely local geology. The exploration programme will commence upon issuing of the clearance certificate.

Exploration drilling, Sampling and Analysis (Operational and Maintenance Phase)

This is the phase during which the Proponent is exploring and undertaking related activities on the site. It is also the phase during which maintenance of the exploration works, equipment and machinery is done. The level and magnitude of planned exploration work is not clear at this stage. However, the Proponent has highlighted that both invasive and non-invasive exploration activities are expected to take place upon issuance of an environmental clearance certificate. Non-invasive activities include geological field mapping and ground-based surveys. Invasive activities involve soil and rock sampling, trenching, drilling and test mining. A 12 to 16 months exploration period is predicted. Furthermore, copper and gold are the main targeted metals for the planned prospecting work. The selection of the potential mineralization model and exploration targets will be selected based on the local geology mapping, trenching, and drilling and assay results of the samples collected. The aim of the planned exploration activities is to delineate the mineral deposits and determine whether the deposits are economically feasible mining resources. No processing of mined commodities with chemicals is planned for onsite at this stage. Only crushing, sorting and bagging. Other aspects of the exploration operations include:

Access

The EPLs are situated within Khorixas district. The nearest town to the tenement is Khorixas which is approximately 35.176 km from the licences. They are accessible from coastal towns via the C35 or alternatively from Windhoek, via the B2, then the C39 to Khorixas.

Material and Equipment

The input required for exploration program in terms of vehicles and equipment include; two (4X4) vehicles, earth movers, drilling machines, crushing and screening equipment, compressor and generator. Equipment and vehicles will be stored at a designated area near accommodation site or a storage site established within the EPLs area.

Human Resources

The project will employ over 10-15 people, both semi-skilled and skilled.

Services infrastructure

*Water***:** Water required for drinking, sanitation, dust control, and washing equipment will be obtained from the nearest boreholes and off-site municipal source and/or from any other approved water sources, through water abstraction permits. It is therefore estimated that 1500 litres of water for drinking, 3600-4000 litres of water for sanitation, 900 litres of water for cooking, 7000 litres of water for dust control, 2000 litres of water for washing equipment will be used per month.

*Power supply***:** Power required during operation phase will be provided by diesel-run generators.

Accommodation

Exploration crew will be accommodated in Khorixas town. Exploration will take place during the day time only and staff will be commuting to exploration site from the accommodation town/place.

Timeframe

The planned ground surveys may last several weeks and will be done in stages on different parts of the properties (EPL 7588 and 7653). The geological mapping, ground surveys and sampling will be done in a period of 12 to 16 months.

Exploration work will take place during the day time only and staff will be commuting to exploration site from the accommodation town/place.

Waste Management

It is required that wastewater has to be disposed in evaporation ponds or storage tanks because no effluent may be discharged into the ephemeral, dry river beds in the interior of Namibia. The site will also be equipped with secured waste bins for each waste type. Depending on the amount generated, waste will be sorted and collected on a weekly basis or monthly and taken to the Khorixas landfill site. Ablution facilities will use chemical toilets and/or sealed septic tanks and the sewerage taken to the Khorixas periodically.

Security

Temporary storage areas for exploration equipment, materials, machines etc. will be necessary at the exploration camp. Security will be supplied on a 24-hour basis at the exploration camp. A temporal support fence surrounding the storage/camp site will be constructed to ensure people and domestic animals are not put at risk.

Decommissioning Phase

As it is with all exploration projects, exploration activities on EPLs 7588 & 7653 will come to an end. The decommissioning of the exploration operations may be considered due to poor exploration results or declining in the copper market price. During the operational phase and before decommissioning, the Proponent will need to put site rehabilitation measures in place. Where necessary, stockpiling of top soil for rehabilitation at a later stage will be undertaken. Necessary rehabilitation of exploration areas will be undertaken upon completion of each phase of exploration (drilling, sampling etc.).

Project Alternatives

The conclusions weighed and considered above are summarized below:

No-go alternative: The “No-Go” alternative is the option of not proceeding with the activity, which typically implies a continuation of the status quo. Should the proposed works of the prospecting and exploration plan be discontinued, none of the potential impacts (positive and negative) identified would occur. Furthermore, the local people to be employed for exploration work will be left unemployed and the Proponent would not be able discover and define the targeted resource for possible future mining activities and contribute to the country’s economy through revenue and license royalty payments.

If the proposed project is to be discontinued, the current land use for the proposed site will remain unchanged. In considering the proposed project, the ‘no-go’ option is not considered the preferred alternative.

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 EPLs area. Therefore, finding an alternative location for the planned exploration activities is not possible. In other words, the base metals (i.e. copper) mineralization is area specific, which means exploration targets are primarily determined by the geology (host rocks) and the geological environment of the site (ore forming mechanism).

Exploration Methods: Both invasive and non-invasive exploration activities are expected to take place. If an economically viable discovery is made, the project will proceed to mining phase. A separate full environmental assessment will be undertaken for the mining phase.

Impact Identification

The potential positive and negative impacts that have been identified for the proposed establishment activities are as follows:

Positive impacts:

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

Negative impacts:

- Land degradation and possible destruction of faunal habitats as well as removal of vegetation that may be encountered within the target areas.
- Generation of dust from the exploration activities and access gravel road
- Environmental pollution
- Visual impacts (scars) on landscape that will, because of low rainfall, remain so for a very long time if not rehabilitated.
- Occupational health and safety risks

- Water quality changes
- Archaeological impact
- Noise and vibrations
- Socio-economic and cultural issues, including sustainable development
- Climatological impacts on exploration and subsequent mining operations, including precipitation and prevailing winds

Impacts Assessment and Mitigations

The key potential impacts associated with prospecting, drilling and sampling and decommissioning phases of the project were identified and assessed. In order to avoid and minimize (where impacts cannot be avoided) the identified project impacts, mitigation measures were recommended. The significant identified impacts for the project phases are summarized below. These impacts can be reduced or minimized by implementing the mitigation measures given under the impact assessment chapter and also management actions plan provided in the Draft EMP.

Loss of Biodiversity: The drilling activities and earthworks done to expose the copper bearing rock units will potentially result in land degradation, thus destroying habitats of small animal species that may be encountered under the site soils and rocks. In order to enable the exploration operations, some site vegetation within the footprint of the exploration area may be removed. This will lead to the destruction of protected plant species. Thus, resulting in the loss of such species and eventual a loss of biodiversity in the area. In fragile ecosystems, vegetation is easily disturbed, which often means any disturbance to the environment will result in the loss flora. It is therefore important to identify what species are present, understand them and try to minimize the impact upon them with operational management guidelines. The most obvious impact on vegetation is direct loss due to removal of soil by digging and trenching. The Consultant advises the Proponent to avoid unnecessary removal of vegetation, in order to promote a balance between biodiversity and their operations. Under the current status, the impact can be considered to be of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will significantly be reduced to low.

Generation of Dust: Dust emanating from site access roads when transporting exploration equipment and supply (water) to and from site (time-to-time) and eventual drilling done at the site may compromise the air quality in the area. Vehicular movements create dust even though it is not always so severe. The hot and dry environment, loose and in some places sandy nature of the substrate and low vegetation cover causes ambient fugitive dust levels. The medium significance of this impact can be reduced by properly implementing mitigation measures (JSI Consultancy, 2015).

Waste Generation: Prospecting and exploration activities are usually associated with generation of waste of all kinds (domestic and general) and if these are not disposed of in a responsible manner, it will result in the pollution of the site and the surrounding environment. Industrial waste is a given by-product of any exploration operation. Non-biodegradable and biodegradable refuse should be stored in a container and collected on a regular basis and disposed of at a recognized disposal facility. Precautions should be taken to prevent any refuse spreading. The container should be covered with mesh to prevent access from animals. Without any mitigation measure, the impact has a medium significance. The impact will be of low significance from medium, upon implementing the mitigation measures.

Visual Impact (Scars) on Landscape: Visual impact due to exploration is aesthetic damage to the landscape. Drilling activities usually leave scars on the local landscape. If the exploration sites are located close to or along tourist routes, these scars in many cases contrasts the surrounding landscape and thus may potentially become a visual nuisance, especially to tourists in tourist-prone areas. Nonetheless, it is a vital to acknowledge that during prospecting phase, certain measures will need to be taken into consideration regarding the visual aspect. Currently, the visual impact can be rated as slightly medium to low significance, but upon effectively implementing the measures.

Potential Health and Safety Risks: Improper handling of mining materials and equipment may cause health and safety risks such as injuries to workers. The impact is probable and has a medium significance rating. However, with adequate mitigation measures, the impact rating will be reduced to low.

Surrounding Soils and Groundwater Impact: Exploration works will potentially result in soil disturbance which will leave the already exposed site soils vulnerable to erosion. This impact is probable because the proposed site is vacant (bare) with no vegetation cover. The impact can be rated as medium, if no mitigation measures are implemented. However, with the implementation of mitigation measures, the impact significance will reduce to low.

Archaeological Impact: During exploration works, historical resources may be impacted through unintentional destruction or damage. This may include the excavation of subsurface graves or other archaeological objects. There information about known heritage is provided in section 5.10 of this report. The impact can be rated medium to low, if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact significance will be low.

Noise and vibrations: The exploration work, especially drilling may be a nuisance to surrounding neighbours. Excessive noise can also be a health risk to site workers. Furthermore, 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, and therefore, the impact likelihood is minimal. Without any mitigation, the impact is rated as of medium significance. In order to change the impact significance from the pre-mitigation significance to low rating, the mitigation measures should be implemented.

Conclusion

The potential positive and negative impacts stemming from the proposed prospecting and exploration activities on EPLs 7588 & 7653 were identified, assessed and mitigation measures made thereof. The mitigation measures and recommendations provided in this EIA report and management action plans provided in the draft EMP, can be deemed sufficient to avoid and/or reduce (where impact avoidance is impossible) the risks to acceptable levels. The Consultant is therefore confident that these measures are sufficient and thus recommend that the Proponent be issued with the ECC to enable for the commencement of exploration, sampling and drilling activities on the properties, EPL 7588 and 7653. However, 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 work 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 EMA (2007), including;

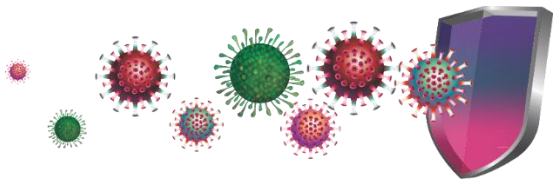
- Furnishing the MEFT and MME with an environmental report every six (6) months
- Carrying out and submission of an annual Environmental Audit to the MEFT and MME

Limitations

The Consultant warrants that the findings and conclusions contained herein were accomplished in accordance with the methodologies set forth in the Scope of Work and EMA, 2007. These methodologies are described as representing good customary practice for conducting an Environmental Impact Assessment 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 on 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 process concerning the proposed exploration work is reliable. However, the Consultant cannot and does not warrant or guarantee that the information provided by these 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.

COVID-19 Influences



COVID-19 has changed the way the world thinks, acts, and does business. The pandemic has forced a comprehensive review of business practices, a higher level of engagement with technology to offset the constraints due to social distancing, restrictive travel, and a focus on social responsibility. The Consultant has had to change very little in the way we operate and provide public consultation services.

Although the Consultant operated with limited travel during the environmental assessment to comply with the measures and regulations put in place to curb the spread of Covid-19, various other platforms were used to communicate the project information. These platforms included emails, registered mails, notices, newspaper adverts, and telephonic communication.

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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
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPL	Exclusive Prospecting License
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
Reg	Regulation
S	Section
TOR	Terms of Reference

KEY 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 environments 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 km2 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 an 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 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).
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

Golden Empire Mineral Mining CC (hereinafter referred to The Proponent), is a holder of Exclusive Prospecting Licenses (EPLs) 7588 and 7653. There are no known impediments to the continued exploration and evaluation of these EPLs. The locality map of EPLs 7588 & 7653 exploration site is shown in Figure 1. The EPLs were granted to the proponent by the Ministry of Mines and Energy (MME). The tenure of the EPLs are from 22 November 2019 as per the agreement with the MME. The earth data of the covered area is prospective with regards to five groups of commodities, upon which detailed prospecting and exploration activities will be conducted. The five commodity groups covered by the licenses are:

- Base Metals and Rare Metals (targeted commodities)
- Dimension Stones
- Precious Metals
- Semi- Precious Metals
- Industrial Minerals

In terms of Section 27 of the Environmental Management Act (EMA), No.7 of 2007 and its 2012 Environmental Impact Assessment (EIA), some activities as listed may not be carried out without an Environmental Impact Assessment (EIA) being undertaken and Environmental Clearance Certificate (ECC) being obtained. The relevant listed activities as per EIA regulations are:

- *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 form 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.*

Consequently, Golden Empire Mineral Mining CC appointed Excel Dynamic Solutions (Pty) Ltd, an independent team of Environmental Consultants to conduct the required EA process and submit the ECC application to the Environmental Commissioner on their behalf.

