

**ENVIRONMENTAL SCOPING ASSESSMENT (ESA) ON  
EXCLUSIVE PROSPECTING LICENSE (EPL) No. 8654  
LOCATED NORTH OF KARASBURG IN //KARAS REGION,  
NAMIBIA**

**REPORT VERSION: Final**

**ECC Application Number: APP - 003908**

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## **EXECUTIVE SUMMARY**

Kefas Ndaudika Shilongo (The Proponent) has applied to be granted the Exclusive Prospecting License (EPL) No. 8654 by the Ministry of Mines and Energy (MME). The EPL application was lodged on the 27th October 2021. However, the approval and granting of the EPL is subject to an Environmental Clearance Certificate (ECC), thus the “pending ECC” status of the EPL. The 19 677.0644-ha EPL is located about 35 km north of Karasburg. The EPL overlies Farms Narudas, Garub, Nukois, Groenrivier, Ariams, and Stinkdorn. The proponent targets to explore and prospect for Base and Rare Metals, Precious Stones, Industrial Minerals and Dimension Stone.

### **Project Description**

The objective of the planned prospecting and exploration activities is to identify geological features and lithostratigraphic units within the area, and to delineate the mineral deposits, to determine whether the deposits are economically viable. The scoping process identifies sensitive environmental features that could be affected by the proposed prospecting and exploration activities. It is anticipated that both invasive and non-invasive exploration activities are to occur upon issuance of an ECC. The Proponent plans to conduct a staged exploration approach with three phases including the Pre-development Phase, Operation and Maintenance Phase, and the Decommissioning and Rehabilitation Phase.

The pre-development phase involves literature and map reviews, as well as fieldwork to determine targets for test drilling. The operational and maintenance phase is the phase during which the exploration program will be operational. The target areas within the EPLs’ boundaries, identified during the pre-development phase will undergo exploration drilling. RC Drilling is the preferred technique for the planned exploration work, and diamond drilling may be considered depending on outcome of initial operations. A pit may be dug for sampling and the size of the samples may be adjusted depending on the nature of mineralization observed from drilling. No explosives will be used during the exploration phase. The decommissioning and rehabilitation phase is primarily reinforced through a decommissioning and rehabilitation plan, which consists of safety, health, environmental and contingency aspects. Uncertain or unstable economic situations or unconvincing exploration results may force the Proponent to eventually cease with the exploration program. Therefore, it is of best practice for the Proponent to ensure that they have a rehabilitation plan for the sites in anticipation of closure of operations.

*Logistical aspects of the exploration operations include:*

**Access:** The EPL is located about 35km north of Karasburg

**Material and Equipment:** Material and equipment requirements for the exploration program include; two 4X4 vehicles, drilling machines, truck, generators, water tanks and excavator. Equipment and vehicles will be stored at a designated area near accommodation site or a storage site within the EPLs area.

**Water & Power Supply:** Water for the exploration operations will be obtained from the nearest existing boreholes and/or off-site municipal source or any other approved water sources, through water abstraction permits. Estimated monthly water consumptions are at 30 000 – 100 000 liters, which includes water for drinking, sanitation, cooking, dust control, washing equipment as well as drilling activity. Power required during the operation phase will be provided from diesel generators.

**Waste Management:** General mineral and non-mineral Waste will be sorted and collected on a regular basis, and taken to the nearest landfill site. Chemical toilets and/or sealed septic tanks will be used as ablution facilities and the sewage waste handled according to the instructions of the toilet model provided. Wastewater disposal will be strictly controlled.

**Security:** Temporary storage areas for project material, machines and equipment will be necessary at the camp. Therefore, security will be supplied on a 24-hour basis at the storage and/or camp site and exploration camp. A temporary support fence surrounding the storage/camp site will be constructed to ensure that the exploration team and domestic animals are not put at risk.

**Human Resources and Accommodation:** The exploration project will employ about 10 skilled and semi-skilled workers. Exploration staff will be accommodated at the exploration sites. If the accommodation camp is to be set up on a farm, necessary arrangements will be made with the farm/land owner/s. Exploration activity will only take place during the day and the exploration team will be commuting to the work site from their place of accommodation.

**Timeframe:** The planned ground geophysical surveys will be done in stages on different parts of the properties. A 24 to 36 months exploration period is anticipated.

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 minimise (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 minimised by implementing the mitigation measures given under the impact assessment chapter and also management actions plan provided in the Draft Environmental Management Plan.

**Land Degradation and Biodiversity Loss:** Exploration activity causes land degradation, which, depending on the severity, could have a highly negative impact on the biodiversity of the area, and lead to habitat loss for a diversity of flora and fauna. Disturbance to soils may leave the naturally exposed soils on the sites vulnerable to erosion, due to the relatively low vegetation cover nature of the EPLs.

**Generation of Dust:** Dust from transportation and exploration activity on site may compromise the air quality in the area. The hot and dry environment, loose and in some parts, sandy nature of the substrate and low vegetation cover may cause ambient fugitive dust levels.

**Waste Generation:** Generation of waste during the prospecting and exploration phase may cause surface water, groundwater, soil, as well as land pollution, if waste is not handled and disposed of in a responsible way. Precautions should be taken to prevent any spreading of refuse on site.

**Visual Impact (Scars) on Landscape:** Exploration activity may cause aesthetic damage to the landscape. Any scars on the landscape and presence of project structures and heavy vehicles and equipment in the area may contrast the surrounding landscape, potentially becoming a visual nuisance.

**Occupational Health and Safety Risks:** Inappropriate handling of material and equipment may cause health and safety risks such as injuries to workers. Covid-19 safety measures are to be always observed during operations on site.

**Impact on Surrounding Soils and Groundwater:** Exploration works may leave the already exposed site soils vulnerable to erosion if no mitigation measures are put in place. Improper handling, storage and disposal of hydrocarbon products and hazardous materials at the site may lead to soil and groundwater contamination, in case of spills and leakages.

**Possible disturbance to heritage/archaeological resources:** During exploration works, heritage and/or archaeological resources may be impacted through unintentional destruction or damage. There are no known archaeological or heritage sites on the EPLs. However, the absence of confirmable and significant archaeological or cultural heritage sites is not evidence that such sites do not exist on the EPL site.

**Noise and Vibrations:** Noise and vibrations produced by drilling works may be a nuisance to neighbours. Excessive noise can also be a health risk to site workers. The exploration equipment planned for use on site is of medium size and the noise level is bound to be limited to the site only. Therefore, the impact likelihood is minimal.

## Conclusions

The potential positive and negative impacts of the proposed prospecting and exploration activities on EPL 8654 and associated activities were identified, assessed and mitigation measures made thereof. The mitigation measures and recommendations provided in this ESA report and the management action plans provided in the draft Environmental Management Plan, 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 issuance of an Environmental Clearance Certificate (ECC) to the Proponent to enable exploration works on EPLs 7989 - 7995 would be appropriate under the suggested mitigation and monitoring measures. However, the ECC should be issued on a condition that the provided management measures and action plans are effectively implemented on site and monitored. 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.

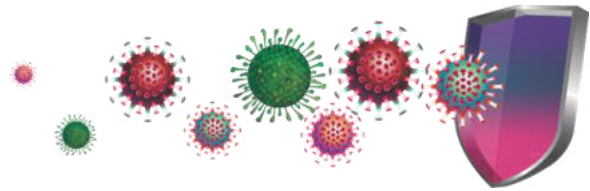
## Limitations

EDS 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. EDS believes that the information obtained from the record review and during the public consultation process concerning the subject property is reliable. However, EDS 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, community meetings 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 constraints 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, site notices, newspaper adverts, and telephonic communication.

During the assessment, particularly public consultation meeting, the consulting team continuously practiced social distancing, wearing of facemasks and regular washing/sanitizing of hands.

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**Appendix B:** Environmental Management Plan (EMP)

**Appendix C:** CV for the Environmental Assessment Practitioner

**Appendix D:** Background Information Document

**Appendix E:** Public Consultation

## 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
ESA	Environmental Scoping Assessment
KRC	//Karas Regional Council
KRDP	Khomas Regional Development Profile
GG	Government Gazette

<b>Abbreviation</b>	<b>Meaning</b>
GN	Government Notice
I&APs	Interested and Affected Parties
MEFT	Ministry of Environment, Forestry and Tourism
Reg	Regulation
S	Section
TOR	Terms of Reference

## KEY TERMS AND DEFINITIONS

<b>Alternative</b>	A possible course of action, in place of another that would meet the same purpose and need of the proposal.
<b>Baseline</b>	Work done to collect and interpret information on the condition/trends of the existing environment.
<b>Biophysical</b>	That part of the environment that does not originate with human activities (e.g. biological, physical and chemical processes).
<b>Cumulative Impacts/Effects Assessment</b>	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.
<b>Decision-maker</b>	The person(s) entrusted with the responsibility for allocating resources or granting approval to a proposal.
<b>Ecological Processes</b>	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).

<b>Environment</b>	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.
<b>Environmental Management Plan</b>	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.
<b>Interested and Affected Party (I&amp;AP)</b>	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.
<b>Fauna</b>	All of the animals found in a given area/region, habitat or geological period.
<b>Flora</b>	All of the plants found in a given area/region, habitat or geological period.
<b>Mitigation</b>	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.
<b>Monitoring</b>	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).
<b>Proponent</b>	Organization (private or public sector) or individual intending to implement a development proposal.

<b>Public Consultation/Involvement</b>	A range of techniques that can be used to inform, consult or interact with stakeholders affected by the proposed activities.
<b>Scoping</b>	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.
<b>Terms of Reference (ToR)</b>	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

Kefas Ndaudika Shilongo (hereinafter referred to as The Proponent) has applied to be granted the Exclusive Prospecting License (EPL) No. 8654 by the Ministry of Mines and Energy (MME). The EPL application was lodged on the 27th October 2021. However, the approval and granting of the EPL is subject to an Environmental Clearance Certificate (ECC), thus the “pending ECC” status of the EPL. The 19 677.0644-ha EPL is located about 35 km north of Karasburg (**Figure 1**). The EPL overlies Farms Narudas, Garub, Nukois, Groenrivier, Ariams, and Stinkdorn (**Figure 2**). The proponent targets to explore and prospect for Base and Rare Metals, Precious Stones, Industrial Minerals and Dimension Stone.

Section 27 (1) of the Environmental Management Act (EMA) (No. 7 of 2007) and its 2012 Environmental Impact Assessment (EIA) regulations, provides a list of activities that may not be carried out without an Environmental Impact Assessment (EIA) undertaken and an Environmental Clearance Certificate (ECC) obtained. Exploration activities are listed among the activities that may not occur without an ECC. Therefore, individuals or organizations may not carry out exploration activities among those listed, without an EIA undertaken and an ECC awarded. The Proponent has appointed, thereupon, Excel Dynamic Solutions (Pty) Ltd (EDS, Consultant or Environmental Assessment Practitioner (EAP) hereinafter), an independent team of Environmental Consultants to conduct the required Environmental Assessment (EA) process and submit the ECC application to the Ministry of Environment, Forestry and Tourism (MEFT) and the Ministry of Mines and Energy (MME) on their behalf.