1.2 Terms of Reference and Scope of Works

Exploration activities are listed among those that may not be carried out by individuals or organizations without an EIA being undertaken and an ECC awarded. The Consultant was

appointed by the Proponent to undertake an environmental assessment for the purpose of applying for an ECC for exploration work on EPLs 7588 & 7653. There were no formal Terms of Reference (ToR) to Consultant provided by the Proponent. The Consultant, instead, relied on the requirements of the Environmental Management Act (No. 7 of 2007) (EMA) and its Environmental Impact Assessment (EIA) Regulations (GN. No. 30 of 2012) to conduct the study.

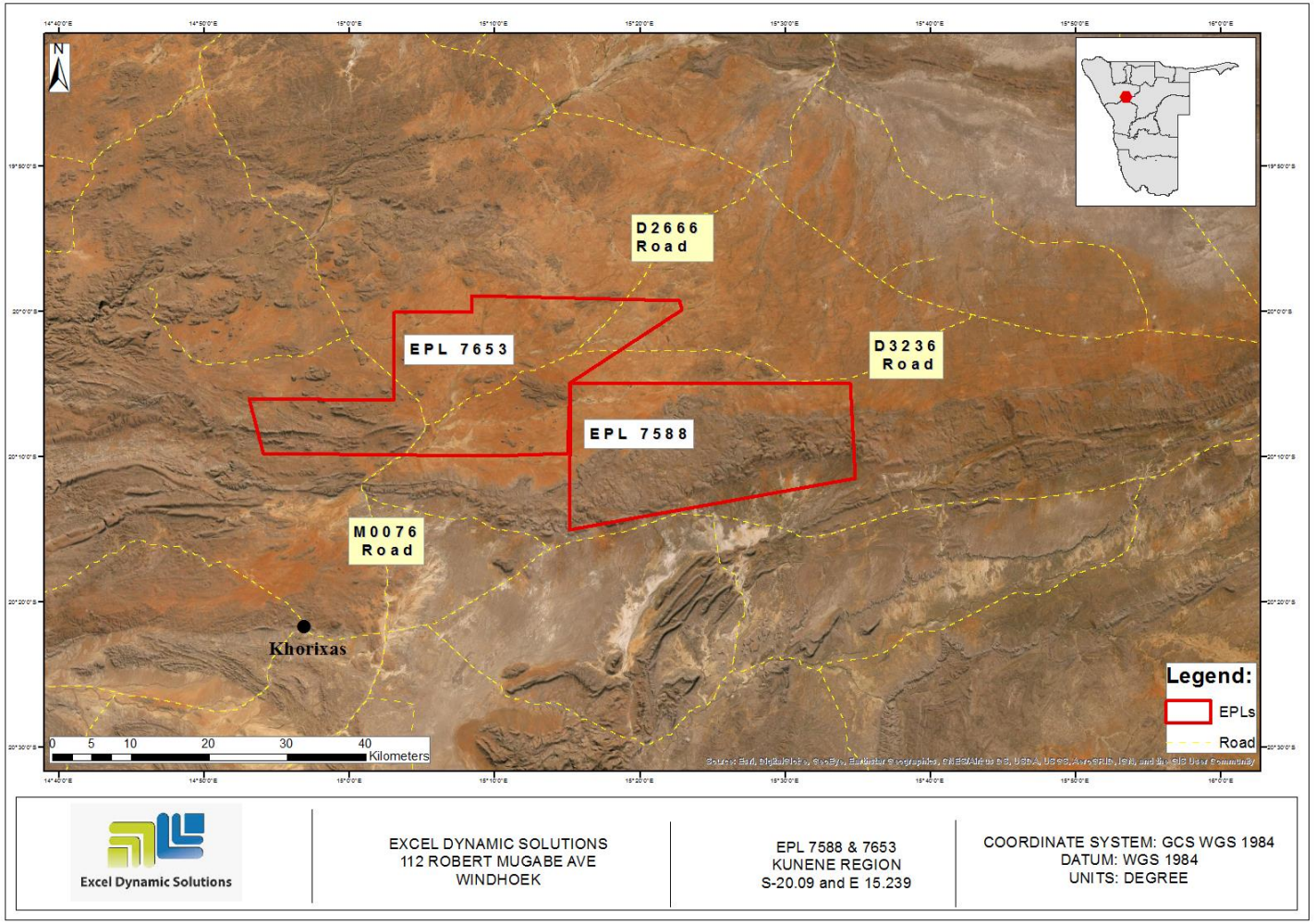


Figure 1: Location of the EPLs No. 7588 & 7653 near Khorixas town in the Kunene Region

1.3 Appointed Environmental Assessment Practitioner

In order to satisfy the requirements of the EMA and its 2012 EIA Regulations, Golden Empire Mineral Mining CC appointed Excel Dynamic Solutions (Pty) Ltd (Consultant hereafter), an independent consulting company to conduct the required EIA process on their (Proponent's) behalf. The findings of the EIA process are incorporated into this report and the draft Environmental Management Plan (EMP) - (**Appendix B**) will be submitted as part of an application for an ECC to the Environmental Commissioner at the Department of Environmental Affairs (DEA), Ministry of Environment, Forestry and Tourism (MEFT) and the Ministry of Mines and Energy (MME).

The EIA project is headed by Mr. Nerson Tjelos, a qualified and experienced Geoscientist and experienced EAP. The consultation process and reporting are conducted by Ms. Althea Brandt with support from Mr. Silas David. Mr. Tjelos, contributed to report writing and review. The CV for Mr. Tjelos is presented in **Appendix C.**

1.4 Details of the Project Proponent

The details of the Proponent are presented in **Table 1** below.

Table 1: Proponent contact details and purpose of the required ECC

Full name of Proponent	Physical Address & Contact number	Postal Address	ECC Application for:
Golden Empire Mineral Mining CC	Erf 19 Bismarck street 62, Windhoek West, Windhoek Cellphone: +264 (0)81 2126 209	**P.O Box 21062** **Windhoek,** **Khomas** Namibia	Exclusive Prospecting License (EPL) No. 7588 and 7653 near Khorixas Settlement in the Kunene Region, Namibia.

1.5 The Need for the Proposed Project

Exploration and Mining activities contribute to 25% of the country's income, thus regarded as one of the largest contributors to the Namibian economy. Namibia has various natural resources including diamonds, uranium, copper, gold, lead, tin, lithium, cadmium, zinc, salt and vanadium. Participation of local communities in prospecting, exploration and mining sector does not only create employment and increase revenue, but also contribute to the GDP of the country, which can help achieve a balance between the creation and distribution of wealth. Moreover, mining

forms the core of some of Namibia's development plans, namely: National Development Plan 5 (NDP5) and Harambee Prosperity Plan (HPP). A discovery of an economic deposit of the EPLs will contribute positively, as a solution, to the ever-increasing demand for base metals for the world's growing population and for prosperity. Copper is one of the metals on which a technological society is based and its behavior as an electrical and thermal conductor appears to ensure a long-term future for the metal in spite of threats of substitution by fibre optics and ceramic superconductors. Moreover, because of the large number of producers in the world, the metal is not as susceptible as other commodities to large price swings as a result of speculation or cartel sales.

Given the fact that this activity creates employment to the local community and contributes to the country's GDP, this justifies the need for exploration work on EPLs 7588 & 7653 to enable future mining works.

2 PROJECT DESCRIPTION: PROPOSED EXPLORATION ACTIVITIES

The description of exploration activities to be undertaken is presented below (section 2.1, 2.2 and 2.3).

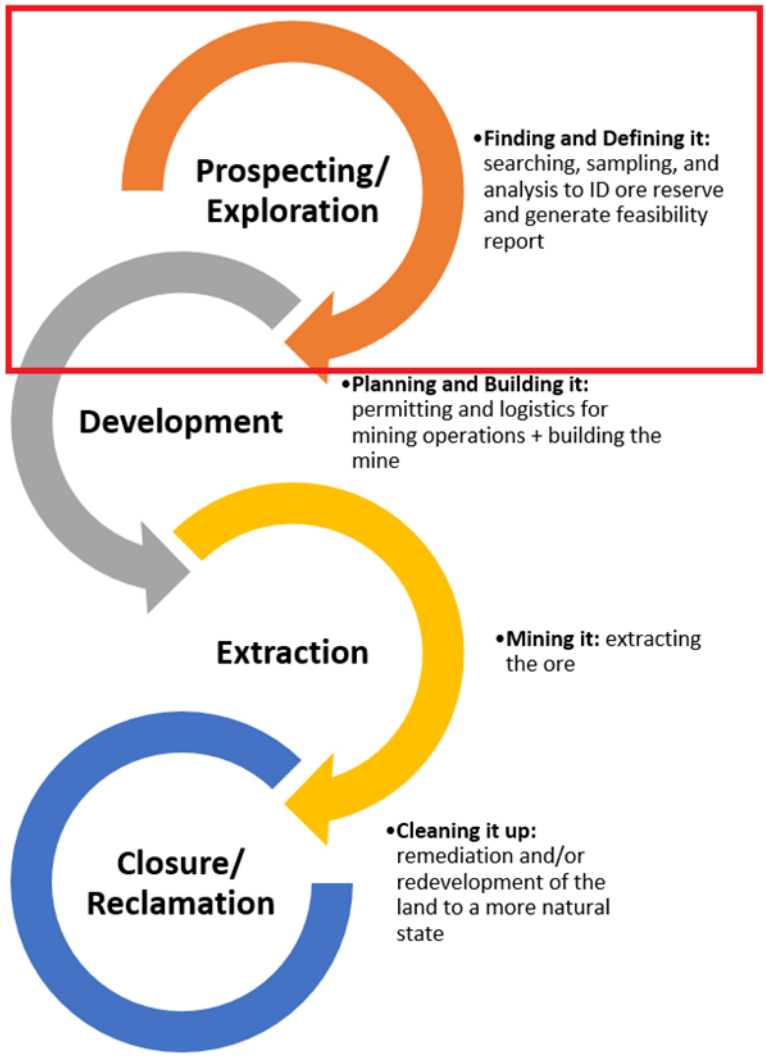


Figure 2: Diagram of the Life Cycle of a Mine (after Superfund Research Project, 2019). The phase covered by this study is highlighted with a red box

2.1 Prospecting

Prospecting is regarded as the first stage of mining (**Figure 3**). Prospecting phase include reviewing existing reports and composite stratigraphic, lithological-geochemical maps of the targeted areas to identify prospective lithostratigraphic packages. In addition to literature review, field work (lithological (soil/rock) mapping and sampling) will be conducted to verify desktop work. Up to this point no physical disturbance is required.

The selection of the potential mineralization model and exploration targets has been specially selected based on the regional and likely local geology as well as the results of the past exploration activities. Upon issuing of the clearance certificate, the exploration program will commence with ground geophysical surveys.

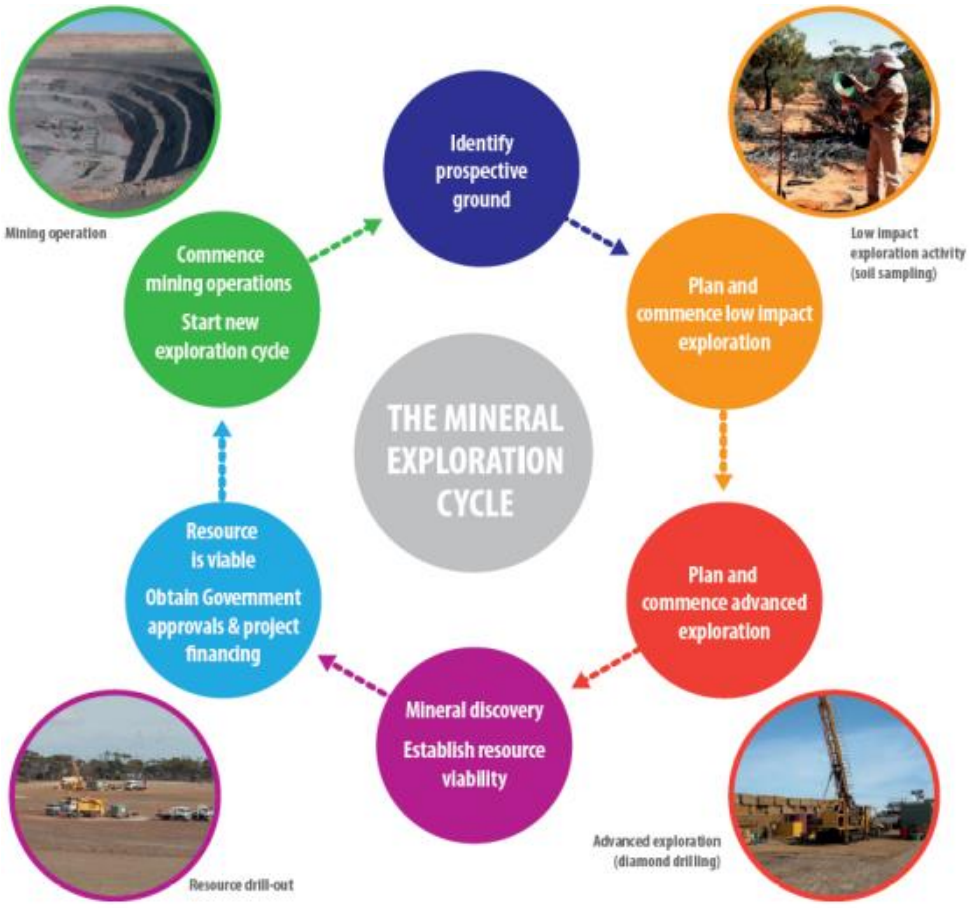


Figure 3: The mineral exploration cycle (after, Savannah Resources, 2019)

2.2 Exploration Drilling, Sampling and Analysis

During this advanced phase, the exploration program will be in operation. The target areas within the EPLs boundaries' which have been identified during the prospecting phase will then undergo exploration drilling. The preferred drilling technique for this exploration program is Reverse Circulation (RC) 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 quick and cheap compared with other techniques like Diamond Drilling. There have been past prospecting activities on the areas, and understandably using diamond

coring technique. Based on the past findings and recommendation from past geology studies, RC Drilling is the preferred technique for the planned exploration work. In the advanced stage of exploration activities, larger amount of sample material may be required for analysis and to perform processing trials. Pit may be dug to sampling. The size of the sample size may be adjusted depending on the nature of mineralization observed from drilling. No explosives will be used during exploration phase. Other aspects of the exploration operations include:

2.2.1 Access

The EPLs are situated within Khorixas district. The nearest town to the tenement is Khorixas which is approximately 35.176 km from the licences. They are accessible from coastal towns via the C35 or alternatively from Windhoek, via the B2, then the C39 to Khorixas.

2.2.2 Material and Equipment

The input required for exploration program in terms of vehicles and equipment include; two (4X4) vehicles, earth movers, drilling machines, crushing and screening equipment, compressor and generator. Equipment and vehicles will be stored at a designated area near accommodation site or a storage site established within the EPLs area.

2.2.3 Human Resources

The project will employ over 10-15 people, both semi-skilled and skilled.

2.2.4 Services

*Water***:** Water required for drinking, sanitation, dust control, and washing equipment will be obtained from the nearest boreholes and off-site municipal source and/or from any other approved water sources, through water abstraction permits. It is therefore estimated that 1500 litres of water for drinking, 3600-4000 litres of water for sanitation, 900 litres of water for cooking, 7000 litres of water for dust control, 2000 litres of water for washing equipment will be used per month.

*Power supply***:** Power required during operation phase will be provided by diesel-run generators.

2.2.5 Accommodation

Exploration crew will be accommodated in Khorixas town or any nearby available place.

2.2.6 Timeframe

The planned ground surveys may last several weeks and will be done in stages on different parts of the properties (EPL 7588 and 7653). The geological mapping, ground surveys and sampling

will be done in a period of 12 to 16 months. Exploration work will take place during the day time only and staff will be commuting to exploration site from the accommodation town/place.

2.2.7 Waste Management

The site will be equipped with secured waste bins for each waste type (i.e. domestic, hazardous etc.). It is required that wastewater has to be disposed in evaporation ponds because no effluent may be discharged into the ephemeral, dry river beds in the interior of Namibia. The site will also be equipped with secured waste bins for each waste type. Depending on the amount generated, waste will be sorted and collected on a weekly basis or monthly and taken to the Khorixas landfill site. Ablution facilities will use chemical toilets and/or sealed septic tanks and the sewerage taken to the Khorixas storage periodically.

2.2.8 Security

Temporary storage areas for exploration equipment, materials, machines etc. will be necessary at the camp. Security will be supplied on a 24-hour basis at the storage and/or camp site and exploration camp. A temporal support fence surrounding the storage/camp site will be constructed to ensure people and domestic animals are not put at risk.

2.3 Decommissioning Phase

As it is with all exploration projects, exploration activities on EPLs 7588 & 7653 will come to an end. The decommissioning of the exploration operations may be considered due to poor exploration results or declining in the commodity market price. During the operational phase and before decommissioning, the Proponent will need to put site rehabilitation measures in place. Where necessary, stockpiling of top soil for rehabilitation at a later stage will be undertaken. Necessary landscaping of exploration areas will be undertaken upon completion of each phase of exploration (drilling, sampling etc.).

3 PROJECT ALTERNATIVES

Alternatives are defined as: "*different means of meeting the general purpose and requirements of the activity*" (Environmental Management Act (2007) of Namibia (and its regulations (2012))). This chapter will highlight the different ways in which the project can be undertaken and to identify the alternative that will 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 subchapters.

3.1 Types of Alternatives Considered

3.1.1 The "No-go" Alternative

The "No-Go" alternative is the option of not proceeding with the activity, which typically implies a continuation of the status quo. Should the proposed works of the prospecting plan be discontinued, none of the potential impacts (positive and negative) identified would occur. Furthermore, the local people to be employed for exploration work will be left unemployed and the Proponent would not be able discover and define the targeted resource for possible mining and contribute to the country's economy through revenue and mining license royalty payments. If the proposed project is to be discontinued, the current land use for the proposed site will remain unchanged. In considering the proposed project, the 'no-go' option is not considered the preferred alternative.

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 EPLs area. Therefore, finding an alternative location for the planned exploration activities is not possible. In other words, the base metals mineralization is area specific, which means exploration targets are primarily determined by the geology (host rocks) and the tectonic environment of the site (ore forming mechanism). The tenements have sufficient surface area for future related facilities should an economic mineral deposit be defined.

3.1.3 Exploration Methods

Both invasive and non-invasive exploration activities are expected to take place. If an economically viable discovery is made, the project will proceed to mining phase.

3.2 Conclusion on Alternatives

The conclusions weighed and considered above are summarized below:

No-go alternative: Should the proposed prospecting and exploration works on the EPLs (7588 & 7653) be discontinued, none of the potential impacts (positive and negative) identified would occur. Furthermore, the local people to be employed by the project will be left unemployed and the Proponent would not be able discover and define the targeted resource for possible future mining activities to generate an income and contribute to the country's GDP through revenue and license royalty payments. In considering the proposed project, the 'no-go' option is not considered the preferred alternative.

Prospecting location: Finding an alternative location for the planned exploration activities is not possible (refer to **section 3.1.2**)

The exploration activities have certain legal implications and these applicable legal standards are presented in the following chapter.

4 LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES

A review of applicable and relevant Namibian legislation, policies and guidelines to the proposed development are given in this chapter. This review serves to inform the project Proponent, Interested and Affected Parties and the decision makers at the DEA of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled in order to establish the proposed prospecting and exploration activities.

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 in order to obtain an Environmental Clearance Certificate (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 form 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 legal obligations that are relevant to the proposed activities of EPLs 7588 & 7653 and related activities are presented in **Table 2**.

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

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Management Act EMA (No 7 of 2007)	Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). Details principles which are to guide all EAs.	The EMA and its regulations should inform and guide this EA process.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878)	Details requirements for public consultation within a given environmental assessment process (GN 30 S21). Details the requirements for what should be included in a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).	
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 land
The Constitution of the Republic of Namibia, 1990 as amended	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:	By implementing the environmental management plan, the establishment will be in conformant to the constitution in terms of environmental management and sustainability. Ecological sustainability will be main priority for the proposed development.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	"…the duty to investigate complaints concerning the over-utilisation 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…" Article 95(l) commits the state to actively promoting and maintaining the welfare of the people by adopting policies aimed at the: "…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."	
Minerals (Prospecting and Mining) Act (No. 33 of 1992)	Section 52 requires mineral license holders to enter into a written agreement with affected landowners before exercising rights conferred upon the license holder. Section 52(1) mineral licence holder may not exercise his/her rights in any town or village, on or in a proclaimed road, land utilised 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. Section 54 requires written notice to be submitted to the Mining Commissioner in the event that the holder of a mineral license (which includes and EPLs) intends to abandon the mineral license area.	The Proponent should enter into a written agreement with landowners before carrying out exploration on their land. The Proponent should carry out an assessment of the impact on the receiving environment. The Proponent should include as part of their application for these EPLs' measures by which they will rehabilitate the areas where they intend to carry out mineral exploration activities. The Proponent may not carry out exploration activities within the areas limited by Section 52(1) of this Act

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	Section 68 stipulates that an application for an exclusive prospecting licenses (EPLs) 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. Section 91 requires that rehabilitation measures should be included in an application for a mineral license.	
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 licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area"	The Proponent should obtain the necessary authorisation 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 Kunene Regional Council, therefore they should be consulted.
Local Authorities Act No. 23 of 1992	To provide for the determination, for purposes of local government, of local authority councils; the establishment of such local authority councils; and to define the powers, duties and functions of local authority councils; and to provide for incidental matters.	The Khorixas 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 duly of care to prevent pollution (S3 (k)). Provides for control and protection of groundwater (S66 (1), (d (ii)). Liability of clean-up costs after closure/abandonment of an activity (S3 (l)). (l)).	The protection (both quality and quantity/abstraction) of water resources should be a priority.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Water Resources Management Act (No 11 of 2013)	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: 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).	
National Heritage Act No. 27 of 2004	To provide for the protection and conservation of places and objects of heritage significance and the registration of such places and objects; to establish a National Heritage Council; to establish a National Heritage Register; and to provide for incidental matters.	The Proponent should ensure compliance with 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
The National Monuments Act (No. 28 of 1969)	The Act enables the proclamation of national monuments and protects archaeological sites.	
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.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
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 labourers.	
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.
Labour Act (No. 6 of 1992)	Ministry of Labour (MOL) is aimed at ensuring harmonious labour relations through promoting social justice, occupational health and safety and enhanced labour market services for the benefit of all Namibians. This ministry insures effective implementation of the Labour Act no. 6 of 1992.	The Proponent should ensure that the prospecting and exploration activities do not compromise the safety and welfare of workers.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
United Nation Convention to Combat Desertification 1992	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 in order to support poverty reduction and environmental sustainability	United Nation Convention

The following chapter is a presentation of the pre-prospecting baseline (environmental baseline).

5 ENVIRONMENTAL BASELINE

The proposed exploration program 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 what was before and what would be after project. This also helps the EAP in identifying the sensitive environmental features that may need to be protected through the recommendation and effective implementation of mitigation measures. The summary of selected biophysical and social baseline information pertaining to the prospecting area is given below.

The baseline information presented below has been sourced from different reports of studies conducted in the Kunene Region (at large) as well those done for Khorixas.

5.1 Climate

Detailed summaries of climate conditions around the EPLs area, are presented below:

5.1.1 Rainfall

The highest rainfall in the Khorixas area is usually experienced in February which may reach an average of approximately 150 mm. Little to no rainfall periods are recorded from May to September with an average of 0-3mm as indicated in **Figure 4**.

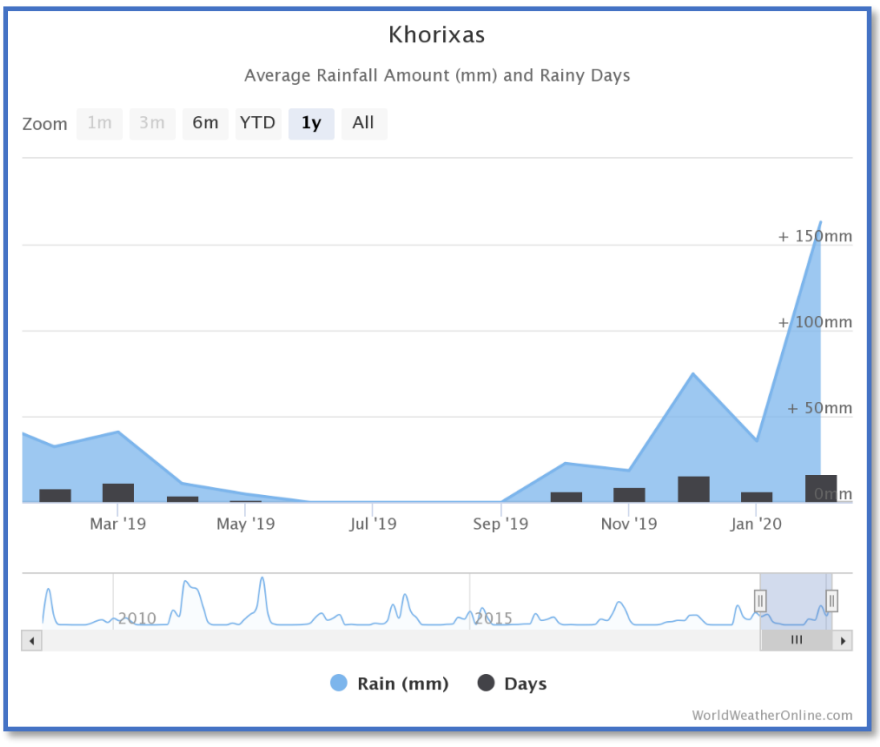


Figure 4: A graph showing rainfall patterns for one year (March 2019 – January 2020) in Khorixas, Kunene Region

5.1.2 Temperature

Khorixas has distinct temperature seasons and the temperature varies during the year. The month of October is the warmest with an average temperature of 30 ^{0}C at noon. July is the coldest month with an average temperature of 8-10 ^{0}C at night (**Figure 5**).