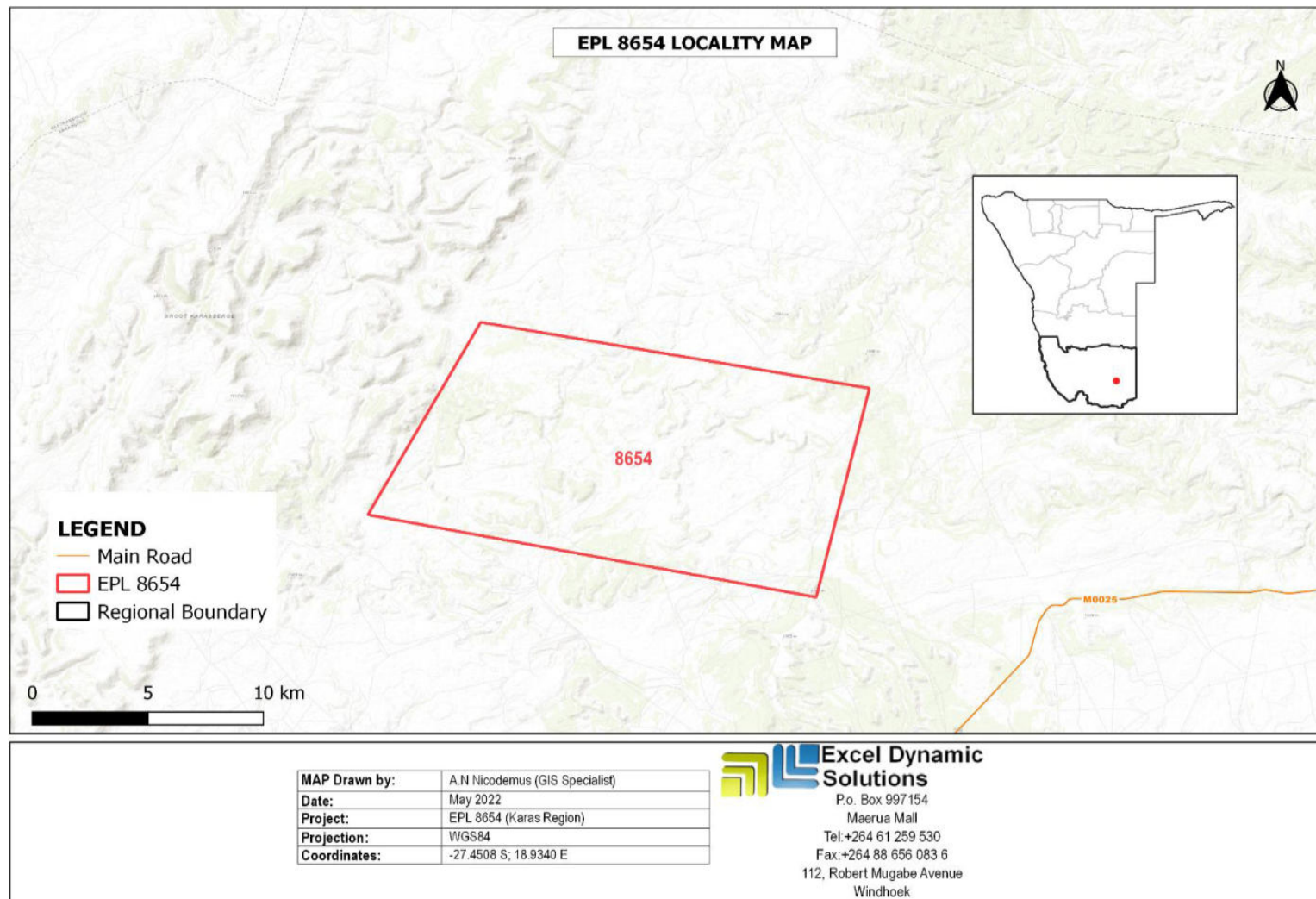


Figure 1: Location of the EPL 8654 Karasburg in the Karas Region



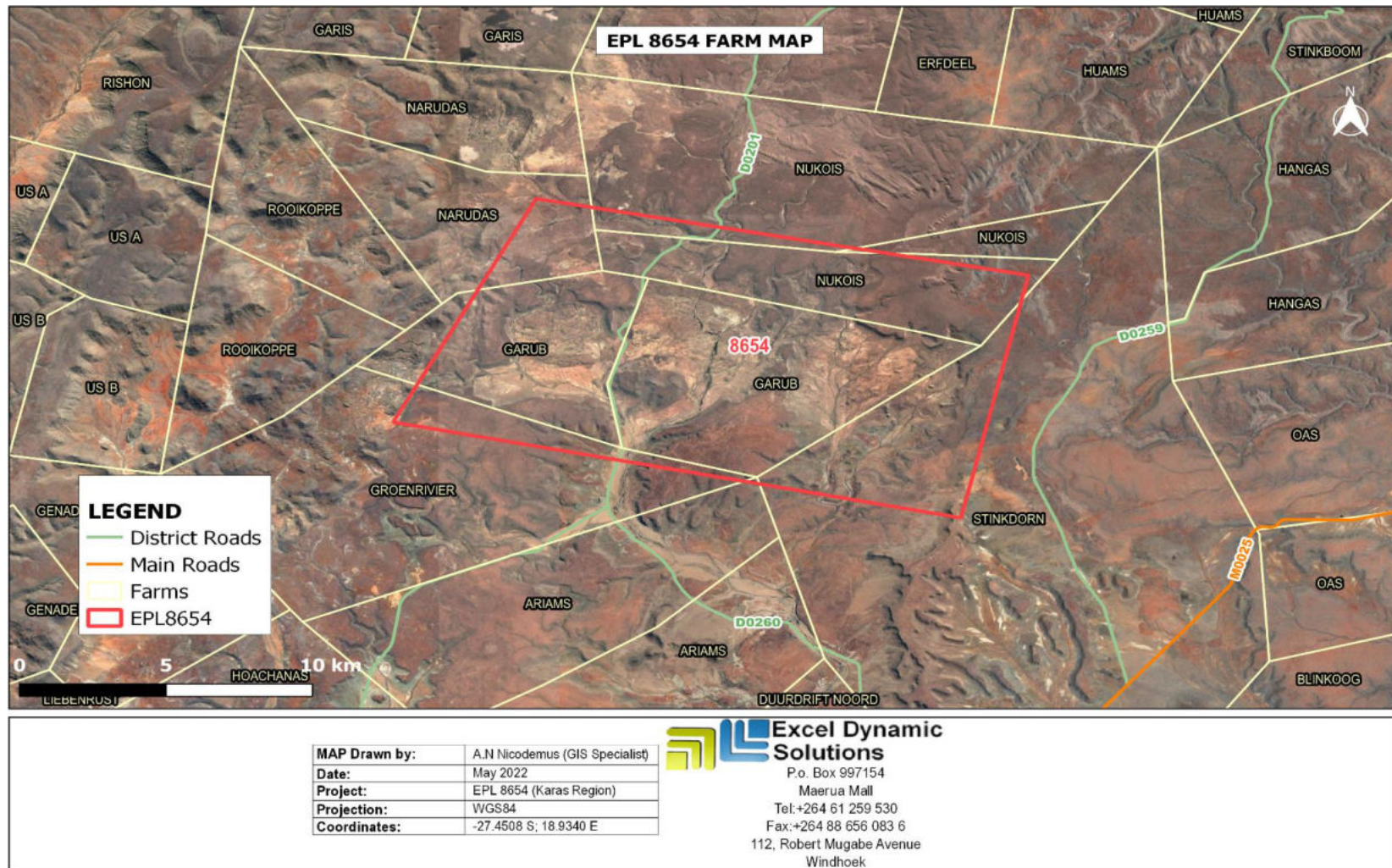


Figure 2: Farms Map

## 1.2 Terms of Reference and Scope of Works

EDS has been appointed by the Proponent to undertake an environmental assessment, and thereafter, apply for an ECC for exploration works on the EPL. There were no formal Terms of Reference (ToR) provided to EDS by the Proponent. The consultant, instead, relied on the requirements of the Environmental Management Act (No. 7 of 2007) (EMA) and its Environmental Impact Assessment (EIA) Regulations (GN. No. 30 of 2012) to conduct the study.

**It should be noted that this document has been solely prepared for the environmental scoping assessment (ESA) of prospecting and exploration phase activities on EPL 8654. This EA is not for subsequent potential phases such as mine development and mining (if exploration yields favorable results for the Proponent).** Should selected site areas of the EPLs provide results of economic value and the EPL converted into a mining license by MME, a separate and detailed environmental assessment (full EIA) will need to be undertaken for this phase and a separate ECC applied for and obtained from the DEAF.

The ESA project is headed by Mr. Nerson Tjelos, a qualified and experienced Geoscientist and experienced EAP. The CV for Mr. Tjelos is presented in **Appendix C**.

## 1.3 Motivation for the Proposed Project

The MME is responsible for regulating extractive industries such as mining and ensuring that the Safety, Health and Environmental standards of the associated activities within the industry align with national and international legislation, regulations and policies. The Ministry also seeks out services to stimulate investment for sustainable economic development and benefit to all Namibians (Ministry of Mines and Energy, 2021). The proposed programme seeks to carry out prospecting and exploration activity for Base and Rare Metals, Dimension Stone, Industrial Minerals, and Precious Metals on the EPL, with the primary priority of prospecting for Base and Rare Metals.

The Proponent's exploration programme represents a valuable opportunity to contribute to mineral acquisition for infrastructure development, which is fundamental to the country's development to meet the infrastructural needs and activate economic development. Exploration activities provide employment, dividends, and taxes that fund social infrastructure. The Minerals sector yields foreign exchange and accounts for a significant portion of gross domestic product (GDP). In addition, the industry produces a trained workforce and small businesses that can service communities and may initiate related businesses.

Several economic activities associated with prospecting and exploration, such as manufacturing of exploration and mining equipment, and provision of engineering and environment services, occur and expand because of exploration and mining activity; contributing towards the socio-economic development of the ||Karas Region. Successful exploration work could, therefore, lead to mining activities on the EPLs, which would feed into the national development plans such as the National Development Plan (NDP5) Economic Progression Pillar on Structural Transformation through Value-added Industrialization, which comprises the aspect of mining activity; as well as the Harambee Prosperity Plan (HPP2) Economic Advancement Pillar, which includes the Goal of Optimizing the Stewardship of Natural Resources and Public Assets.

The exploration project is expected to generate full time medium to long term direct employment for at least ten (10) workers. Most workers to be employed on the proposed exploration project are expected to be skilled and/or semi-skilled (general labourers and operators). A site manager and geologist(s) are also to be employed for the exploration programme.

## 2 PROJECT DESCRIPTION: PROPOSED EXPLORATION ACTIVITY

Prospecting and exploration of minerals is the first component of any potential mining project (development and eventual mining). The planned exploration activities are aimed at delineating the mineral deposits and determine whether the deposits are economically feasible mining resources. Successful exploration results could lead to development of a mine for extraction of the target mineral in market rate quantities, and to the eventual closure of mining. The exploration project activities only commence after issuance of the ECC. The proposed prospecting and exploration phase on EPL 8654 is expected to last for about three years. The primary target commodity for this exploration is Base and Rare Metals.

Due to the iterative, results-driven, and phased nature of mineral exploration programmes, it is not possible at an early stage of exploration to earmark the exact areas for future drilling or an exact duration of the exploration activities. Drilling programmes may initially range from two weeks to a month at a time, depending on the planned programme or based on the results of the programme. In general terms, mineral exploration activities can take up to a maximum of seven years, with different projects at various stages of the exploration phase.

The Proponent will commit to work with all relevant stakeholders to keep them informed of exploration progress to facilitate site visits and access to ongoing field exploration programmes.

The project is developed in stages (**Figure 3**), which can be summarized as three main phases: the Pre-Development Phase, the Exploration Phase, and the Decommissioning and Rehabilitation Phase.

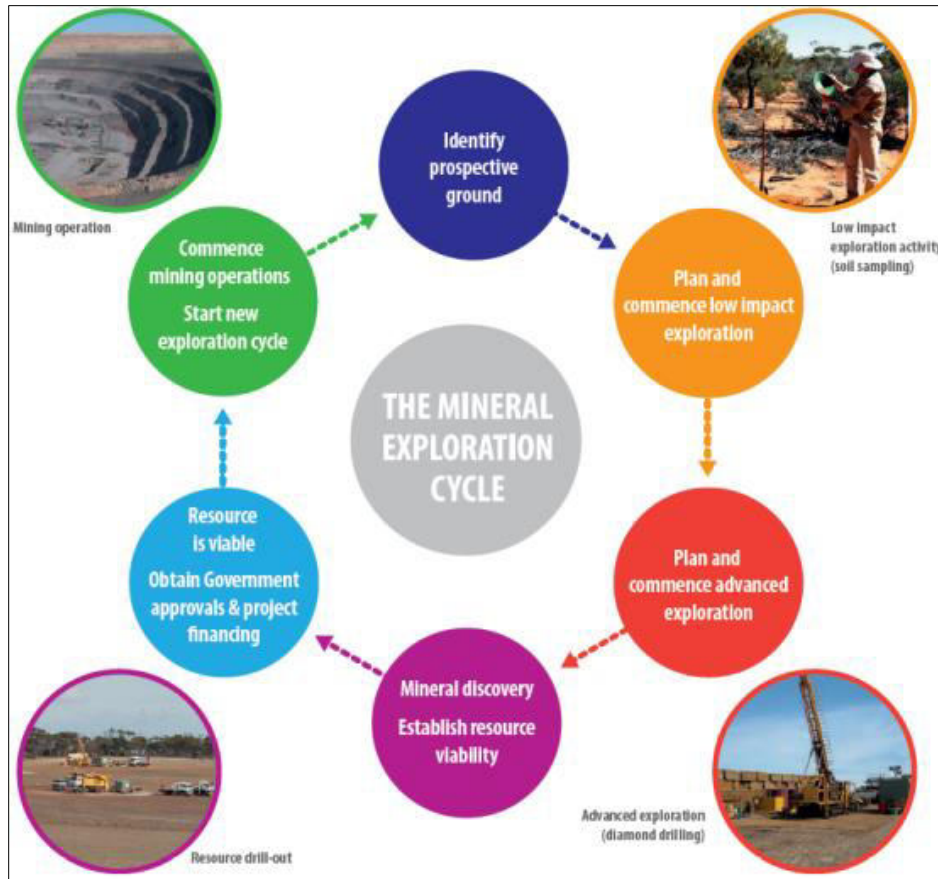


Figure 3: The mineral exploration cycle (Source: Dept. Energy & Mining – Government of South Australia, 2021)

## 2.1 Pre-Development (Prospecting) Phase

Before carrying out activities that require the Proponent or their employees and or contractors to be onsite and perform prospecting and exploration activities, the following need to be undertaken: *Consultation, Land access permission, and a Health and Safety Induction for workers.*

### 2.1.1 Consultation (Liaison) with Landowners and/or Authority for Permitting

Consultations with all the landowners, users, community and government stakeholders will commence to introduce the Proponent, to explain the purpose and stage of the proposed exploration, determine any current operating procedures and nature conservation regulations of the area, and to develop land access and operational agreements with the governing authorities and land users.

### **2.1.2 The Minerals Act: Land Use and Permitting**

The Proponent is required to secure a signed agreement from the affected landowners or occupiers of land to gain access to the areas of interest for prospecting and exploration investigations as per the Section 52 of the Minerals (Prospecting and Mining) Act No. 33 of 1992 and Section 2.2.3 of the Minerals Policy of Namibia.

1. *Section 52 (1) The holder of mineral licence shall not exercise any rights conferred upon such holder by this Act or under any terms and conditions of such mineral 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.*

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

### **2.1.3 Induction on Health and Safety**

Before any work is carried out, all workers (including fully employed, contracted, and casual) will be inducted on the Proponent's Environmental, Health and Safety policy and procedures and processes to follow while conducting the work.

### **2.1.4 Prospecting Works**

The project will include a variety of prospecting and exploration techniques. The early phase, regional exploration, normally comprises a mixture of non-invasive techniques such as soil sampling and ground geophysics and invasive drilling techniques. From the early stages of the exploration phase, all the Proponent's employees and contractors will employ industry standard best practice techniques and will incorporate photographic evidence of progress. This photographic record will be included in (bi) annual environmental monitoring reports to show the impact and environmental best practice that is adopted by the Proponent and all sub-contractors, as well as provide a record for the Department of Environmental Affairs and Forestry (DEAF).

The systematic prospecting approaches to be adopted by the Proponent are, exploration using:

- **Non-invasive techniques:** Geological mapping, remote sensing (satellite imagery), reviewing of existing geological maps and historical drilling data, Field evaluation and sampling – and
- **Invasive techniques:** Soil and rock sampling, pitting and detailed exploration by Reverse Circulation (RC) and infill drilling).

#### 2.1.4. Prospecting Work: Non-Invasive

During the prospecting and exploration phase, reviewing of existing reports and composite stratigraphic, lithological-geochemical maps of the targeted areas to identify prospective lithostratigraphic packages will be vital. In addition to literature review, fieldwork (lithological (soil/rock) mapping and sampling) will be conducted to verify desktop work. Up to this point no physical disturbance is required. Prospecting during the advanced exploration phase will require the Proponent to assess the license area through detailed geological mapping, geophysical and geochemical surveys, with a view to define targets for test drilling. Upon issuing of the ECC, the exploration program will commence with ground geophysical surveys

#### 2.2 Exploration (Invasive): Drilling, Sampling and Analysis Phase

The techniques involved herein include soil survey, rock sampling, trenching, and/ or pitting and detailed exploration drilling. Once the target areas have been selected and verified under the prospecting phase, detailed exploration works will follow.

The preferred drilling technique for this exploration programme is Reverse Circulation (RC) Drilling. RC It is relatively quick and cheap when compared to other techniques like Diamond Drilling. However, if found to be necessary, diamond drilling may also be considered for this exploration programme, during advanced stages of exploration if large amounts of sample material are required for analysis and to perform processing trials. The selection of the potential mineralization model and exploration targets are based on the local geology, trenching, drilling, and assay results of the samples collected.

**Reverse circulation (RC) drilling** is achieved by blowing compressed air down the annulus of a drill rod; the differential pressure creates air lift pushing water and cuttings up the inner tube that is inside each rod. The drill cuttings travel up the inside of the drill rod and are collected in a

sample bag on the surface. Samples are collected every metre and the number of samples is therefore dictated by the depth of the hole. Generally, a RC drilling program will see multiple holes drilled at 60-90° inclination and can range from 60 to 500m in depth. RC drilling does not require a significant amount of water, as compared to diamond core drilling. For RC drilling, water is often required and used down the hole to cool the drill bit and reduce dust, and assist with the transportation of sample bits to the surface.

**Diamond (Core Drilling):** There are two main types of core drilling: soft and hard coring. This refers to the type of lithology each method is suited for. Soft coring is used when taking a core sample of unconsolidated material and can reach depths of 152.5 m (or more—but this is what is typical for environmental industry projects). Soft coring uses a punch core system. This involves using two containers, one nested inside the other. The inner container is pushed out in front to capture the core sample, then the outer container is extended to provide casing, so the hole does not collapse (Cascade, 2021). This method protects the integrity of the sample from the air or fluid used when progressing the outer container. Hard coring is used when the subsurface consists of materials as hard or harder than sandstone. Much greater depths can be reached with this type of coring; depths up to 1524 m reached. Hard coring also uses two nested containers, but the outer container is extended before the inner container. This means the sample is washed with the drilling fluid or air, but because the core sample is of competent rock, there is no danger in it being disturbed or contaminated. Hard coring is sometimes referred to as Diamond Coring, as drill bits with small diamonds embedded are used in difficult lithology to cut through rock (Cascade, 2021).

**Pitting:** Pitting is usually employed to test shallow, extensive, flat-lying bodies of mineralization such as a buried heavy mineral placer. The main advantage of pitting over a pattern-drill programme on the same deposit is that pits can provide a very large volume sample. Large sample sizes are necessary to overcome problems of variable grade distribution, which are a characteristic feature of such deposits (Marjoribanks, 1997). In areas where the ground is wet, or labour is expensive, pits are best dug with a mechanical excavator. Pits dug to depths of 3–4 m are common and with large equipment excavation to 6 m can be achieved. In wet, soft ground any pit deeper than 1 m is dangerous. Diggers excavate rapidly and pits 3–4 m deep can be dug, logged, sampled, and re-filled within an hour. In cooler and moister weather conditions, thick lateritic soil forms ideal conditions for pitting (Geology Hub, 2021).

**In-fill drilling:** The results of in-fill drilling are intended to support an update to a higher classification of the Mineral Resource estimate. The metallurgical test-work results will improve



understanding of blending designs in the exploration schedules for the product offtake specifications (Canyon Resources, 2021).

**The selection of the potential mineralization model and exploration targets will be based on the local geology, trenching, drilling and assay results of the samples collected.**

*Other aspects and resource requirements of the exploration operations include:*

### **2.2.1 Accessibility to Sites**

The EPL is located about 35 km north of Karasburg. The EPL overlies Farms Narudas, Garub, Nukois, Groenrivier, Ariams, and Stinkdorn. The EPL is accessible via the D0201 route, which cuts through the EPL. The D0201 is accessible via the M0025 from Karasburg; it diverges onto D0260, which connects to D0201. Therefore, project related vehicles will be using these existing roads/routes to access the EPL. It is also anticipated that, if necessary, onsite new tracks to the different targeted exploration sites within the EPL will be created. The Proponent may need to do some upgrade on the site access road to ensure that it is fit to accommodate project related vehicles, such as heavy trucks.

### **2.2.2 Material and Equipment**

The input required for the exploration program in terms of vehicles and equipment includes

- 4X4 vehicles
- Truck
- Excavator / front-end loader to scoop up sandy overburden
- Dozers (to clear along planned drilling site access roads)
- Drilling fluids stored in manufacturers approved containers
- Diesel generator for power supply

Equipment and vehicles will be stored at a designated area near accommodation site or a storage site established within the EPLs.

### **2.2.3 Human Resources**

Around 10-15 people will be employed on site during the exploration phase. The workforce will include skilled, semi and unskilled workers, as necessary to complete the work.

#### 2.2.4 Accommodation

The exploration workforce will be accommodated near Karasburg, or on site, upon reaching an agreement between the Proponent and the respective landowner or custodian (authority) prior to setting up any accommodation structures (tented camps).

If the accommodation camp is to be set up on a farm, necessary arrangements will be made with the farm/land owner/s. The temporary site camps will only be set up upon reaching signed agreement with and signed by the landowners/local authority and or occupiers of land. Therefore, agreements will need to be reached between the two parties (Proponent and affected landowners/occupiers of land or authorities) prior to the setting up of accommodation structures. Exploration activity will take place during daytime only and the exploration team will be commuting to the work site from their place of accommodation.

#### 2.2.5 Services and Infrastructure

**Water supply:** Around 4,500 liters of water will be required for the activities per month. This water will be used for cooling down and washing of equipment, drilling related activities, and ablution. The water will be sourced from elsewhere and transported to site. Therefore, no project related water abstraction will be done onsite or within the site area. The estimated monthly water consumption amounts for exploration and associated activities are at  $\pm 100,000$  litres.

Potable water will also be made available for the exploration crew (workers) on site.

**Electricity:** Power required during the operation phase will be provided from diesel-generators.

**Fuel (diesel for generators and other equipment):** The fuel (diesel) required for exploration equipment will be stored in a tank mounted on a mobile trailer, and drip trays will be readily available on this trailer and monitored to ensure that accidental fuel spills are cleaned up as soon as they have been detected/observed. Fuel may also be stored in jerry cans placed on plastic sheeting to avoid contamination of the ground.

#### 2.2.6 Waste Management

The site will be equipped with secured waste bins for each waste type i.e. domestic, hazardous and recyclable). Depending on the amount generated, waste will be sorted and collected as necessary for disposal at the nearest waste disposal/landfill site. In the case of production of any

hazardous waste, an agreement would need to be reached for authorization to dispose of such waste at the designated waste management facility.

**Sanitation and human waste:** The working site will be equipped with ablution facilities that will include portable/mobile chemical toilets fitted with sealed septic tanks. The sewage will be handled on site and periodically be taken to the nearest treatment facility either by the Proponent themselves or an independent appointed wastewater removal service provider.

**Hazardous waste:** Drip trays and spill control kits will be available on site to ensure that oil/fuel spills and leaks from vehicles and equipment are captured on time and contained correctly before polluting the site. Any hazardous waste handled and produced on site will be transported for disposal to the nearest appropriate and authorized hazardous waste management facilities. The nearest considered town is Karasburg therefore, waste disposal agreement will be reached between the Proponent and the Karasburg Town Council.

*The waste produced on-site can also be categorized as mineral or non-mineral waste:*

**Mineral Waste:** Consists of solid products of exploration and mineral concentration to acquire the targeted minerals. Mineral waste will potentially be produced throughout the project exploration phase. This waste will be stripped and dumped in allocated areas as stipulated in the EMP.

**Non-mineral Waste:** Consists primarily of auxiliary materials that will support the exploration phase. This includes but is not limited to items such as empty containers, plastic and other domestic waste. This waste will be collected, sorted and taken to the dumpsite regularly, depending on the amount of waste generated.

### 2.2.7 Safety and Security

**Storage Site:** Temporary storage areas for exploration material, equipment and machinery will be set up at working/exploration sites on the EPLs. Security will be supplied on a 24-hour basis at the delegated sites for storage if there is a need for certain equipment to be left at site overnight on some days.

**Accidental Fire management:** A minimum of basic firefighting equipment, i.e., two fire extinguishers will be readily available in vehicles, at the working sites and camps.

**Health and Safety:** Adequate and appropriate Personal Protective Equipment (PPE) will be provided to every project personnel while on and working at site. A minimum of two first aid kits will be readily available on site to attend to potential minor injuries.

### 2.2.8 Timeframe

The planned ground geophysical surveys may last several weeks and will be done in stages on different parts of the EPL. The planned exploration works are estimated to last for a total of about three (3) years.

## 2.3 Decommissioning and Rehabilitation Phase

Once the exploration activities on EPL 8654 come to an end, the Proponent will need to put site rehabilitation measures in place. Concluding of exploration activity on the EPLs occurs once the planned exploration activities are completed, or may be discontinued before planned closure due to an unfavourable economic situation or unconvincing exploration results. Decommissioning and rehabilitation are primarily reinforced through a decommissioning and rehabilitation plan, consisting of safety, health, environmental and contingency aspects. It is, therefore, of best practice for the Proponent to ensure that the project is finalized in an environmentally friendly manner, and the sites are rehabilitated to as close to their original state as possible.

## 3 PROJECT ALTERNATIVES

Alternatives are defined as the “*different means of meeting the general purpose and requirements of the activity*” (EMA, 2007). This section will highlight the different ways in which the project can be undertaken and how the alternative that will be the most practical, but least damaging to the environment is identified.

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?

### 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, on the entirety of the project area, which typically implies a continuation of the status quo. The No-Go alternative may also be considered as the option of not proceeding with the activity on selected parts of the project area, which may be deemed environmentally unsuitable for the proposed activity. Should the proposed works of the prospecting and exploration plan not be implemented, none of the potential impacts (positive and negative) identified would occur, and the current land use for the proposed site remain unchanged. In overall consideration, the proposed project area has been identified by the Directorate of Mines for mineral exploration because of the potential it carries to contribute to the economic development of the area and its vicinity, and the region at large.

### 3.1.2 Exploration Location

The prospecting/exploration location is dependent on the (regional and local) geological setting, the economic geology, and the exploration and mining history of the EPL area. Therefore, finding an alternative location for the planned exploration activities is not possible. This means that the mineralization of the commodities targeted for the project is area specific, therefore, the 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.

Given the fact that the EPL or their future exploration targets cannot be relocated, it will be of utmost importance to reduce the project footprints within the actual active sites of the EPL by ensuring that exploration works and related activities on the EPL are limited to specific sites only.

### 3.1.3 Exploration Methods

Both invasive and non-invasive exploration activities are expected to take place. The combination of prospecting methods (non-invasive techniques) has no alternatives therefore, these will be implemented as presented. However, the invasive techniques (drilling) may present some options/alternatives to carrying out the project. Drilling provides most of the information for the final evaluation of a prospect and will ultimately determine if the prospect is mineable.

Commonly in mineral exploration drilling, two methods are utilized. These are reverse circulation (RC) drilling and Diamond (Core) drilling, depending on the type of mineral sought after.

**Table 1** below presents the differences between the two commonly used drilling methods in mineral exploration.

Table 1: Drilling method alternatives

Invasive exploration Method (Alternatives Considered)	Short Description	Justification for selected option
<b>Reverse Circulation (RC)</b>	<p>-Crushed rock is collected in the form of cuttings samples called back within stems contrast to conventional drilling that puts the air inside the stems and cuttings outside. Here the air passes downwards through the annular space between the inner shaft and the outer tube.</p> <p>-Water is often used down the hole to cool the drill bit and reduce dust as well as assisting with the transportation of sample bits to the surface.</p> <p>-RC drilling is designed for drilling through and crushing hard rock.</p> <p>-RC is fundamentally different from diamond core drilling, both in terms of equipment and sampling. One major difference is that RVC drilling creates small rock chips instead of solid core.</p> <p>Furthermore, according to Technidril (2020), the RC method:</p> <ul style="list-style-type: none"> <li>-Allows full recovery of samples continuously</li> <li>-Quick installation</li> <li>-There is no contact between the walls and cuttings taken at the bottom.</li> <li>-The penetration rate is fast (Techndril, 2020)</li> </ul>	<p>- Diamond (Core) drilling methods provide more reliable data collection and analysis. Core Drilling can penetrate deeper than RC Drilling, and is required in dimension stone drilling, in order to give a full picture of colour variation and textural variations as well as micro-discontinuities and weathering.</p>
<b>Diamond (Core) drilling</b>	<p>-Diamond core drilling uses a diamond bit, which rotates at the end of drill rod (or pipe). The opening at the end of the diamond bit allows a solid column of rock to move up into the drill pipe and be recovered at the surface.</p> <p>-The diamond bit is rotated slowly with gentle pressure while being lubricated with water to prevent overheating. As a result, this drilling method is known to use a huge amount of water compared to RC, thus may put pressure on water supply sources.</p> <p>-While the drill cuttings obtained with RC drilling can be analysed to provide a limited amount of information, the scope of these tests is limited, and their locations are less precise. Core samples, on the other hand, will identify actual veins of materials and give</p>	

Invasive exploration Method (Alternatives Considered)	Short Description	Justification for selected option
	<p>you their precise location (BG Drilling, 2016). Therefore, for accuracy's sake, diamond drilling would provide better result. In other words, RC results are reliable but may not be accurate.</p> <ul style="list-style-type: none"> <li>- As diamond is one of the hardest/strongest materials in the world, it has no trouble drilling through most surfaces. Therefore, it works well across a wider range of ground types and conditions.</li> <li>-Time-consuming and more effort is required to obtain the drill core. -Low initial investment, but generally more expensive to meters drilled because of the limitation of the speed.</li> </ul>	

The final drilling technique would be determined by the mineralization type. However, based on the information presented in the Table above regarding the detailed exploration methods (drilling), it was pre-determined that Reverse Circulation drilling would be preferable given that it is the most appropriate drilling method for exploration of Base and Rare Metals as the primary target commodity. Diamond (Core) drilling method is to be considered in the cases of specific sites on the EPL where the Proponent considers to explore for other target commodities, due to its efficiency in terms of costs, operating speed and comparative environmental friendliness (water demand).