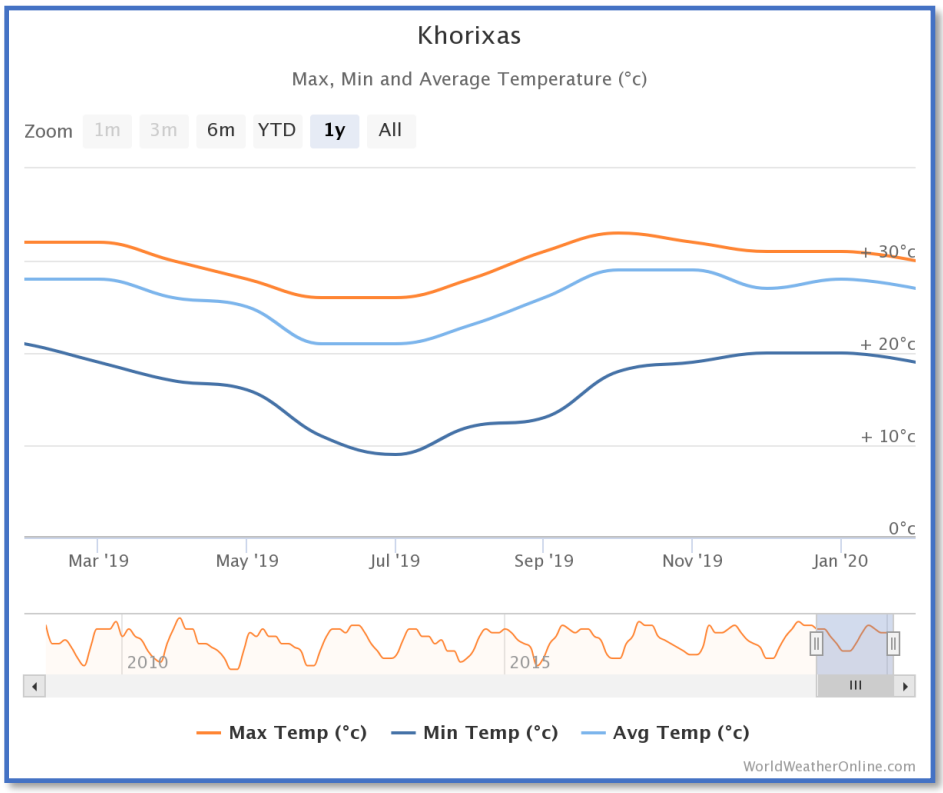


Figure 5: A graph showing temperature patterns for one year (March 2019 – January 2020) in Khorixas, Kunene Region.

5.1.3 Winds

Primarily, south easterly, southerly, easterly and northerly airflows are common in Khorixas area. The Khorixas area is subject to erratic winds and considerable discrepancies in spite of short distances due to the varying terrains. The graph below depicts the wind patterns in the area. The highest wind speeds are attained in October as shown in **Figure 6**.

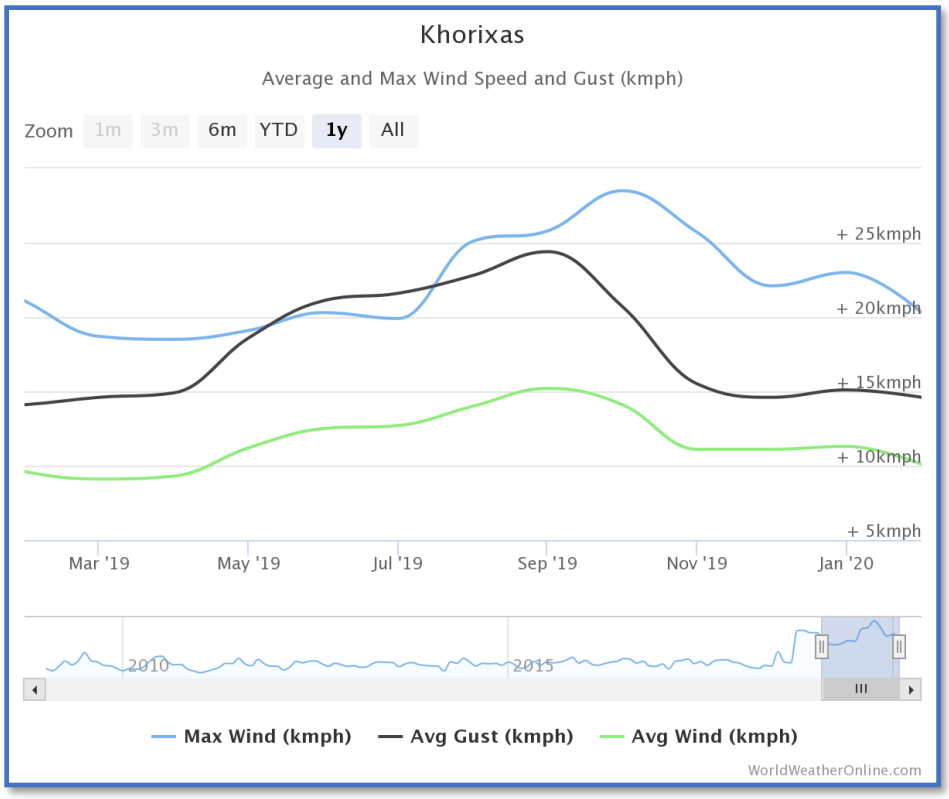


Figure 6: A graph showing wind patterns for one year (March 2019 – January 2020) in Khorixas, Kunene Region.

5.1.3 Humidity

The relative humidity during the least humid months of the year, i.e. September, is around 20 % and the most humid month is February with about 45% humidity. Namibia has a low humidity in general, and the lack of moisture in the air has a major impact on its climate by reducing cloud cover and rain increases the rate of evaporation (Mendelsohn, 2002). **Figure 7** depicts the humidity patterns in the Khorixas area (https://en.climate-data.org).

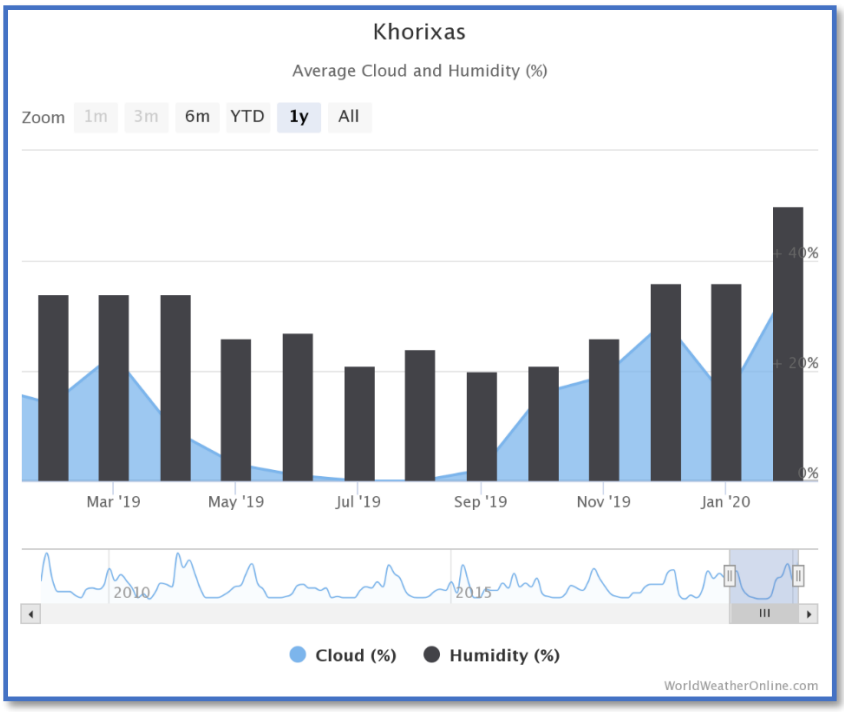


Figure 7: A graph showing Humidity patterns for one year (March 2019 – January 2020) in Khorixas, Kunene Region

5.2 Topography

The EPLs 7588 & 7653 area is being dominated by gently rolling vegetated hills. Furthermore, the altitude within the EPLs ranges from 950 to 1400m above mean sea level (**Figure 8**).

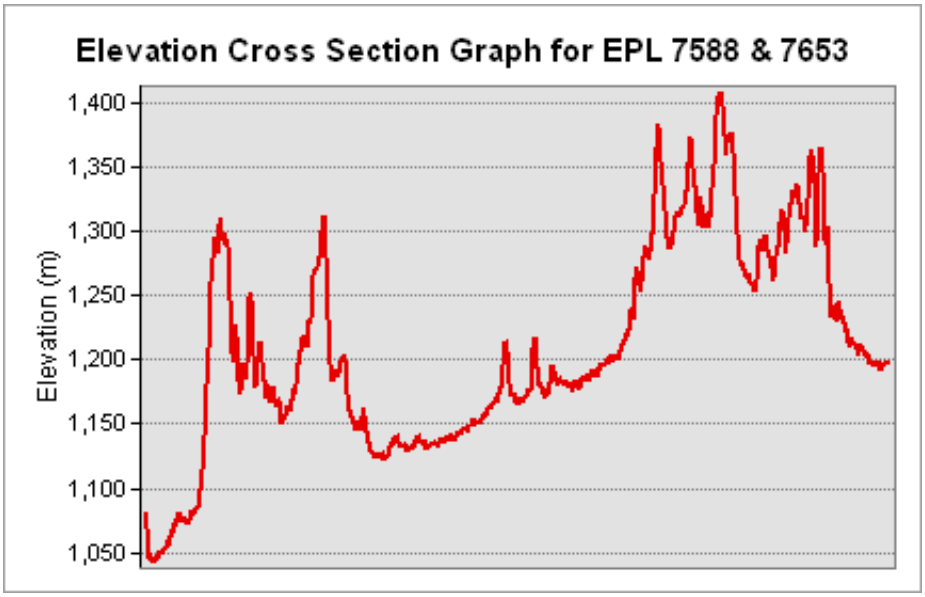


Figure 8: Elevation profile within the EPLs.

5.3 Soils

Generally, the region is dominated by different groups of soil such as the Ferralsols, Arenosols, Luvisols, leptosols and Lithosols, sometimes with associations of Fluvisols and Vertisols. Ferralsols sands dominate the highlands in the upper Kunene region, the vicinity of the project area; while Arenosols and Luvisols are dominant in the middle of the region. The lower part of the region is dominated by Lithosols. Overall, infertile soil groups cover more than 80%. Moreover, the Ferralsols developed from the weathering of basement rocks. The fine to medium Arenosols sands are more generally called Kalahari sands with sand grain making up more than 70% of the soil volume and extending often to more than one meter deep. These soils are very poor and at best only marginal cultivation can be carried out on them. The Leptosols cover 75% of the region, these soils are generally very shallow soil over hard rock, although they can also be deeper, and are extremely stony (FAO, 1997). Below is the dominant soil map (Figure 9).