Although RC drilling is known to have its shortcomings, particularly lack of solid drill recovery and inaccuracy, it is usually combined with Diamond drilling for the exploration of some minerals, if the borehole(s) needs to be deeper than what RC Drilling can reach.

### 3.1.4 Accommodation

Alternatives for accommodation include tented campsite, and accommodation on the already existing established facilities (lodges). Both alternatives are viable depending on season and/or duration of exploration, considering the health and safety of the exploration crew. Therefore, if possible, the workers could alternate between tented campsite and existing accommodation facilities.

## 4 LEGAL FRAMEWORK: LEGISLATION, POLICIES AND GUIDELINES

Prospecting and exploration activities have legal implications associated to certain applicable legal standards. A summary of applicable and relevant International policies and Namibian legislation, policies and guidelines to the proposed development are given in this section. This summary serves to inform the project Proponent, Interested and Affected Parties and the decision makers at the DEAF, of the requirements and expectations, as laid out in terms of these instruments, to be fulfilled to establish the proposed prospecting and exploration activities.

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

This ESA is 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. The activities relevant to the proposed exploration project 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 Environmental Impact Assessment (EIA) Regulations GN 28-30 (GG 4878) detail requirements for public consultation within a given environmental assessment process (GN 30 S21). The EIA regulations also outline the required details of a Scoping Report (GN 30 S8) and an Assessment Report (GN 30 S15).
- Part 2 of the Act sets out 12 principles of environmental management, summarized as follows



- *Community involvement in natural resources management, must be promoted and facilitated.*
- *The participation of all I&APs must be promoted and decisions must consider the interest, needs and values of I&APs.*
- *Equitable access to environmental resources must be promoted and the functional integrity of ecological systems must be considered to ensure sustainable systems.*
- *Assessments must be undertaken for activities which may have significant effects on the environment or the use of natural resources.*
- *Sustainable development must be promoted in all aspects relating to the environment.*
- *Namibia's cultural and natural heritage including, its biological diversity, must be protected and respected.*
- *The option that provides the most benefit or causes the least damage to the environment, at a cost acceptable to society must be adopted to reduce the generation of waste and polluting substances at source.*
- *The reduction, re-use and recycling of waste must be promoted.*
- *A person who causes damage to the environment must pay the costs associated with rehabilitation of damage to the environment and to human health caused by the pollution.*
- *Damage to the environment must be prevented and activities which cause such damage must be reduced, limited, or controlled.*

Other legal obligations that are relevant to the proposed activities of EPL 8654 and related activities are presented in **Table 2**.

Table 2: Applicable local, regional and national legislation, policies and guidelines

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
<p><b>The Constitution of the Republic of Namibia, 1990 as amended</b></p> <p>- addresses matters relating to environmental protection and sustainable development.</p>	<p>Article 91(c) defines the functions of the Ombudsman to include:</p> <p><i>“...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...”</i></p> <p>Article 95(l) commits the state to actively promoting and maintaining the welfare of the people by adopting policies aimed at the:</p> <p><i>“...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.”</i></p>	<p>By implementing the environmental management plan, the establishment will be in conformant to the constitution in terms of environmental management and sustainability.</p> <p>Ecological sustainability will be the main priority for the proposed development.</p>
<p>Minerals (Prospecting and Mining Act) No. 33 of 1992</p>	<p><i>Section 52(1)</i> A mineral license 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 (dam, spring, drinking trough etc.) and boreholes, or no operations in municipal areas, etc.), which should individually be checked to ensure compliance.</p> <p><i>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 –</i></p> <p><i>(b) 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.</i></p>	<p>The Proponent should enter into a written agreement with landowners/affected parties before carrying out exploration 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:</p>

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	<p><i>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 exploration or mining purposes.</i></p> <p><i>Section 68 stipulates that an application for an exclusive prospecting license (EPL) shall contain the particulars of the condition of, and any existing damage to, the environment in the area to which the application relates and an estimate of the effect which the proposed prospecting operations may have on the environment and the proposed steps to be taken to prevent or minimize any such effect</i></p> <p><i>Section 91 requires that rehabilitation measures should be included in an application for a mineral license</i></p>	
Nature Conservation Amendment Act, No. 3 of 2017	provides for a proper administrative, legal and procedural framework for tourism concessions in protected areas and other State land; to control the import and export of live game or animal, and to increase the penalties; and to provide for incidental matters.	Though the Act does not specifically refer to exploration/mining activity within a protected area (PA) or recreational area (RA), it does restrict access to PAs and prohibits certain acts therein as well as the purposes for which permission to enter game parks and nature reserves may be granted.
The Parks and Wildlife Management Bill of 2008	Aims to provide a regulatory framework for the protection, conservation, and rehabilitation of species and ecosystems, the sustainable use and sustainable management of indigenous biological resources, and the management of protected areas, to conserve biodiversity and in order to contribute to national development.	The Proponent is required to sustain the conservation of biodiversity and the maintenance of ecological integrity of Protected Areas and other State land, and ensure rehabilitation of species and ecosystems affected or threatened by exploration works.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
The Regional Councils Act (No. 22 of 1992)	The main objective of this Act is to initiate, supervise, manage and evaluate regional development. This Act sets out the conditions under which Regional Councils must be elected and administer each delineated region. 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   Karas 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 Karasburg/Ariamsvlei Council and Constituency is the responsible Local Authority of the area therefore they should be consulted in local public consultation matters regarding this project.
Water Act 54 of 1956	<p>The Water Resources Management Act 11 of 2013 is presently without regulations; therefore, the Water Act No. 54 of 1956 is still in force:</p> <ul style="list-style-type: none"> <li>• Prohibits the pollution of water and implements the principle that a person disposing of effluent or waste has a duty of care to prevent pollution (S3 (k)).</li> <li>• Provides for control and protection of groundwater (S66 (1), (d (ii)).</li> </ul> <p>Liability of clean-up costs after closure/abandonment of an activity (S3 (l)).</p>	The protection (both quality and quantity/abstraction) of water resources should be a priority.
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:	

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	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).	
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 authorization from the MME for the storage of fuel on-site.
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 this Acts' requirement. The necessary management measures and related permitting requirements must be taken. This done by 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 (Act 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.
Forest Act (Act 12 of 2001)	The Act provides for the management and use of forests and forest products.	The proponent will apply for the relevant permit under this Act if it becomes necessary..

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
	Section 22. (1) provides: "Unless otherwise authorized by this Act, or by a licence issued under subsection (3), no person shall on any land which is not part of a surveyed erven of a local authority area as defined in section 1 of the Local Authorities Act, 1992 (Act No. 23 of 1992) cut, destroy or remove - (a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully; or (b) any living tree, bush or shrub growing within 100 m of a river, stream or watercourse."	
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.	
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.
Atmospheric Pollution Prevention Ordinance (1976)	This ordinance provides for the prevention of air pollution and is affected by the Health Act 21 of 1988. Under this ordinance, the entire area of Namibia, apart from East Caprivi, is proclaimed as a controlled area for the purposes of section 4(1) (a) of the ordinance.	The proposed project and related activities should be undertaken in such a way that they do not pollute or compromise the surrounding air quality. Mitigation measures should be put in place and implemented on site.

Legislation/Policy/ Guideline	Relevant Provisions	Implications for this project
Hazardous Substance Ordinance, No. 14 of 1974	The ordinance provides for the control of toxic substances. It covers manufacture, sale, use, disposal and dumping as well as import and export. Although the environmental aspects are not explicitly stated, the ordinance provides for the importing, storage, and handling.	The Proponent should handle and manage the storage and use of hazardous substances on site so that they do not harm or compromise the site environment
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 therefore 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.

## 4.2 International Policies, Principles, Standards, Treaties and Conventions

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

**Table 2: International Policies and Standards**

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
Equator Principles	A financial industry benchmark for determining, assessing, and managing environmental and social risk in projects (August 2013). The Equator Principles have been developed in conjunction with the International Finance Corporation (IFC), to	These principles are an attempt to: '...encourage the development of socially responsible projects, which subscribe to appropriately responsible environmental

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	<p>establish an International Standard with which companies must comply with to apply for approved funding by Equator Principles Financial Institutions (EPFIs). The principles apply to all new project financings globally across all sectors.</p> <p><b>Principle 1:</b> Review and Categorization</p> <p><b>Principle 2:</b> Environmental and Social Assessment</p> <p><b>Principle 3:</b> Applicable Environmental and Social Standards</p> <p><b>Principle 4:</b> Environmental and Social Management System and Equator Principles Action Plan</p> <p><b>Principle 5:</b> Stakeholder Engagement</p> <p><b>Principle 6:</b> Grievance Mechanism</p> <p><b>Principle 7:</b> Independent Review</p> <p><b>Principle 8:</b> Covenants</p> <p><b>Principle 9:</b> Independent Monitoring and Reporting</p> <p><b>Principle 10:</b> Reporting and Transparency</p>	<p>management practices with a minimum negative impact on project-affected ecosystems and community-based upliftment and empowering interactions.'</p>
<p>The International Finance Corporation (IFC) Performance Standards</p>	<p>The International Finance Corporation's (IFC) Sustainability Framework articulates the Corporation's strategic commitment to sustainable development and is an integral part of IFC's approach to risk management. The Sustainability Framework comprises IFC's Policy and Performance Standards on Environmental and Social Sustainability, and IFC's Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC's commitments,</p>	<p>The Performance Standards are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of</p>



STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	<p>roles, and responsibilities related to environmental and social sustainability.</p> <p>As of 28 October 2018, there are ten (10) Performance Standards (Performance Standards on Environmental and Social Sustainability) that the IFC requires a project Proponents to meet throughout the life of an investment. These standard requirements are briefly described below.</p> <p><b>Performance Standard 1:</b> Assessment and Management of Environmental and Social Risks and Impacts</p> <p><b>Performance Standard 2:</b> Labour and Working Conditions</p> <p><b>Performance Standard 3:</b> Resource Efficient and Pollution Prevention and Management</p> <p><b>Performance Standard 4:</b> Community Health and Safety</p> <p><b>Performance Standard 5:</b> Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement</p> <p><b>Performance Standard 6:</b> Biodiversity Conservation and Sustainable Management of Living Natural Resources</p> <p><b>Performance Standard 7:</b> Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities</p> <p><b>Performance Standard 8:</b> Cultural Heritage</p> <p><b>Performance Standard 9:</b> Financial Intermediaries (FIs)</p>	<p>the Client (Borrower) in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the Performance Standards to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives.</p>

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	<p><b>Performance Standard 10:</b> Stakeholder Engagement and Information</p> <p>A full description of the IFC Standards can be obtained from</p> <p><a href="http://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards?cq_ck=1522164538151#ess1">http://www.worldbank.org/en/projects-operations/environmental-and-social-framework/brief/environmental-and-social-standards?cq_ck=1522164538151#ess1</a></p>	
The United Nations Convention to Combat Desertification (UNCCD) 1992	<p>Addresses land degradation in arid regions with the purpose to contribute to the conservation and sustainable use of biodiversity and the mitigation of climate change.</p> <p>The convention objective is to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas to support poverty reduction and environmental sustainability United Nation Convention</p>	The project activities should not be such that they contribute to desertification.
Convention on Biological Diversity 1992	<p>Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use.</p> <p>Promote the protection of ecosystems, natural habitats, and the maintenance of viable populations of species in natural surroundings</p>	Removal of vegetation cover and destruction of natural habitats should be avoided and where not possible minimised
Stockholm Declaration on the Human Environment, Stockholm (1972)	It recognizes the need for: “a common outlook and common principles to inspire and guide the people of the world in the	Protection of natural resources and prevention of any form of pollution.

STATUTE	PROVISIONS	PROJECT IMPLICATIONS
	preservation and enhancement of the human environment.	

**Other relevant international Treaties and Protocols ratified by the Namibian Government**

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

## 5 ENVIRONMENTAL BASELINE

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

The baseline information summary presented below has been sourced from a variety of sources including reports of studies conducted in the //Karas Region, as well those done in the Karasburg area. Further information of the EPLs is obtained by the Environmental Consultant, during site visit conducted in May 2022.

### 5.1 Climate

The proposed area is situated in the south-eastern part of Namibia in the Karas Region, which has been classified as a hyper-arid desert. Mostly summer rain is experienced in this area but due to its proximity to the Succulent Karoo Biome, it often experiences winter rainfall as well. The average annual rainfall for Karasburg and surroundings is 50 – 100 mm, while the average evaporation rate is in the region of 2,100 – 2,240 mm a year (Mendelsohn, et al, 2003). It is obvious that evaporation exceeds rainfall by far, resulting in a water deficit, both on a month to month and annual basis. During winter months the average minimum temperature is 8 – 10 °C, while the average maximum day temperature during summer is 25-40 °C (Mendelsohn, et al, 2003). Southerly to south-westerly winds dominate throughout the year causing wind erosion where soil cover is low. Average wind speeds are rarely higher than 6m/s.

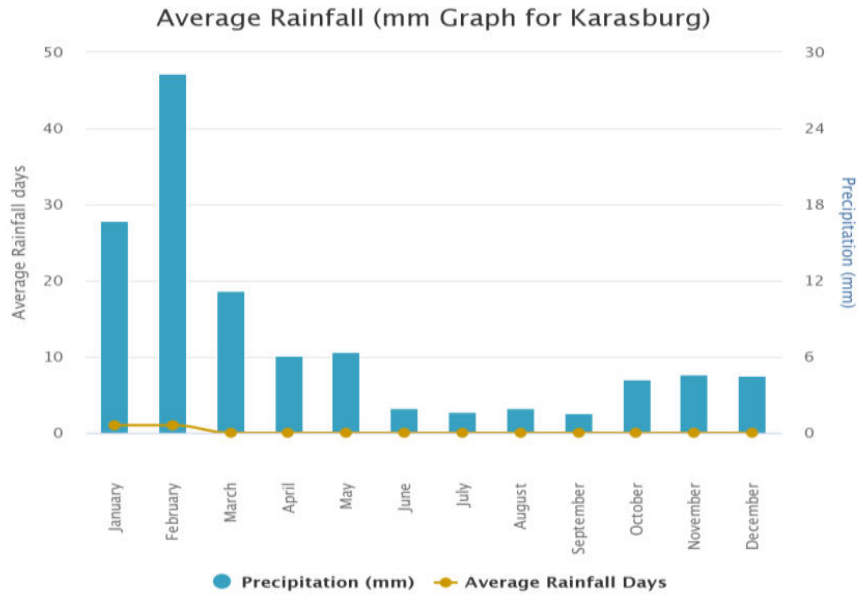


Figure 3: Annual rainfall Graph for Karasburg (Worldweatheronline, 2022)

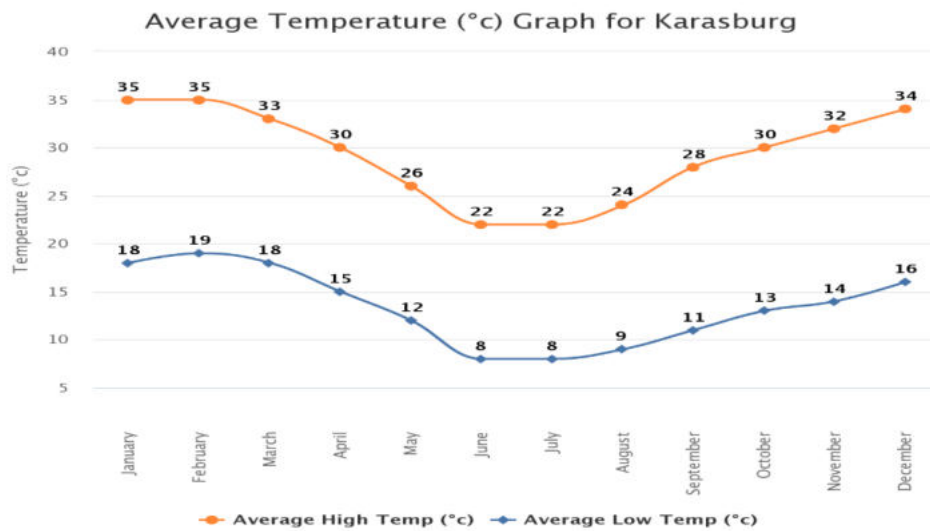


Figure 4: Annual temperature Graph for Karasburg (Worldweatheronline, 2022).

## 5.2 Topography and Drainage

### 5.2.1 Topography

The EPL is located in the Nama-Karoo Basin, and is found at elevation levels ranging from 500 m to approximately 1,200 m, with the higher elevation levels found on EPL located North West of the site, due to formation of the Karasburg Mountains. **Figure 5** below shows the elevation profile (elevation map) of the project area, and **Figure 6**, the landscape types covered by the EPL.

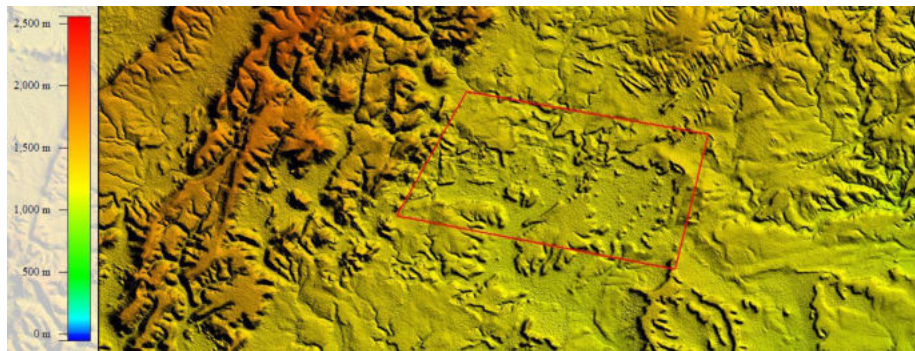


Figure 5: Elevation profile of EPL 8654

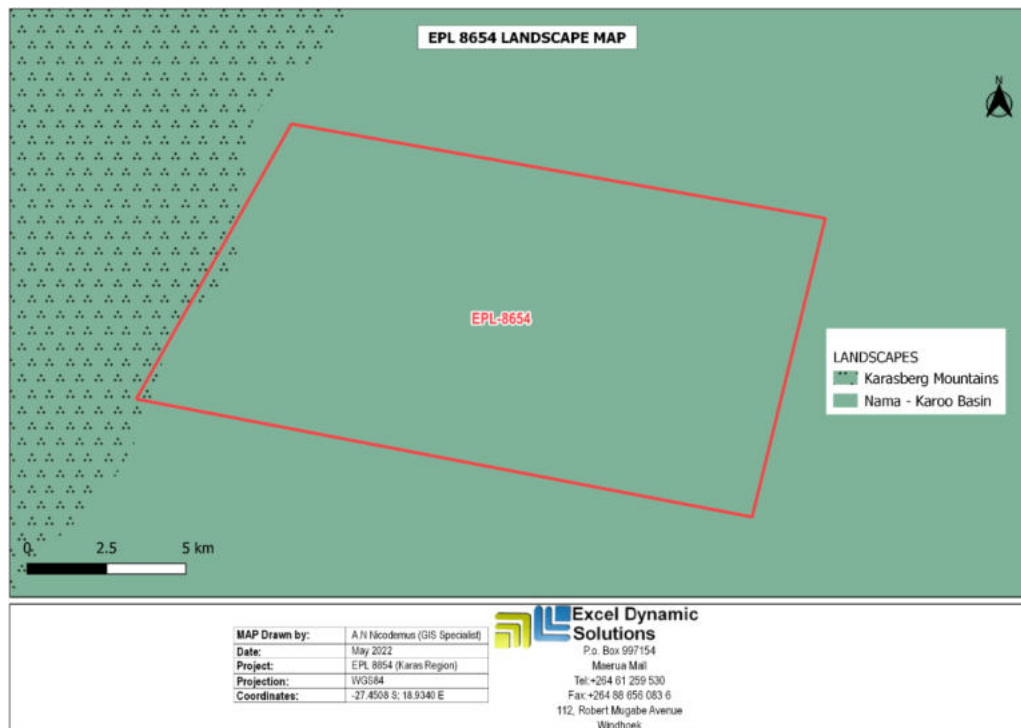
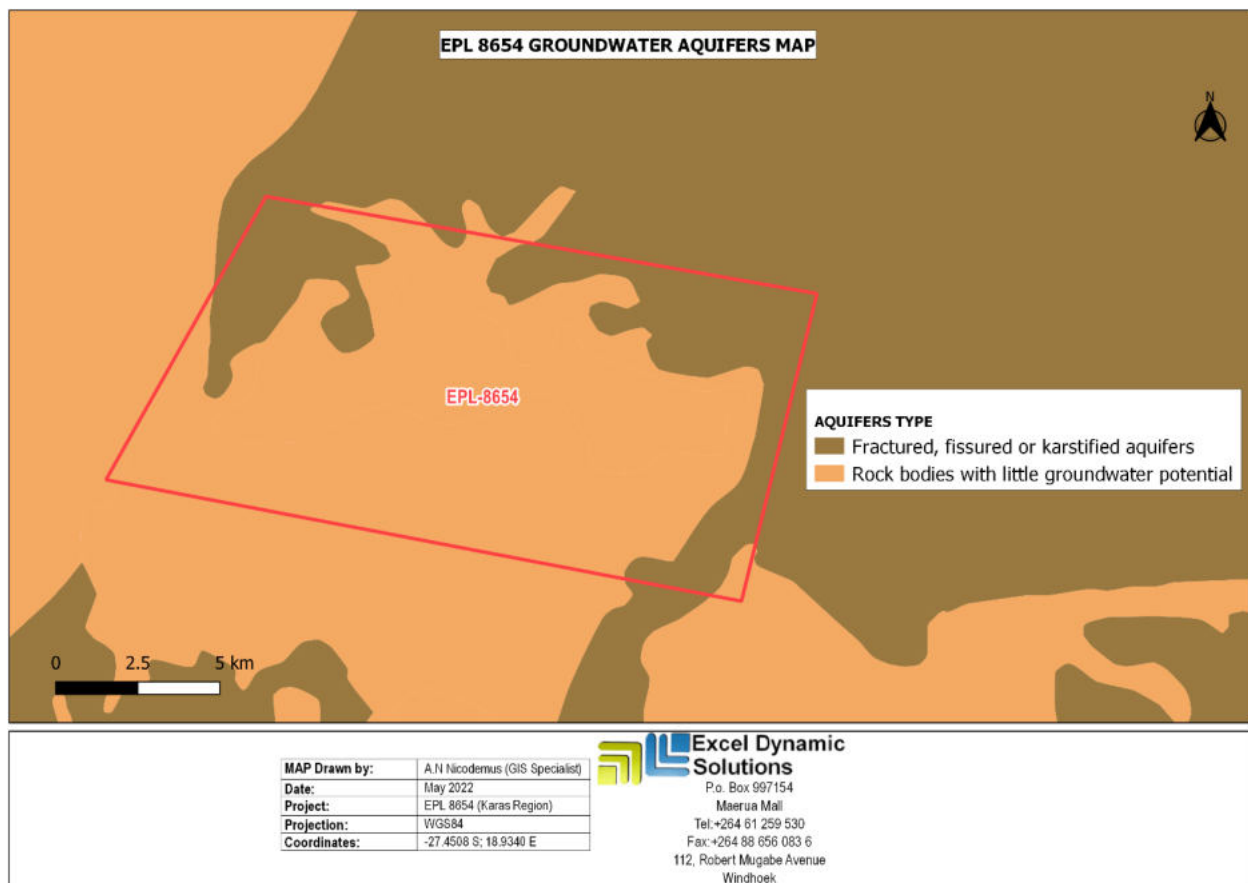


Figure 6: The Landscape covered by the EPL

### 5.2.2 Water Resources: Hydrology and Hydrogeology

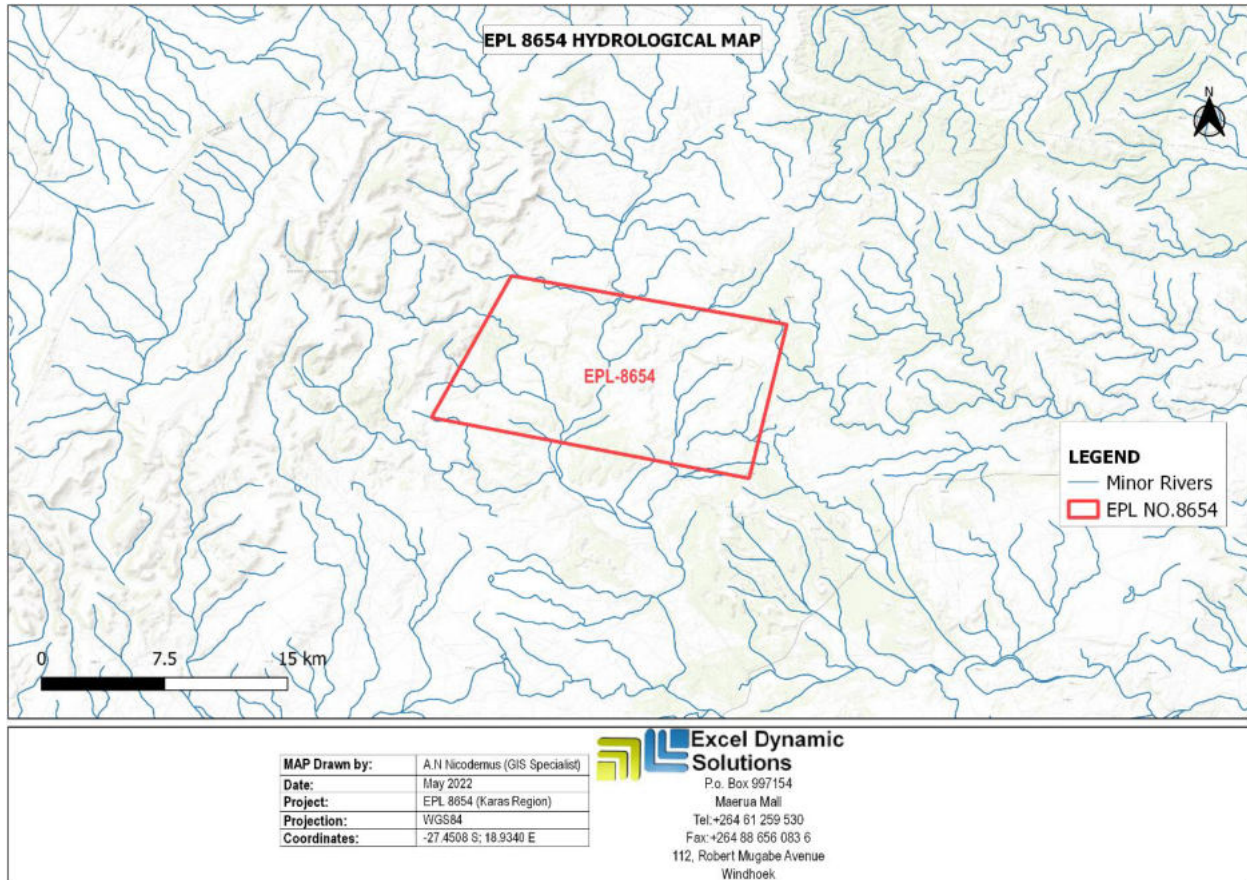
Hydrologically, the EPL fall within an area of very low and limited groundwater potential, which is partly enclosed by some fracture, fissured or karstified aquifers to its north and eastern edges (**Figure 7**). Additionally, there are several ephemeral rivers running across and through the EPL (**Figure 8**). Groundwater resources in this part of Namibia are very limited, that extraction would easily exceed recharge in the event of exploitation of the available groundwater resources, considering that the low average annual rainfall provides little groundwater recharge (Christelis et al, 2011). The scarce water resources in the area have generally limited its development.



**Figure 7: Groundwater and Aquifers map for EPL 7057**

Exploration activity has the potential to affect the quantity and quality of surface and groundwater. Therefore, any potential contamination and alteration of surface and groundwater, during the project phase, would require close monitoring, in accordance with the presence of surface and groundwater within the EPL. This could involve the setting up of monitoring stations at an early stage to designate possible sources of contamination and possible flow charges of the rivers.