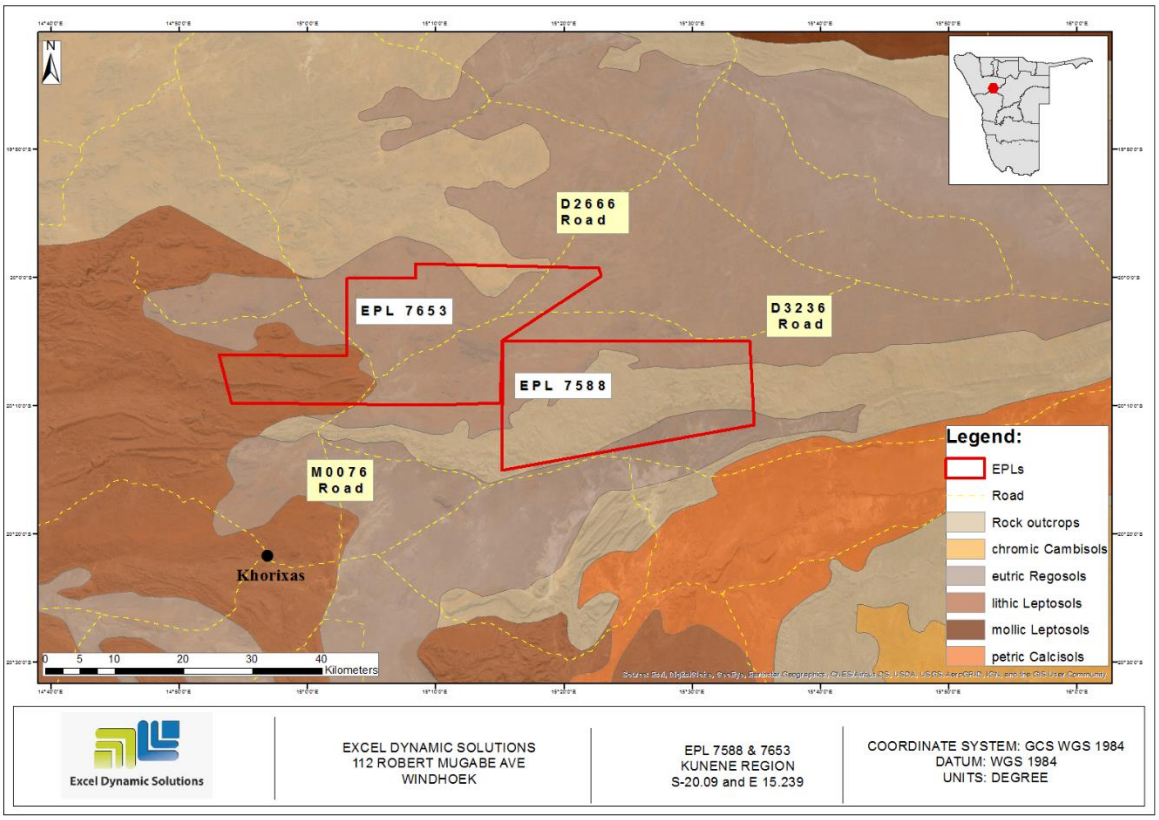


Figure 9: A map of dominant sand soils found within the EPLs and surrounding

5.4 Geology

The EPLs area is underlain by Palaeoproterozoic metamorphic rock of the Huab Metamorphic Complex, which outcrop as an inlier of the Congo Craton surrounded by stratified rocks of the Damara Orogen. The metamorphic basement was intruded at ca 750 Ma by alkaline silicate rocks and carbonatites of the Lofdal Carbonatite complex. The complex comprises an early silicate intrusive assemblage ranging from soviet through dolomitic and ankeritie carbonatitie. The entire complex comprises a central intrusive core characterized by a number of plugs of nepheline syenite and Carbonatite with associated hydrothermal alteration, in which phonolite and Carbonatite dykes related to the intrusive plugs have exploited pre-existing structures in the basement that were re-activated during Neoproterozoic tectonism. Furthermore, these carbonatite dykes are widely mineralized with rare earth elements. These carbonatite dykes are widely mineralized with rare earth elements. The total area affected by carbonatitic dykes and associated alteration and mineralization is more than 200 km^2 (Miller, 2008). The geological map for the site is shown in Figure 10.

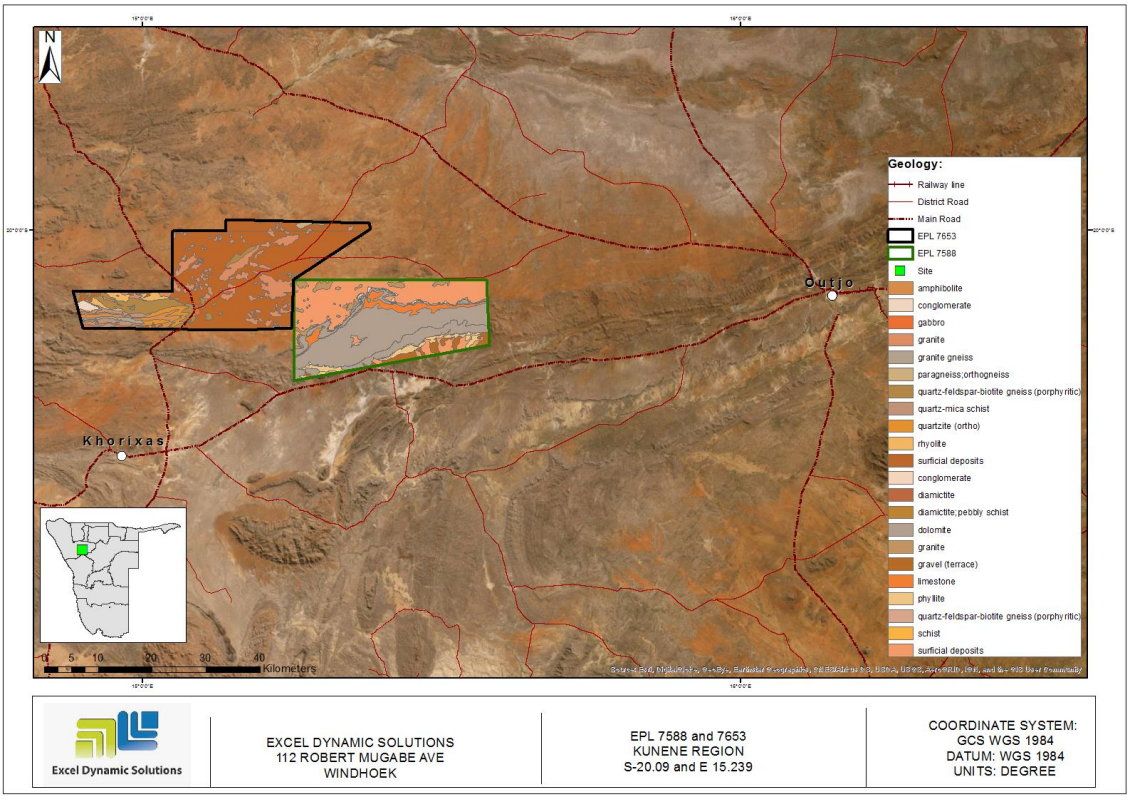


Figure 10: Map displaying geology of the project area

Figure 11: Rock types in Khorixas

5.5 Hydrology/Water Resources in Kunene

Water infrastructure in Kunene Region consists of man-made structures and facilities to abstract, store treat (if necessary) and deliver water to users. They can also serve to collect, transport, treat and dispose of wastewater. Typical infrastructure includes: groundwater well-fields, water supply schemes, sewers and sewage treatment facilities, dams, river water abstraction works, inter-basin transfers (bulk transfers), and canals.

Water infrastructure supports life and helps protect public health, but can have a significant impact on the environment. Practices that encourage the sustainable use and management of water-related infrastructure must therefore be promoted. Improved management practices, efficient water use, suitable pricing of water, and a catchment scale approach to protection can all help in achieving sustainable operations. Those responsible for the management of infrastructure need to establish ongoing oversight, monitoring, evaluation, maintenance and replacement of assets as needed, to maximise the productive life of infrastructure (Kunene River Awareness Kit, 2019).

The water supply scheme of Opuwo comes from a Dwyka shale aquifer, known as the north-western wellfield, and from a sandstone and shale aquifer of the southeastern wellfield. The entire area is dependent on groundwater resources for domestic purposes and stock watering. Since communal farmland occupies most of the area, the Directorate of Rural Water Supply is responsible for most of the water supplied to these farms. Water supply schemes operated by NamWater provide groundwater to the urban centres of Khorixas, Opuwo, and Kamanjab, as well as to some of the smaller villages such as Anker, Bergsig, Erwee and Fransfontein (Christels and Struckmeier, 2011).

5.6 Groundwater in the Khorixas area

5.6.1 Groundwater availability

The EPLs are found in a hydrogeological setting that can be described as an aquitard, aquiclude aquifer (Christelis & Struckmeier, 2001). This aquifer type is generally considered very unproductive and deep. The groundwater potential of this rock unit is generally low, to locally moderate; it improves as one goes further east, in the direction of increasing precipitation. Groundwater in the Khorixas area is pumped 30 km away from Braunfels where high-yielding boreholes are drilled into calcretes underlain by fractured dolomite of the Otavi Group. Other thick groundwater calcrete deposits in the Khorixas area, known as the Ugab terraces, are drained by the Ugab River itself and contain little groundwater. Mudstones and shales of the Chuos

Formation are found between the Otavi Group dolomites. The groundwater potential of this unit is very limited but the dolomite in contact with the Chuos is karstified at the contact plains and provides high-yielding boreholes. Groundwater is utilized in the Khorixas area, with known boreholes (**Figure 12**) within a 40km radius.

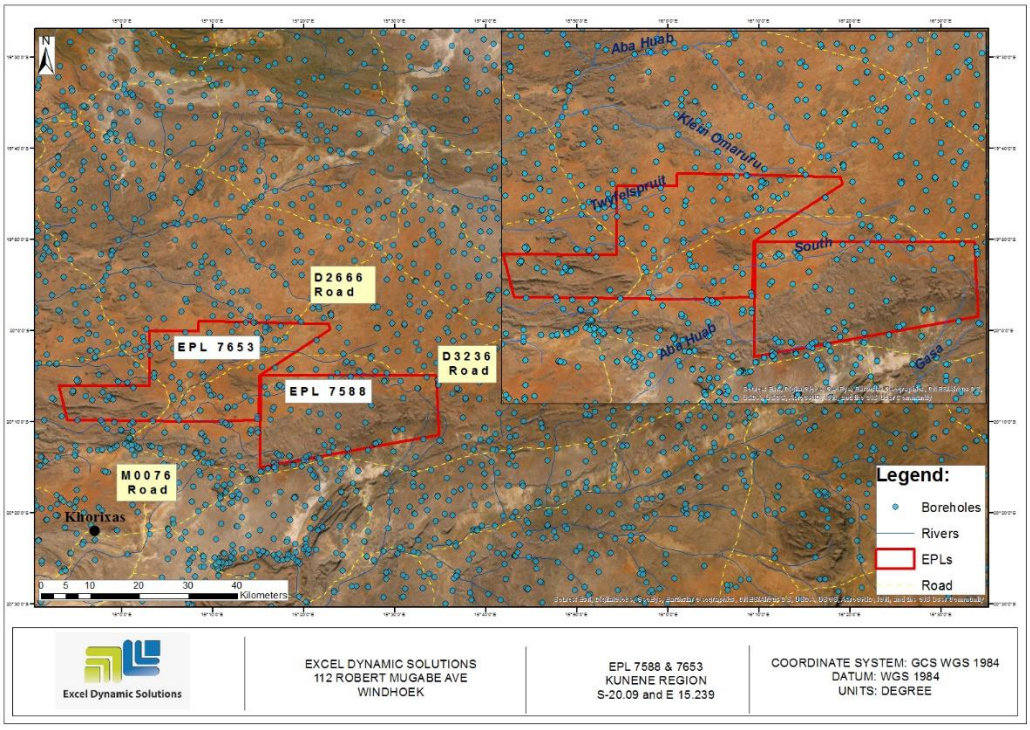


Figure 12: Boreholes in the Khorixas (and EPLs area)

5.6.2 Groundwater quality and Vulnerability

Groundwater in most parts of the Khorixas area is expected to be saline and the depth to water table at the site is expected to be not less than 2m below surface (Christelis & Struckmeier, 2001). The groundwater vulnerability of the area covered by EPLs is not studied in detail. However, to protect the aquifer against pollution it is essential to constrain exploration work, effluent discharge and waste disposal practices. In practice it is also necessary to define groundwater protection strategies which accept trade-offs between competing interests. Thus, instead of applying universal controls over planned exploration work and effluent discharge, it is more cost-effective to utilize the natural contaminant attenuation capacity of the strata overlying the aquifer, when defining the level of control required to protect groundwater quality (Christelis et al., 2016).

Aquifer pollution vulnerability mapping over more extensive areas is required before commencement of advanced exploration program to provide the general information needed for planning purposes. This will be performed before mining commences if an economic discovery is made. Such mapping will be followed by an inventory of subsurface contaminant load at a more detailed scale, at least within the more vulnerable areas.