Potential water pollution on rivers and other waterbodies needs to be prevented, through identifying incidental sources of pollution such as accidental spillage, chemicals or hydrocarbons (ECC, 2019)



**Figure 8: Surface Hydrology of the EPL 8654**

### 5.3 Geology and Soils

The EPL is located within the Main Karoo Basin, comprising mainly Sandstones and Shales. The EPL is mainly Sandstone, with the central section of the EPL presenting some Biotite and an alluvial valley composed of shales. The geology of the project area is presented in **Figure 9**.



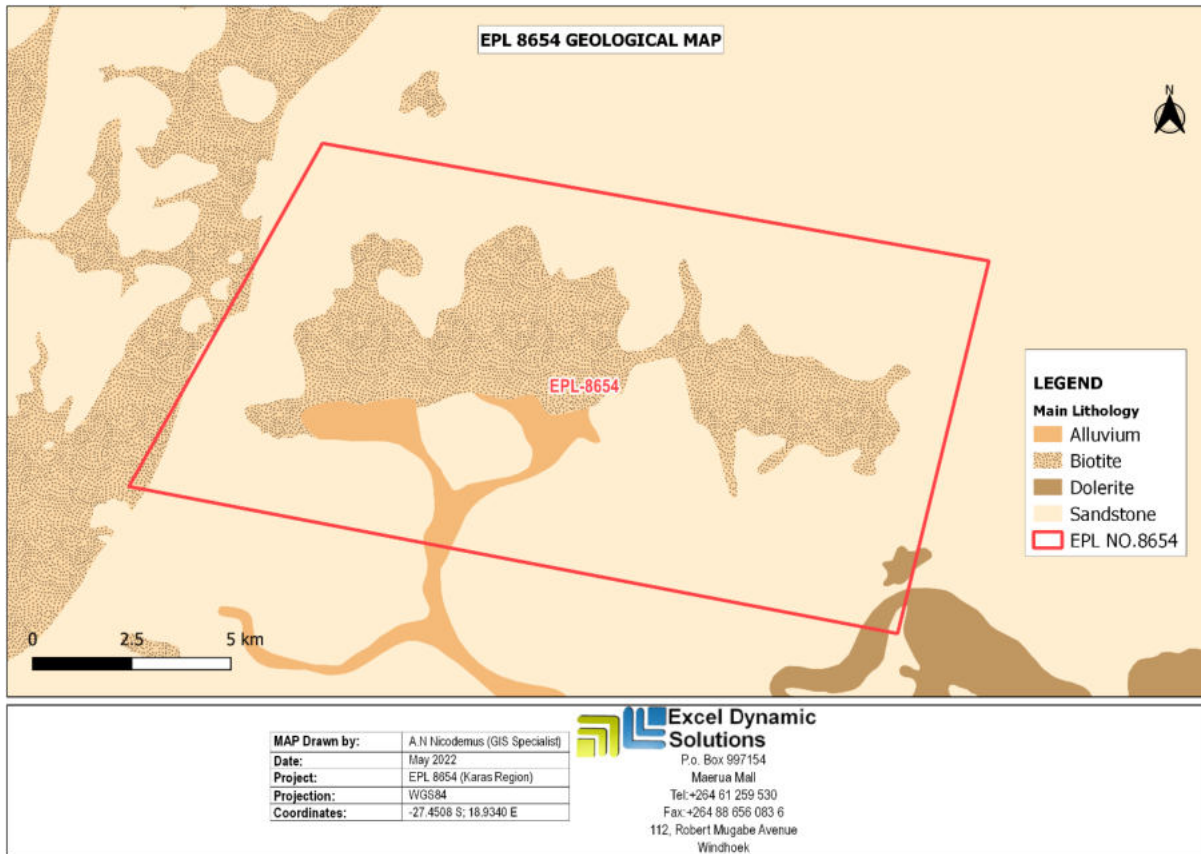
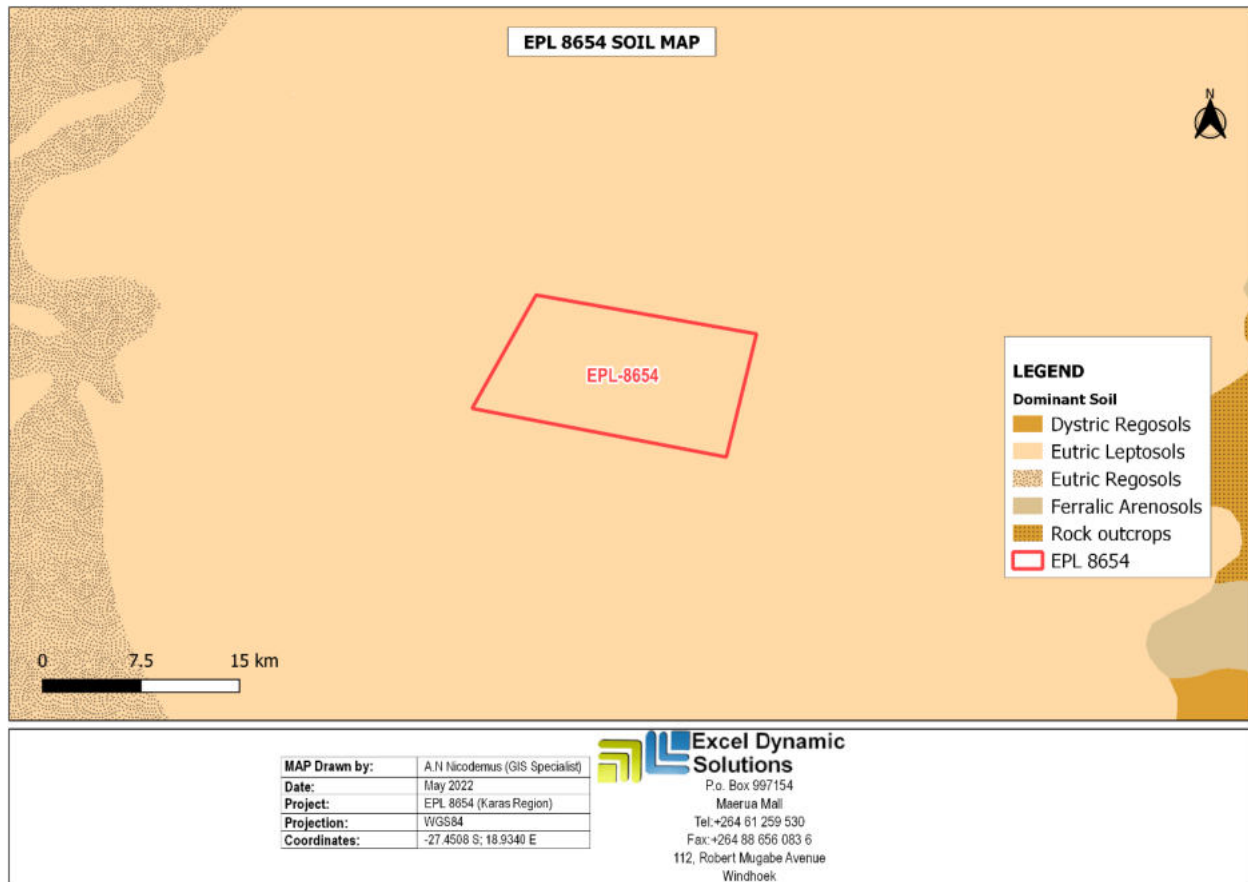


Figure 9: Geology of the EPL area

The soils in the area are considered to be of medium to low Relative Soil Fertility. The EPL is dominated by the Eutric Leptosol soils, which are fertile soils with high base saturation, typically forming in actively eroding landscapes of undulating areas. These soils are characterized by limited depths, due to the presence of continuous hard rock. The water-holding capacity of these soils is low and the area is prone to drought.. **Figure 10** below shows the soil types in the project area



**Figure 10: Project Soils Map**

## 5.4 Ecology and Biodiversity: Flora and Fauna

### Flora

The EPL is located with the Nama Karoo Biome, with Karas Dwarf Shrubland vegetation types with grasslands and low shrubs. Vegetation in the area is mostly diverse shrubland, with dwarf shrubland vegetation types of the Karasburg Mountains to the west of the EPL and taller shrubs to the east. Shrubs species such as *Acacia reficiens* commonly make up the sparse shrubland in the area.



Figure 11: Vegetation and landscape observed on site

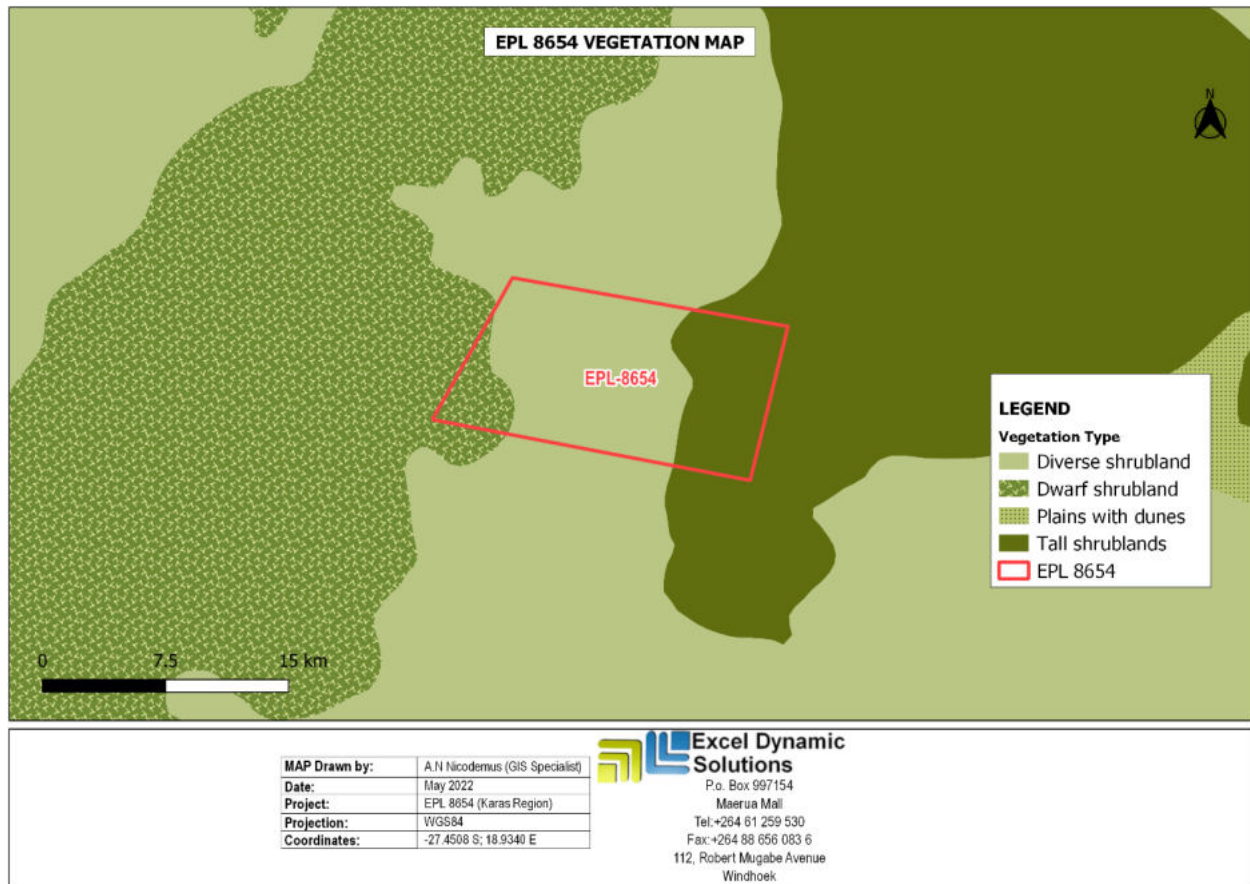


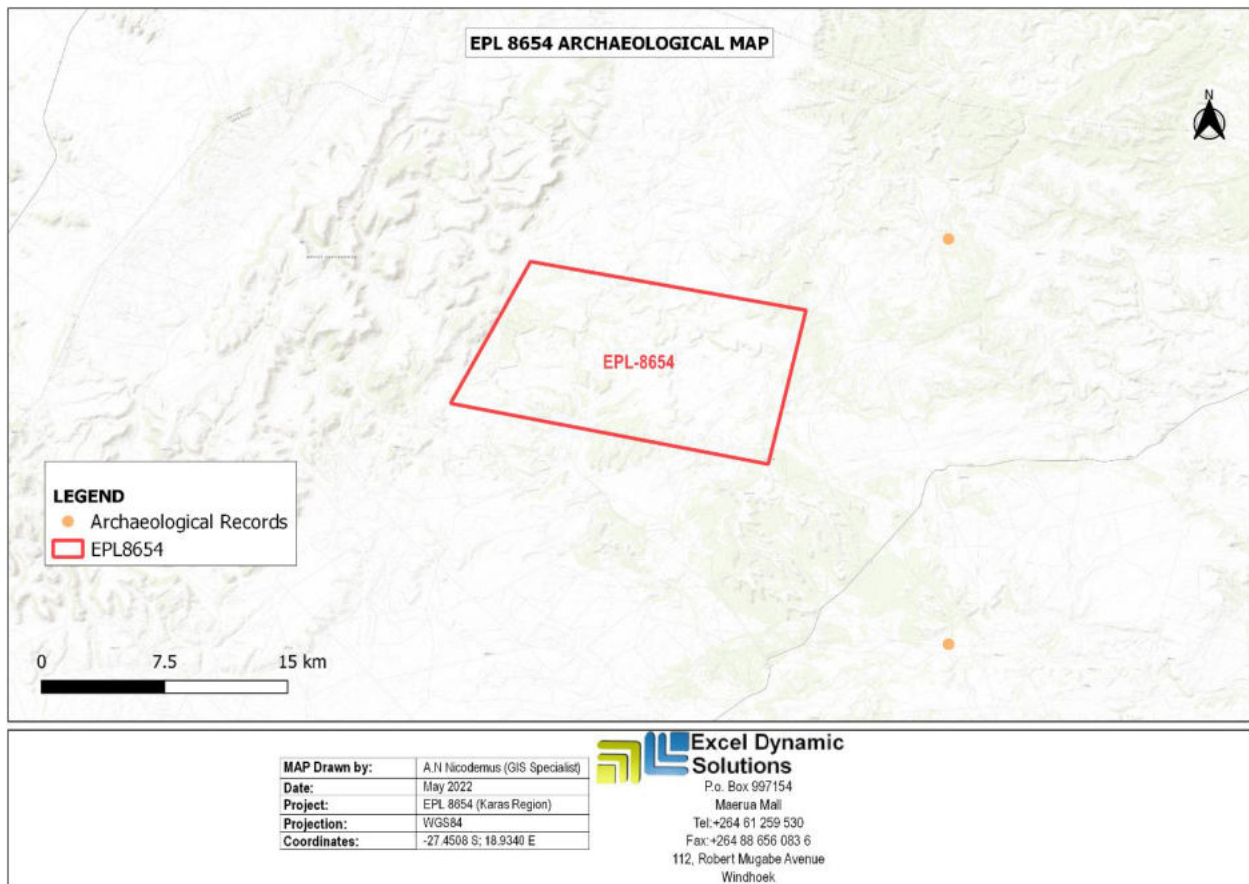
Figure 12: Project Vegetation Map

**Fauna**

Although considered generally low in faunal diversity, the Karasburg area hosts a variety of large to small fauna, ranging from Kudu (*Tragelaphus strepsiceros*), and Springbok (*Antidorcas marsupialis*), to Duiker (*Sylvicapra grimmia*), Klipspringer (*Oreotragus oreotragus*), Steenbok (*Raphicerus campestris*), black-backed jackal (*Canis mesomelas*) and Caracal (*Caracal caracal damarensis*). Gemsbuck (*Oryx gazella*) are also widely scattered across the area (Barnard et al., 1997)

### 5.5 Archaeology and Heritage

The //Karas Region archaeological record is reported to have evidence of human occupation dating to the Pleistocene and Holocene periods, roughly in the last 800 000 years to 2000 BP (Kinahan, 2012). Such evidence is reflected in materials records such as surface scatters of stone artefacts, rock shelters with evidence of occupation, including rock art, graves, stone features such as hunting blinds and huts. Archaeological data for mapping shows two sites with archaeological records located on the far northeast and southeast of the map (**Figure 13**). There are no findings of archaeological significance observed during the study.



**Figure 13: Project Archaeology Map**

## 5.6 Surrounding Land Uses

The EPL falls within 100% of farmland (**Figure 14**). The EPL covers Farms Narudas, Garub, Nukois, Groenrivier, Ariams, and Stinkdorn. The Proponent is required to secure a signed agreement from the affected landowners and farmers to gain access to the areas of interest for prospecting and exploration investigations as per the Section 52 of the Minerals (Prospecting and Mining) Act No. 33 of 1992 and Section 2.2.3 of the Minerals Policy of Namibia.

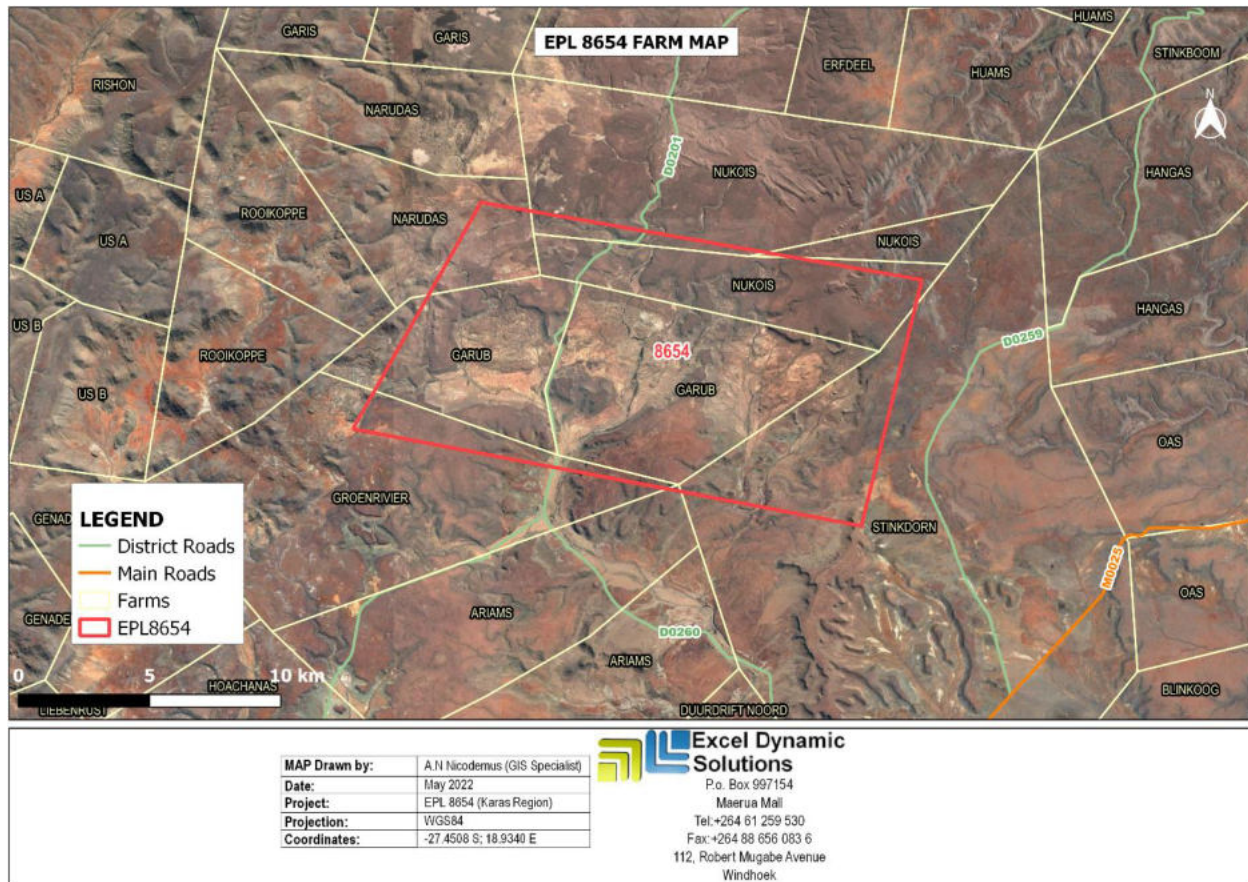


Figure 14: Project Land Use (Farms) Map

## 5.7 Economic Activities

### 5.7.1 Farming

Stock farming occurs at subsistence and commercial levels in the region, farming mainly of small stock i.e. sheep and goats. The region is predominantly suitable for small stock. (Mendelsohn et al, 2003) However, in recent years, the region has experienced a growth in commercial ostrich and game farming. (NEPRU, 1998)



**Figure 15. Livestock Farming on one of the farms**

## **5.8 Infrastructure and Services**

### **Electricity**

The area has access to electricity and power infrastructure. The electricity network of the //Karas Region is well distributed to provide the electricity needs of the region. From the Harib Substation extends a 132 kV OHTL to Rock Substation in the east and Aurus Substation to the west. A 220 kV OHTL connects Harib Substation to the Kokerboom Distribution Station to the north and connects with the SAPP to the south.

### **Roads**

The B3 main route from Grunau to the South-African border at Ariamsvlei passes through Karasburg and the C10 connects Karasburg with the South-African border at Viooldsdrift towards Upington. The C11 connects Karasburg with Aroab and Koes. Karasburg is thus well located within in the southern Namibian road network.

**Airport**

Karasburg area has an air strip, the Karasburg Airport: (IATA:KAS) which is used mainly for light aircraft or as an emergency landing strip for larger planes.

**Railway**

Karasburg also has an active train station, which is the last significant stop before Upington Station across the border into South-Africa.

**Reservoir**

Approximately 7 km to the west of Karasburg is the Bondels Dam, built in 1959. It dams the Satco River and was built to enhance the recharge of the Bondels Dam aquifer. It has a capacity of 1.105 million cubic metres.

**Mining**

A significant amount of mining activity occurs in the //Karas Region, rendering the region an important mining area in Namibia. The development of the //Karas Region is economically tied to its rich mineral deposits that provide mining opportunities and development. Minerals mined in the //Karas Region include diamonds, zinc, copper, tin, lead, silver, marble and gemstones. (NEPRU, 1998). Some of the existing mining activity in the region include the Rosh Pinah Zinc Mine and the Skorpion Zinc Mine in Rosh Pinah, the NamDeb Diamond mine in Oranjemund, as well as De Beers Marine offshore diamond mining off the coast of Lüderitz.



## 6 PUBLIC CONSULTATION

Public consultation forms an important component of an Environmental Assessment (EA) process. It provides potential Interested and Affected Parties (I&APs) with an opportunity to comment on and raise any issues relevant to the project for consideration as part of the assessment process, thus assisting the Environmental Assessment Practitioner (EAP) in identifying all potential impacts and to what extent further investigations would be necessary. Additionally, public consultation can also aid in the process of identifying possible mitigation measures. Public consultation for this scoping study has been conducted in accordance with the EMA and its EIA Regulations.

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

Relevant and applicable national, regional and local authorities, local leaders and other interested members of the public were identified as stakeholders. The pre-identified I&APs were contacted directly, while other parties who contacted the Consultant after project advertisement notices were placed in newspapers, were registered as I&APs upon their request. Newspaper advertisements of the proposed exploration activities were placed in two widely-read national newspapers in the region (*The Namibian* and *New Era* newspapers). The project advertisement/announcement ran for two consecutive weeks inviting members of the public to register as I&APs, submit their comments or concerns and/or attend the public consultation meeting as notified through the advertisements.

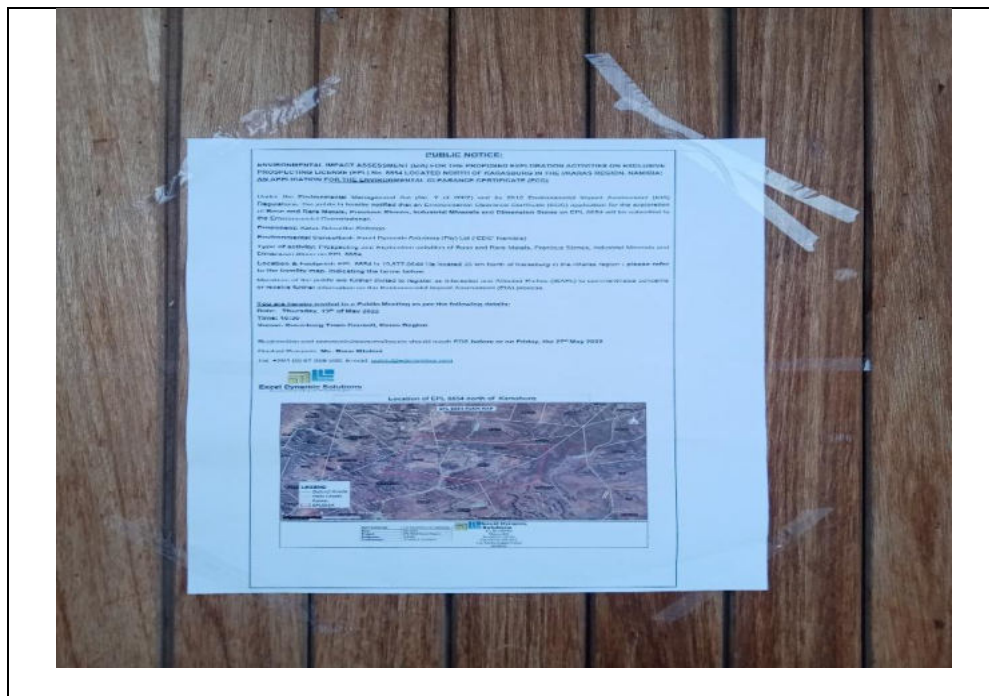
### 6.2 Communication with I&APs

Regulation 21 of the EIA Regulations details the steps to be taken during a public consultation process and these have been used in guiding this process. Communication with I&APs 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 D**) 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 E**) dated 06 May 2022 and 13 May 2022, briefly explaining the activity and its locality, and inviting interested members of the public to register as I&APs and submit comments and/or concerns;



- Public notices were placed at Karasburg Town Hall (**Figure 16**) to inform members of the public of the Environmental Assessment process and to register as I&APs as well as submit comments; and
- A public meeting was scheduled and held on **Thursday, 19th of May 2022** at Karasburg Town Council Hall (**Figure 17**).



**Figure 16: Public Notices for Public Consultation Meeting**

**Figure 17: Public Meeting at the Karasburg Town Hall, Karas Region**

Issues raised during the ESA process and all communication from I&APs has been recorded; all responses provide are fully presented in the meeting minutes and incorporated in the ESR and EMP. The summarized issues raised in the meeting are presented in **Table 4** below. The issues raised and responses (by EDS) are attached in **Appendix E**.

Table 4: Summary of comments raised at public consultation

Comment/ issue No.	Issue / comment / question	Response and name of responder:	
1.	<p>We do not have an issue with this type of development but I have a problem with these things are handled, especially with accessing our farms.</p> <p>Both my farm and my neighbors' farm was accessed without consent.</p> <p>There are concerns regarding pollution, field fires and theft that can arise when such activities take place on one's farm.</p>	<p><b>Ms. Althea Brandt:</b> I do understand where the frustration comes from and this is actually why we have meetings such as this one in order for us to not only explain the EIA process but to also get as much feedback from the affected parties.</p> <p>Normally we as consultants conduct the site visits and reporting and then apply for an ECC at MEFT and therefore we also try to keep as much communication between ourselves and the affected parties throughout all phases of the process. For this reason, I was not aware that the EPL holder had already made contact with you as the farm owner and visited the farms. It is important to have a good relationship with all farmers from the start which is why I also do not agree with entering one's farm without consent.</p> <p>Within the EMP we will provide mitigation measures for the pre-identified negative impacts which is also a document that the EPL holder and workers should adhere to upon issuance of the ECC.</p>	

## 7 IMPACT IDENTIFICATION, ASSESSMENT AND MITIGATION MEASURES

### 7.1 Impact Identification

Proposed developments/activities are usually associated with various potential positive and/or negative impacts. For an environmental assessment, the focus is placed mainly on the identified 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 for the exploration activities on EPL 8654 is listed as follows:

#### **Positive impacts:**

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

#### **Negative impacts:**

- Land degradation and Biodiversity Loss
- Impact on Water Resources
- Generation of dust,
- Generation of waste,
- Visual impacts (scars) on landscape,
- Potential occupational health and safety risks,
- Potential Impact on Surrounding Soils
- Possible disturbance to heritage/archaeological resources,
- Vibrations and noise from exploration works, and
- Vehicular traffic safety
- Impacts associate with closure and decommissioning of exploration works.