5.7 Flora

The vegetation in Khorixas is generally sparse, with few tress and thin variety of grass. Furthermore, based on the literature review, most of the vegetation that are found within the area of the project is considered to be low to medium sensitivity against external conditions. Moreover, there is a very short growing season because of the semi- arid climate (Burke, 2003). The EPLs are covered by dense shrubland, sparse shrubland and wood vegetation structures; and covered by medium plant diversity. Furthermore, the project area has a high sensitivity to important plant species such as Colophospermum Mopane, commonly known as Mopane tree and Harpagophytum procumbens, commonly known as the (Devil's claw). The Devil's claw is traditionally used for musculoskeletal disorders, osteoarthritis and pain; these important plant species has higher probability to be affected but, this can lowered through adhering with the Environmental Management Act 7 of 2007 which stipulates that no important plant species should be cut down once a clearance certificate is issued to the proponent. Typical vegetation in the EPL areas are shown in Figure 13, and their structure in Figure 14.

a)

b)

Figure 13: Shows the typical vegetation type in Khorixas (a & b)

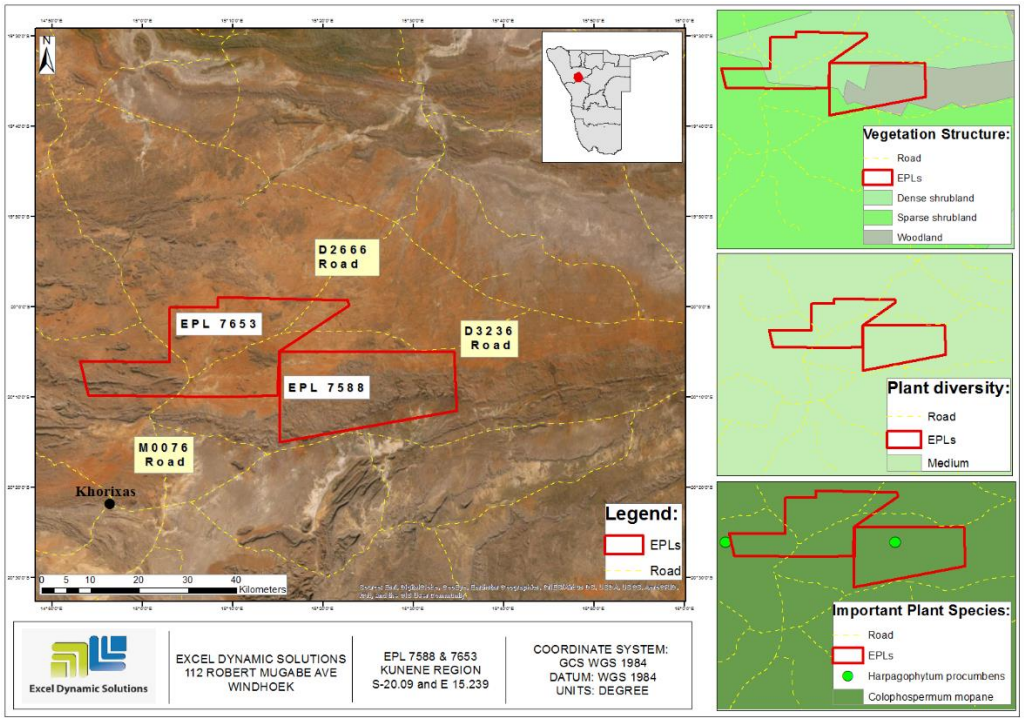


Figure 14: A map of the vegetation on EPL 7588 & 7653

5.8 Population of Kunene Region

The Kunene Region is one of the fourteen regions of Namibia. The population of Kunene Region recorded in the Kunene 2011 Census Regional Profile in 2011 was 86 856 (43 253 females and 43 603 males). This figure shows that the Regional population had increased from 68 039 since recorded in 2001 (Namibia Statistics Agency, 2011). In the Southern part of the Kunene Region, Khorixas Constituency sits on 21 328 square kilometres of land with a population of just over 12 500 (Kunene Regional Council, 2019).

5.9 Tourism

Kunene's rugged landscape and ancient traditional diversity and practices make tourism a key economic sector for the region. The region offers geo-tourism, eco-tourism and adventure-tourism. 46% of the nation's conservancies are in the Kunene Region, hosting wildlife such as desert elephants, rhinos, lions and giraffes. Kunene is home to some of the most stunning tourism sites in Namibia. A number of attractions to be found in the region include the Petrified Forest, Epupa Falls, the Skeleton Coast and the Swartbooi Graves. The Hartmann's & Maneuflus valleys, Steep van Zyl's pass, Hoarusib & Hoanib Rivers, and Sesfontein are some of the land marks in the Kunene Region. The culture, numerous wild animals, conservancies and national parks make the region an investor's dream (Kunene Regional Council, 2019).

5.10 Surrounding Land Uses

The regional hospital and some other regional offices are located in Khorixas Townland, though the capital of Kunene Region is Opuwo. Furthermore, there are six schools and one branch of University of Namibia (UNAM). The EPLs are explicitly located within farmlands (**Figure 15**). The Proponent is required to secure signed agreements from the affected land owners to be able to gain access to go undertake 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 Draft 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 licence –*

    (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.

2. *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.*

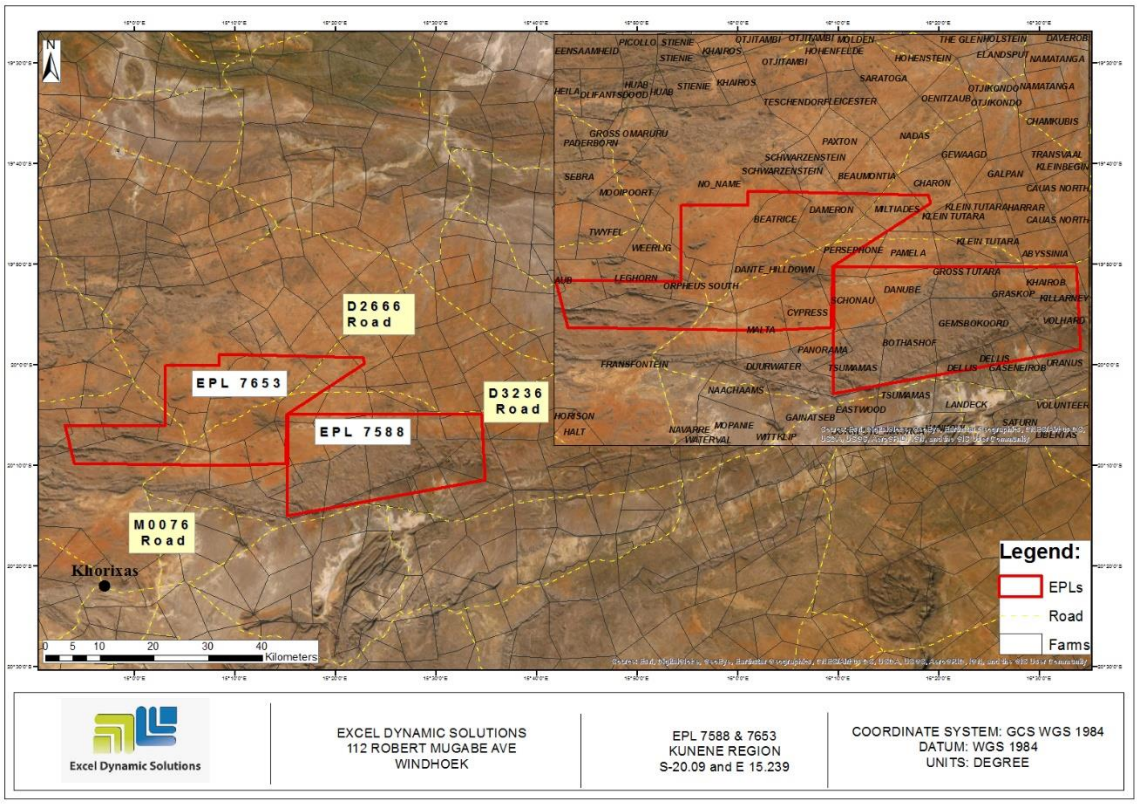


Figure 15: Map farms within the EPLs 7588 & 7653

5.11 Archaeology

There are known rock art sites in the EPLs area (Figure 16). Should the proponent find any archaeological sites during the next project phase, these will be acknowledged and proper guidelines will be followed to have them protected. On a regional level, Kunene region has different ethnic groups such as the Herero/Himba, Ovambo, and Damara/Nama. Cultural festivals are held every year from constituency to regional level where different groups showcase their traditional dress, dancing, and rituals. Various programmes initiated by the Directorate of National Heritage and Culture have been undertaken in order to encourage Namibians from all cultural backgrounds to take part in nation building activities and show mutual respect and understanding for each other. Additionally, the establishment of processes and networks to develop Namibians' material and spiritual culture, to establish and maintain links beyond national borders and to contribute towards human culture development and international understanding are required. The Directorate organizes cultural activities, cultural exchange activities, workshops, conferences and training programmes, exhibitions and culture and heritage conservation activities (Kunene River Awareness Kit, 2019).

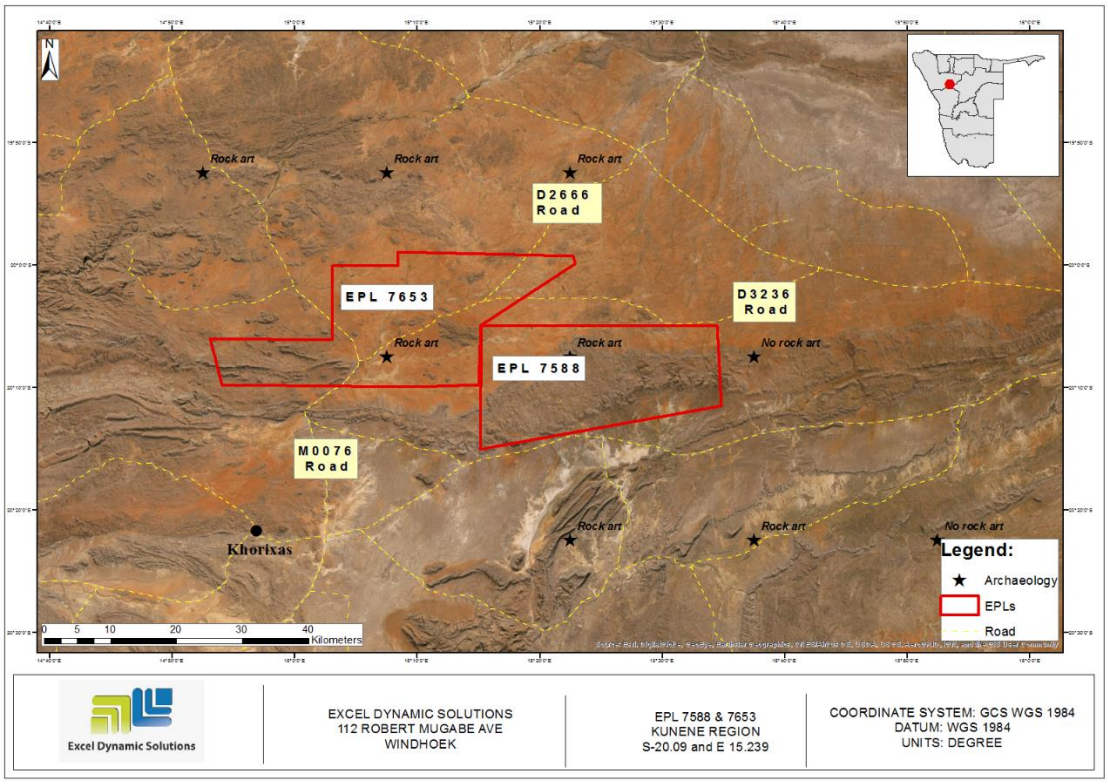


Figure 16: Rock art sites within EPLs

5.12 Services Infrastructure

Infrastructure on the property is limited to the network of roads and tracks. A number of small villages and farms are present on the two properties. None of the villages has electricity, running water or sewage facilities. Cell phone coverage is sporadic at best. Long distance communication is accomplished via radio, satellite phone or over the internet using the Inmarsat satellite network. Khorixas is the nearest town which is about 35.176 km from the EPLs. They are accessible from coastal towns via the C35 or alternatively from Windhoek, via the B2, then the C39 to Khorixas. The area is well serviced by infrastructure, such as telephones, petrol stations (Khorixas, Uis) and 3-phase electricity (power) from NamPower. There is a small land strip in Khorixas, which is 9 km east of town parallel to the main road C 39, whereas Swakopmund and Walvis Bay possess fully fledged airports. A harbour is present at Walvis Bay where materials can be offloaded or loaded onto international shipping lines. There exists sufficient manpower to work in the area as unskilled labour; whereas skilled labour can be obtained from Windhoek or Swakopmund and Walvis Bay. Equipment and supplies are more readily available locally, and if specialized items are not available in Namibia they can be outsourced regionally, e.g. from South Africa and Botswana.

6 PUBLIC CONSULTATION PROCESS

Public consultation forms an important component of an Environmental Assessment (EA) process. Public consultation 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. Public consultation has been done in accordance with both the EMA and its EIA Regulations.

The public consultation process assists the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and to what extent further investigations are needed. Public consultation can also aid in the process of identifying possible mitigation measures.

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

The Consultant identified relevant and applicable national, regional and local authorities, church leaders and other interested members of the public. The (pre-identified) I&APs were contacted directly and some were registered as I&APs upon their request (those that were registered after the EA notification in the newspapers). Newspaper adverts of the proposed exploration activities were placed in two widely-read national newspapers in the region (*The Namibian* and *New Era* newspapers). 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 3** below and the complete list of I&APs is provided in **Appendix D**.

Table 3: 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 Urban and Rural Development
Ministry of Labour, Industrial Relations and Employment Creation
Ministry of Health and Social Services
Ministry of Agriculture, Water and Land Reform
Ministry of Works and Transport
Namwater/Nampower
Roads Authority
Regional, Local and Traditional Authorities

Kunene Regional Council
Khorixas Constituency
#Aodaman Traditional Authority
General Public
Interested members of the public & Farm Owners
Namibia Community Based Tourism Association

6.2 Communication with I&APs

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. Communication with I&APs about the proposed development was facilitated through the following means and in this order:

- A Background Information Document (BID) containing brief information about the proposed facility was compiled (**Appendix E**) and sent out to all pre-identified affected parties and upon request to all new registered Interested and Affected parties (I&APs);
- Project Environmental Assessment notices were placed in *The Namibian and New Era* newspapers (**Appendix F**) dated 10 **March 2020** and **17 March 2020**, briefly explaining the activity and its locality, inviting members of the public to register as I&APs and submit comment;
- Public notices were placed at frequented places (**Figure 17**) in Khorixas to inform members of the public of the EIA process and register as I&APs as well as submit comments.

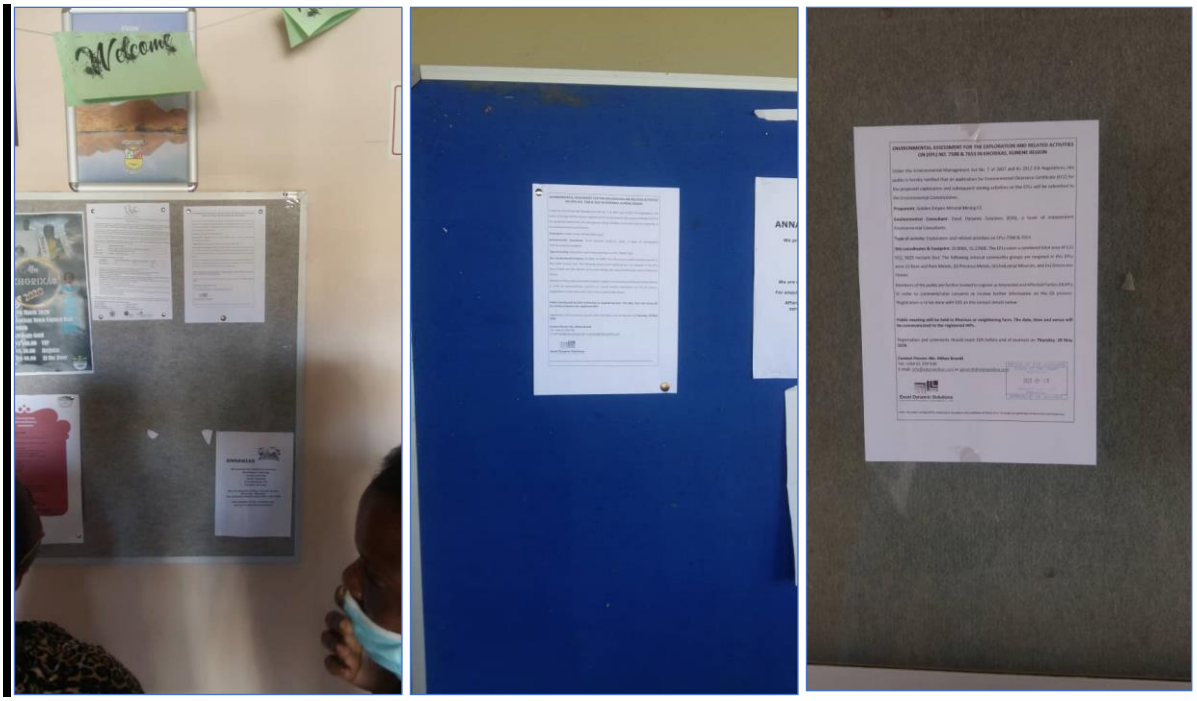


Figure 17: Public notices placed in Khorixas

6.3 First Round Public Feedback

There was no public meeting held. The issues raised by stakeholders that are received by the via email after the EIA advertisement in the newspapers or upon placing public notices in Khorixas are presented in **Table 4.**

The Draft EIA report together with all its appendices was circulated to all I&APs for review for a period of 7 days. There were no comments received after submission of the draft reports for comments and/or input.

Table 4: Summary of issues or comments received by registered I&APs

Issue No.	Comment by, Date & Mode of communication (presented as received)	Consultant Response
1.	C. J Oberholzer, 12 June 2020, via email To whom it may concern, I see that a letter was addressed to my father J.H. Oberholzer who passed away 7 years ago. I revered to your letter regarding prospecting and mining on farms attached on the list.	The concern raised and the stakeholder's position regarding the proposed activities are registered.

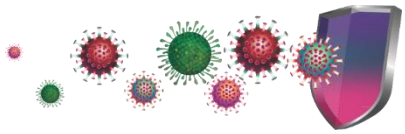
	Unfortunately, we as new owners are **not interested** in any prospecting for exploration activities on the farm Gross Tutara no. 55 and we are not open for any negotiations. Regards, C.J Oberholzer	
2	Cristofina Kanyama (Ministry of Agriculture, Water & Land Reform: Geohydrology Division), June 2020, letter via email Recommendations: 1. **Hydrogeology and Groundwater Potential:** The proponent needs to provide information on the existing boreholes on the EPLs. The existing boreholes on the site should be pump tested to determine the actual yields and sustainable pump rates. The groundwater level should be measured to understand the current levels and the changes during exploration and subsequent mining operations in the future. 2. **Groundwater use:** Quantity of groundwater to be used for this project must be discussed in depth. An indication of how much groundwater to be required during the operation is needed. 3. **Groundwater Quality:** To understand groundwater quality trend, there is a need to sample and test the quality of water before operation in order to establish a baseline and continue monitoring after that. That will guarantee that any changes taking place in water quality as a result of exploration and subsequent mining activities will be picked up from comparing the sample before and during operation. 4. **Impact of groundwater over-abstraction**: How groundwater use will be monitored to ensure over-abstraction does not occur. There is a need to drill an observation borehole to be used for monitoring of groundwater levels and the data must be shared with the Geohydrology Division. 5. **Groundwater contamination:** The proponent should provide information on possible groundwater contamination as a result of spillages of hydrocarbons during construction activities and chemicals used at exploration and or mining site, water treatment activities, tailing disposal and handling, ablution facilities septic tanks. The proponent should indicate mitigation measures in case of an accident that groundwater is polluted. The treatment and discharge of wastewater is regulated by the	The recommendations are studied and well understood. The Proponent has indicated that it is not clear yet whether water needed for exploration will be sourced from boreholes (groundwater). However, two options are under consideration; Khorixas town (existing water scheme) or existing boreholes owned by farmers. For the latter, a water-use agreement will be prepared and agreed upon between the Proponent and the farmer(s). If it is decided that the boreholes will be supplying water for the operation phase, a detailed assessment on the groundwater impacts will be conducted to inform the issuing of a water-use permit by MAWLR. The Groundwater baseline information is provided under **section 5.6** and **7.3.6**

	Water Act (Act 54 of 1956) and Water Resource Management Act (Act 11 of 2013), and these two acts must be included in the study. 6. **Groundwater monitoring:** DWRM Geohydrology Division recommends that a monitoring program be developed and implemented for early detection of possible contamination of groundwater. Monitoring boreholes should be drilled on the selected site as part of the monitoring network of the area. The developer should collect monitoring data on monthly bases and submit it to Geohydrology Division on quarterly bases with a full geohydrological report at the end of every year. The Geohydrology Division should be granted access to these boreholes to collect data when needed to verify the information provided by the developer. 7. **Legal requirements:** Drilling of boreholes and abstraction of groundwater source for industrial purposes requires a license from the MAWF. Abstraction returns with groundwater levels must be submitted to Geohydrology Division quarterly. The developer should obtain permit for drilling of production and monitoring boreholes on the sites. The developer should obtain an abstraction permit for utilizing of water from either the ground or surface for industrial purposes.	

6.4 Second Round -Follow up Communication

No comments were registered during the second round of public consultation.

6.5 COVID-19 Influences



COVID-19 has changed the way the world thinks, acts, and does business. The pandemic has forced a comprehensive review of business practices, a higher level of engagement with technology to offset the constraints due to social distancing, restrictive travel, and a focus on social responsibility. The consulting team has had to change very little in the way we operate and provide public consultation services.

Although the team operated with limited travel during the environmental assessment to comply with the regulations put in place, various other platforms were used to communicate the project information. These platforms included emails, registered mails, newspaper adverts, and telephonic communication.

7 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES

7.1 Impact Identification

Proposed developments/activities are usually associated with different potential impacts, be it positive or negative. 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:

- Helps boost local economic growth.
- Open up other investment opportunities.
- Contribution to regional economic development.

Negative impacts:

- Land degradation and possible destruction of faunal habitats as well as removal of vegetation that may be encountered within the target areas.
- Generation of dust from the exploration and mining activities and access gravel road
- Environmental pollution
- Visual impacts (scars) on landscape that will, because of low rainfall, remain so for a very long time if not rehabilitated.
- Occupational health and safety risks
- Water quality changes
- Archaeological impact
- Noise
- Socio-economic problems

7.2 Impact Assessment Methodology

The impact assessment method used for this project was adopted from previous environmental reports that were compiled by the author and as well as published reports online through research on the suitable project assessment methodology.

The identified impacts were assessed in terms of probability (likelihood of occurring), scale/extent (spatial scale), magnitude (severity) and duration (temporal scale) as presented in **Table 5**, **Table 6**, **Table 7** and **Table 8**.

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:

7.2.1 Extent (spatial scale)

Extent is an indication of the physical and spatial scale of the impact. **Table 5** shows rating of impact in terms of extent of spatial scale.

Table 5: Extent or spatial impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Impact is localised 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

7.2.2 Duration

Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project. **Table 6** shows the rating of impact in terms of duration.

Table 6: 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

7.2.3 Intensity, Magnitude / severity

Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative. These were also taken into consideration during the assessment of severity. **Table 7** shows the rating of impact in terms of intensity, magnitude or severity.

Table 7: 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 processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat / diversity or resource, severe alteration or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat / biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.

7.2.4 Probability of occurrence

Probability describes the likelihood of the impacts actually occurring. This determination is based on previous experience with similar projects and/or based on professional judgment. See **Table 8** for impact rating in terms of probability of occurrence.

Table 8: 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.

7.2.5 Significance

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

Once the above factors (**Table 5**, **Table 6**, **Table 7** and **Table 8**) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

SP = (magnitude + duration + scale) x 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 9**).

Table 9: Significance rating scale

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

For an impact with a significance rating of high, mitigation measures are recommended to reduce the impact to a low or medium 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 both pre-mitigation (before implementing any mitigation) and post-mitigation (after mitigations are implemented).

The risk/impact assessment is driven by three factors and these are:

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.

According to Booth (2011), a pollutant linkage occurs when a source, pathway and receptor exist together. The objective with the mitigation measures is to firstly avoid the risk and if the risk cannot be avoided, mitigation measures to minimize the impact are recommended. Once the mitigation measures have been applied, the identified risk will be of low significance.

The impact assessment for this EIA focuses on the three project phases namely; the prospecting, drilling, sampling (and possible analysis) and decommissioning. The potential negative impacts stemming from the proposed activities of EPLs 7588 & 7653 are described, assessed and mitigation measures provided thereof. Further mitigation measures in a form of management action plans will be provided in the Draft Environmental Management Plan.

7.3 Assessment of Potential Negative Impacts: Surveys, Drilling, Sampling Phases

The main potential negative impacts associated with construction and operational (and maintenance phases) identified are; soil disturbance, dust (air pollution), visual impact, loss of biodiversity (fauna), health and safety, archaeological impact, waste generation and noise. Potential impacts identified to be associated with the exploration discontinuation; loss of economic growth for the country.

- *Loss of biodiversity* **-** possible destruction of faunal habitats that may be encountered within the site soils.

- *Generation of Dust (air quality)* **-** generation of dust from the unpaved site access roads during construction and possible gaseous emissions into the air by unserviced vehicles and machinery
- *Waste generation* - potential environmental pollution through uncontrolled waste disposal.
- *Visual impact*
- *Potential Health and safety risk* - potential health and safety risks associated with mishandling of project equipment.
- *Surrounding Soils impacted* **-** disturbance of site soils by exploration, project vehicles and machinery.
- *Archaeological impact* - potential uncovering of unknown archeological objects during construction works or operational phase.
- *Noise*

7.3.1 Loss of Biodiversity

Land degradation will be created due to drilling activities and earthworks done to uncover the copper rock units. The destruction or drastic modification of the area can have a catastrophic impact on the biodiversity of in the area. This can lead to a massive habitat loss for a diversity of flora and fauna ranging from social microorganisms to large animals. Endemic species are most severely affected since even the slightest disruptions in their habitat can results in extinction or put them at high risk of being wiped out. The Consultant advises the Proponent to avoid unnecessary removal of vegetation, in order to promote a balance between biodiversity and their operations. Under the current status, the impact can be considered to be of a medium significance rating. With the implementation of appropriate mitigation measures, the rating will significantly be reduced to low. The impact is assessed in **Table 10** below.

Table 10: Assessment of the impacts of exploration on biodiversity

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 3	M – 36
Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M - 2	L - 16

Mitigations and recommendation to minimize the loss of biodiversity

- Vegetation found on the site, but not in the targeted mining areas should not be removed, but left to preserve biodiversity on the site.
- Even if a certain shrub or tree is found along mining spots on sites, this does not mean that it should be removed. Therefore, care should be taken when extracting mineral species without destroying the vegetation.
- Workers should refrain from killing or snaring animals' species (big or small) that may be found on the site.
- Environmental awareness on the importance of biodiversity preservation should be provided to the workers.

7.3.2 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 create dust even though it is not always so severe. The hot and dry environment, loose and in some places sandy nature of the substrate and low vegetation cover causes ambient fugitive dust levels. The medium significance of this impact can be reduced by properly implementing mitigation measures. The impact is assessed in **Table 11** below.

Table 11: Assessment of the impacts of exploration on air quality

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	L/M - 2	L/M - 2	L/M- 4	L/M - 2	M – 16
Post mitigation	L - 1	L - 1	L- 2	L - 1	L - 4

Mitigations and recommendation to minimize dust

- The Proponent should ensure that the exploration schedule is limited to the given number of days of the week, but not every day. This will keep the vehicle-related dust level minimal in the area.
- Since the project site is in an area where due to little vegetation cover, soils are exposed, it is highly probable that more dust will be generated from exploration activities (excavating). It is therefore advised that in extremely windy days, a reasonable amount of water should be used to suppress the dust that may be emanating from certain exploration areas on the EPLs.

7.3.3 Waste Generation

During the prospecting and exploration phase, there is a potential that domestic waste in the field can be generated. Therefore, land pollution can occur on the EPLs site or around the sites if these generated wastes are not disposed in a responsible way. In order to prevent these issues, both non-biodegradable and biodegradable wastes must be stored in containers and collected regularly for disposal at a recognized landfill/dump site. Furthermore, there will be no sewage or other hazardous waste that may have an impact on the animals, vegetation or the environment will be produced on the site. However, without any mitigation measure, the impact has a medium significance. The impact will be of low significance from medium, upon implementing the mitigation measures. The assessment of this impact is given in **Table 12**.

Table 12: Assessment of waste generation impact

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M/H - 4	M - 6	M - 3	M – 39
Post mitigation	L - 1	L - 1	L - 2	L/M - 2	L - 8

Mitigations and recommendation to waste management

- Workers should be sensitized to dispose of waste in a responsible manner and not to litter.
- After each daily works, the Proponent should ensure that there are no wastes left on the sites.
- All domestic and general operational waste produced on a daily basis should be contained 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(s) should be equipped with separate waste bins for hazardous and general waste/domestic.
- A penalty system for irresponsible disposal of waste on site and anywhere in the area should be implemented.

7.3.4 Visual Impact (Scars) on Landscape

Visual impact due to exploration works is aesthetic damage to the landscape. Drilling and sampling activities usually leave scars on the local landscape. If the exploration sites are located close to or along tourist routes, these scars in many cases contrasts the surrounding landscape and thus may potentially become a visual nuisance, especially to tourists in tourist-prone areas. Nonetheless, it is a vital to acknowledge that during prospecting phase, certain measures will

need to be taken into consideration regarding the visual aspect. Currently, the visual impact can be rated as slightly medium to low significance, but upon effectively implementing the measures. The assessment of this impact is presented in **Table 13**.

Table 13: Assessment of exploration on visual

	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 3	M – 36
Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M -2	L - 16

Mitigations and recommendation to minimize visual impact

- The Proponent should consider the implementation of continuous rehabilitation programme, by using overburden waste rocks or soils.

7.3.5 Potential Health and Safety Risks

As the number of global cases of the novel corona virus (Covid -19), continues to drastically increase, the mining and exploration activities are suspected to slow down in order to keep cases low. However further safety measurements can be implemented. Improper handling of exploration materials and equipment may cause health and safety risks such as injuries to workers. 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 14** below and mitigation measures provided.

Table 14: Assessment of the impacts of exploration on health and safety

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	L/M - 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 recommendation to minimize health and safety issues

- Workers should be tested before-hand for high fever prior to exploration, if exploration works are allowed to proceed.
- As part of their induction, the workers should be provided with an awareness training of the risks of mishandling equipment and materials on site.
- When working on site, employees should be properly equipped with personal protective equipment (PPE) such as coveralls, gloves, safety boots, earplugs, safety glasses, etc.

- No employee should be allowed to drink alcohol prior to and during working hours as this may lead to mishandling of equipment which results into injuries and other health and safety risks.
- Employees should not be allowed on site if under the influence of alcohol.

7.3.6 Surrounding Soils and Groundwater Impact

Exploration works will potentially result in soil disturbance which will leave the already exposed site soils vulnerable to erosion. This impact is probable because the proposed site is vacant (bare) with no vegetation cover. The impact can be rated as medium, if no mitigation measures are implemented. However, with the implementation of mitigation measures, the impact significance will reduce to low. The impact is assessed in **Table 15** below and mitigation measures are provided below.

Table 15: Assessment of the impacts of exploration on soils and Groundwater

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

Mitigations and recommendation to minimize impact on soil

- Overburden material (if any) should be handled more efficiently during exploration operations to avoid erosion when subjected erosional processes.
- Prevent the creation of huge piles of waste rocks by performing sequential backfilling.
- Careful storage and handling of hydrocarbons on site is essential.
- Potential contaminants such as hydrocarbons and waste water should be contained on site and disposed of in accordance to 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 sit

7.3.7 Archaeological Impact

During exploration works, historical resources may be impacted through inadvertent destruction or damage. This may include the excavation of subsurface graves or other archaeological objects. There was no information provided about neither known heritage nor site of cultural values within

the site nor in the vicinity of the project site area. Therefore, this impact can be rated medium to low, if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact significance will be low. The impact is assessed **Table 16**.

Table 16: Assessment of the impacts of exploration on archaeological sites

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 3	M – 36
Post mitigation	L/M - 2	L/M- 2	L/M - 4	L/M -2	L - 16

Mitigations and recommendation to minimize impact on archaeological sites

- The Proponent should consider having a qualified and experience archaeologist on standby during drilling and sampling phase and as required during the entire operational phase. This action will be to assist on the possible of uncovering of sub-surface graves or other cultural/heritage objects and advice the Proponent accordingly.
- Identified graves or any archaeological significant objects on the site should not be disturbed, but are to be reported to the project Environmental officer or National Heritage Council offices.

7.3.8 Noise and Vibrations

Prospecting and Exploration works (especially drilling) may be a nuisance to surrounding neighbours. Excessive noise can also be a health risk to site workers. Furthermore, the exploration equipment used for drilling and blasting on site is of medium size and the noise level is bound to be limited to the site only, and therefore, the impact likelihood is minimal. Without any mitigation, the impact is rated as of medium significance. In order 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 17** below.

Table 17: Assessment of the impacts of noise from exploration

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

Mitigations and recommendation to noise

- Noise from operations' vehicles and equipment on the sites should be reduced to acceptable levels.
- The exploration operational times should be set such that, no mining 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 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 noise exposure.

7.4 Assessment of Potential Negative Impacts: Decommissioning Phase

Impacts pertaining to the closure of the exploration program have been identified. The impacts are; loss of employment by workers at the exploration site and contribution to the national economy (revenue and royalties' payments). Another concern that stems from exploration program closure is the rehabilitation of the site.

7.4.1 Impact on Employment Opportunities and Economic Contribution

Should the exploration program come to an end, workers that are employed by the exploration company lose their jobs and source of income. This will also mean that there will be no more revenue and royalties paid to the government. This impact can be rated as of medium significance and given that the program has defined timeframe, only so much can be done by the Proponent to assist the workers in this regard. Regarding the national revenue and royalties' payment, there will be unfortunately nothing that the Proponent would do to mitigate this. The impact significance of unemployment can be reduced from medium to low, by implementing mitigation measures. The impact assessed in **Table 18** below is that of employment loss only.

Table 18: Assessment of the impacts of exploration activities closure on employment

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	L/M - 2	M - 6	M/H - 4	M – 44
Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M - 2	L - 16

Mitigations and recommendation to minimize joblessness

- The Proponent should inform the employees on time, of its intentions to cease the exploration works and the expected date of such closure. This will provide the employees with enough time to search for work elsewhere.

- The Proponent should raise awareness of the possibilities for work in a similar or another industrial sector.

7.4.2 Impact on Groundwater

Should the exploration activities be decommissioned, and the exploration area be rehabilitated groundwater pollution may occur if contaminated soils are utilised during rehabilitation. The assessment of this impact is presented in **Table 19.**

Table 19: Assessment of the impacts of exploration on soils and Groundwater

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

Mitigations and recommendation to minimize impact on soil

- Rehabilitation of the site to acceptable standards should be commenced once exploration works cease
- Landowners should be consulted to indicate acceptance of the rehabilitation

To conclude this chapter, it is found that most of the identified potential negative impacts are rated as medium significant. Therefore, in order to reduce the significance from medium to low, it is recommended that the Proponent effectively implement mitigation measures. Furthermore, in order to maintain low significance, the implementation of measures will need to be continuously monitored.

8 RECOMMENDATIONS AND CONCLUSIONS

8.1 Recommendations

The key potential impacts associated with the proposed the exploration program and its associated activities were identified and assessed. In order to avoid and minimize (where impacts cannot be avoided) the identified project impacts, mitigation measures were recommended. The significant identified impacts for the project phases on the environmental features are summarized below. These impacts can be reduced or minimized by implementing the mitigation measures and given under the impact assessment chapter and also management actions plan provided in the Draft EMP.

Loss of Biodiversity: The Consultant has advised the Proponent (in section 7.3.1) to avoid unnecessary removal of vegetation, in order to promote a balance between biodiversity and their operations. Under the current status, the impact can be considered to be of a medium significance rating. With the implementation of appropriate mitigation measures (provided in the EMP, Appendix B), the rating will significantly be reduced to low.

- Generation of Dust: The generation of dust by exploration operations is considered minimal, and therefore of medium significance without any mitigation measures. The medium significance of this impact can be reduced by properly implementing mitigation measures (provided in the EMP, Appendix B).
- Waste Generation: Without any mitigation measure, the impact has a medium significance. The impact will be of low significance from medium, upon implementing the mitigation measures (provided in the EMP, Appendix B).
- Visual Impact (Scars) on Landscape: Currently, the visual impact can be rated as slightly medium to low significance, but upon effectively implementing the measures (provided in the EMP, Appendix B).
- Potential Health and Safety Risks: Improper handling of mining materials and equipment may cause health and safety risks such as injuries to workers. The impact is probable and has a medium significance rating. However, with adequate mitigation measures, the impact rating will be reduced to low (provided in the EMP, Appendix B).
- Soils and Groundwater Impacts: The impact can be rated as medium, if no mitigation measures are implemented. However, with the implementation of mitigation measures, the impact significance will reduce to low (provided in the EMP, Appendix B).

- Archaeological impact: There is no information provided and/or established about the neither known heritage nor site of cultural values within the sites or in the vicinity of the project site area. Therefore, this impact can be rated medium to low, if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact significance will be low (provided in the EMP, Appendix B).
- Noise: Without any mitigation, the impact is rated as of medium significance. In order to change the impact significance from the pre-mitigation significance to low rating, the mitigation measures should be implemented (provided in the EMP, Appendix B).

8.2 Conclusions

The potential positive and negative impacts stemming from the proposed exploration activities were identified, assessed and mitigation measures made thereof. The mitigation measures recommended in this report and management action plans provided in the draft EMP, can be deemed sufficient to avoid and/or reduce (where impact avoidance impossible) the risks to acceptable levels.

The Consultant is therefore confident that these measures are sufficient and thus recommends that the Proponent be issued with the Environmental Clearance Certificate (ECC) to enable the exploration works on EPLs 7588 and 7653. However, the ECC should be issued on condition that the provided management measures and action plans are effectively implemented on site. 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 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.

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