## 7.2 Impact Assessment Methodology

The Environmental Assessment is primarily a process used to ensure that potential impacts that may occur from project activity are identified and addressed with environmentally cautious approaches and legal compliance. The impact assessment method used for this project is in accordance with Namibia's Environmental Management Legislation (Environmental Management Act No. 7 of 2007) and its Regulations of 2012, as well as the International Finance Corporation (IFC) Performance Standards.

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

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 allows potential impacts to be addressed in a standard manner so that a wide range of impacts is comparable. It is assumed that an assessment of the significance of a potential impact is a good indicator of the risks 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 are 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 6** shows rating of impact in terms of extent of spatial scale.

**Table 7-1: Extent or spatial impact rating**

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

### 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 7** shows the rating of impact in terms of duration.

**Table 7-2: 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 ratings are also taken into consideration during assessment of severity. **Table 8** shows the rating of impact in terms of intensity, magnitude or severity.

**Table 7-3: Intensity, magnitude or severity impact rating**

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
<b>Qualitative</b>	Very high deterioration, high quantity of deaths, injury of illness / total loss of habitat, total alteration of ecological processes,	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.

Type of criteria	Negative				
	H- (10)	M/H- (8)	M- (6)	M/L- (4)	L- (2)
extinction of rare species					

### 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. **Table 9** shows impact rating in terms of probability of occurrence.

**Table 7-4: 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 section, for this assessment, the significance of the impact without prescribed mitigation action is measured.

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

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

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

**Table 7-5: Significance rating scale**



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

**Positive (+)** – Beneficial impact

**Negative (-)** – Deleterious/ adverse Impact

**Neutral** – Impacts are neither beneficial nor adverse.

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

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

The risk/impact assessment is driven by three factors:

- **Source:** *The cause or source of the contamination.*
- **Pathway:** *The route taken by the source to reach a given receptor*
- **Receptor:** *A person, animal, plant, eco-system, property or a controlled water source. If contamination is to cause harm or impact, it must reach a receptor.*

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

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

### 7.3 Assessment of Potential Negative Impacts

#### 7.3.1. Loss of Biodiversity and Land Degradation

Drilling activities and earthworks done to expose the mineral bearing rock units could result in land degradation, leading to the destruction of habitat for the local diversity of fauna and flora, ranging from micro-organisms that may be encountered under the site soils and rocks, to large animals, shrubs, and trees. To enable the exploration operations, some site vegetation within the footprint of the exploration area would be removed. This might lead to the destruction of any protected plant species on the site, resulting in the loss of such species and eventual loss of biodiversity in the area. Endemic species would be most severely affected since even the slightest disruption in their habitat can result in extinction or put them at high risk of being wiped out. The Consultant advises the Proponent to avoid unnecessary removal of vegetation, to promote a balance between biodiversity and their operations. Under the status, the impact is 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/L: - 4	M - 3	M – 30
Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M - 2	L - 16

#### Mitigations and recommendation to minimize land degradation and loss of biodiversity

- The Proponent should avoid unnecessary removal of vegetation, to promote a balance between biodiversity and their operations.
- Vegetation found on the site, but not in the targeted mining sites areas should not be removed but left to preserve biodiversity on the site.
- Shrubs or trees found within the EPL should not be unnecessarily removed.

- Movement of vehicle and machinery should be restricted to existing roads and tracks to prevent unnecessary damage to the vegetation.
- No onsite vegetation should be cut or used for firewood related to the project's operations. The Proponent should provide firewood for onsite camping from authorized firewood producer or seller.
- Design access roads appropriately in a manner that disturbs minimal land areas as possible.
- Vegetation clearing to be kept to a minimum. The vegetation of the site is largely low and open and therefore large scale vegetation clearing should only be applied where necessary and within the EPL footprint.
- Formulate and implement suitable and appropriate operational management guidelines for the cleared areas. Incorporated in the guidelines are the progressive rehabilitation measures.
- Workers should refrain from disturbing, killing or stealing farm animals and killing small soil and rock outcrops' species found on sites.
- Poaching (illegal hunting) of wildlife from the area is strictly prohibited.
- Environmental awareness on the importance of biodiversity preservation should be provided to the workers.

### 7.3.3 Impact on Water Resources

The state of limited water resources in the area implies that the use of local water resources for a water-demanding activity such as drilling during the proposed exploration activities would be unsustainable and would place too much strain on the water resources in the area. The Consultant advises the Proponent to consider alternative sources of water for activities requiring large amounts of water, rather than the use of locally sourced water, in order to achieve the necessary water requirements for the planned exploration activity. This impact is rated with a Medium Significance, and can be reduced to a Low Significance upon effective implementation of the mitigation measures. The assessment of this impact is presented in **Table 11** below.

**Table 11: Impact on water resources**

Mitigation Status	Extent	Duration	Intensity	Probability	Significance
Pre mitigation	M - 3	M - 3	M - 6	M - 4	M - 48

Post mitigation	L/M - 2	L/M - 2	L/M - 4	L/M - 2	L - 16
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### ***Mitigations and recommendation to minimize Impact on Water resources***

- Drinking water abstracted from boreholes or supplied by carting should be used efficiently, and recycling and re-using of water on certain site activities should be encouraged, where necessary and possible.
- The Proponent should consider carting water for exploration activity from elsewhere if the existing boreholes cannot sustain the operations. Agreements of water supply should be made between the farmer / landowner and the Proponent.
- Water reuse/recycling methods should be implemented as far as practicable such that the water used to cool off mining equipment should be captured and used for the cleaning of project equipment, if possible.
- Water storage tanks should be inspected daily to ensure that there is no leakage, resulting in wasted water on site.
- Water conservation awareness and saving measures training should be provided to all the project workers in both phases so that they understand the importance of conserving water and therefore be held accountable

### **7.3.4 Generation of Dust (Air Quality)**

Dust emanating from site access routes 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 to a lower significance rating. The impact is assessed in **Table 12** below.

**Table 12: 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***

- Exploration vehicles should not drive at a speed more than 40 km/h to avoid dust generation around the area.
- The Proponent should ensure that the schedule for works is limited to the given number of days of the week, and not every day. This will keep the vehicle-related dust level minimal in the area.
- Reasonable amount of water should be used on gravel roads, using regular water sprays on gravel routes and near mining sites to suppress the dust that may be emanating from certain mining areas on the EPL.

**7.3.5 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. Precautions should be taken to prevent any refuse from spreading on site. Without any mitigation measures, the impact has a medium significance. The impact will be reduced to low significance upon implementation of the mitigation measures. The assessment of this impact is given in **Table 13**.

**Table 13: 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 daily 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 should be equipped with separate waste bins for hazardous and general/domestic waste.
- Hazardous waste, including emptied chemical containers should be safely stored on site where they cannot be accessed and used by locals for personal use. These containers can then be transported to the nearby approved hazardous waste sites for safe disposal. No waste should be improperly disposed of on site or in the surroundings, i.e., on unapproved waste sites.
- Sewage waste should be stored as per the portable chemical toilets supplied on site and regularly disposed of at the nearest treatment facility.
- Oil spills should be taken care of by removing and treating soils affected by the spill.
- A penalty system for irresponsible disposal of waste on site and anywhere in the area should be implemented.
- Careful storage and handling of hydrocarbons on site is essential.
- Potential contaminants such as hydrocarbons and wastewater should be contained on site and disposed of in accordance with municipal wastewater discharge standards so that they do not contaminate surrounding soils and eventually groundwater.
- An emergency plan should be available for major/minor spills at the site during operation activities (with consideration of air, groundwater, soil and surface water) and during the transportation of the products(s) to the sites.
- All wastewater and hydrocarbon substances and other potential pollutants associated with the project activities should be contained in designated containers on site and later disposed of at nearby approved waste sites in accordance with MAWLR's Water Environment Division standards on wastewater discharge into the environment. This is to ensure that these hazardous substances do not infiltrate into the ground and affect the local groundwater quality.

### **7.3.6 Visual Impact (Scars) on Landscape**

Exploration works may cause aesthetic damage to the landscape. Drilling and sampling activities leave scars on the local landscape. If the mining sites are located close to or along tourist routes, these scars in many cases contrasts the surrounding landscape and may potentially become a visual nuisance, especially for the tourism industry. Therefore, during the prospecting phase, certain measures will need to be taken into consideration regarding the visual aspect. Currently, the visual impact is rated as Medium, and can be reduced to low significance upon effective implementation of the mitigation measures. The assessment of this impact is presented in **Table 14**.

**Table 14: Assessment of visual impact on landscape**

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

***Mitigations and recommendation to minimize visual impact***

- The Proponent should avoid the unnecessary creation of new routes, which lead to landscape scarring on site.
- The Proponent should consider the implementation of continuous rehabilitation programme on site, by using overburden waste rocks to visually maintain the landscape's natural setting.

**7.3.7. Occupational Health and Safety Risks**

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

The use of heavy equipment, especially during exploration, and the presence of hydrocarbons on sites may result in accidental fire outbreaks. This could pose a safety risk to the project personnel and equipment and vehicles too.

If machinery and equipment are not properly stored and packed, the safety risk may not only be a concern for project workers but residents too.

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 15** below and mitigation measures provided.

**Table 15: Assessment of the impacts of exploration on health and safety**

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

***Mitigations and recommendation to minimize health and safety issues***

- The Labour Act's Health and Safety Regulations should be complied with.
- The Proponent should commit to and make provision for bi-annual full medical check-up for all the workers at site to monitor the impact of project related activities on them (workers).
- As part of their induction, the project workers should be provided with an awareness training of the risks of mishandling equipment and materials on site as well as health and safety risk associated with their respective jobs.
- When working on site, employees should be properly equipped with adequate personal protective equipment (PPE) such as coveralls, gloves, safety boots, earplugs, dust masks, safety glasses, and hard hats.
- Heavy vehicle, equipment and fuel storage site should be properly secured, and appropriate warning signage placed where visible.
- Drilled boreholes that will no longer be in use or to be used later after being drilled should be properly marked for visibility and capped/closed off.
- Ensure that after completion of drilling activity, drill cuttings are put back into the hole and the holes filled and levelled, and trenches backfilled.
- An emergency preparedness plan should be compiled, and all personnel appropriately trained.



- Workers should not be allowed to consume alcohol or any other intoxicants prior to and during working hours, as this may lead to mishandling of equipment which results into injuries and other health and safety risks.
- The site areas that are considered temporary risks should be equipped with cautionary signs.

### 7.2.8 Soil and Water Resources Contamination Impacts

Exploration works result in soil disturbance which will leave the already exposed site soils vulnerable to erosion. This impact is probable because the proposed site has limited vegetation cover. Contamination of soils from sewage and mineral processing, extraction and recovery processes can also affect large areas of land if they occur.

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

The spills (depending on volumes spilled on the soils) from these machinery, vehicles and equipment could infiltrate into the ground and pollute the fractured or faulted aquifers on site, and with time reach further groundwater systems in the area. However, it should be noted that the scale and extent/footprint of the activities where potential sources of pollution will be handled is relatively minima. 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 16** below and mitigation measures are provided below.

**Table 16: Assessment of the impacts of exploration on soils/land and water**

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 and water resources***

- Spill control preventive measures should be in place on site to management soil contamination, thus preventing and or minimizing the contamination from reaching water

resources bodies. Some of the soil control preventive measures that can be implemented include:

- Identification of oil storage and use locations on site and allocate drip trays and polluted soil removal tools suitable for that specific surface (soil or hard rock cover) on the sites.
  - Maintain equipment and fuel storage tanks to ensure that they are in good condition thus preventing leaks and spills.
  - The oil storage and use locations should be visually inspected for container or tank condition and spills.
- All project employees should be sensitized about the impacts of soil pollution and advised to follow appropriate fuel delivery and handling procedures.
  - The Proponent should develop and prepare countermeasures to contain, clean up, and mitigate the effects of an oil spill. This includes keeping spill response procedures and a well-stocked cache of supplies easily accessible.
  - Ensure employees receive basic Spill Prevention, Control, and Countermeasure (SPCC) Plan training and mentor new workers as they get hired.
  - Project machines and equipment should be equipped with drip trays to contain possible oil spills when operated on site.
  - Polluted soil should be removed immediately and put in a designate waste type container for later disposal.
  - Drip trays must be readily available on this trailer and monitored to ensure that accidental fuel spills along the tank trailer path/route around the mining sites are cleaned on time (soon after the spill has happened).
  - Polluted soil must be collected and transported away from the site to an approved and appropriately classified hazardous waste treatment facility.
  - Washing of equipment contaminated hydrocarbons, as well as the washing and servicing of vehicles should take place at a dedicated area, where contaminants are prevented from contaminating soil or water resources.
  - Toilet water should be treated using chemical portable toilets and periodically emptied out before reaching capacity and transported to a wastewater treatment facility.

### **7.3.9 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. Some information about known heritage sites of cultural monuments within the sites or in the vicinity was found during this assessment. Therefore, any planned exploration activity should make no interaction with the identified sites of heritage significance. This impact can be rated as Medium to Low, if there are no mitigation measures in place. Upon implementation of the necessary measures, the impact significance would be rated as low. The impact is assessed **Table 17** below.

**Table 17: 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***

- A “No-Go-Area” should be put in place where there is evidence of archaeological site, historical items or cultural objects. It can be a demarcation by fencing off or avoid the site completely by not working closely or near the known site.
- On-site personnel (s) and contractor crews must be sensitized to exercise and recognize “chance finds heritage” in the course of their work.
- During the exploration process, it is important to take note and recognize any significant material being unearthed and making the correct judgment on which actions should be taken (refer to CFP, attached to the EMP).
- The footprint impact of the proposed mining activities should be kept to minimal to limit the possibility of encountering chance finds within the MCs boundaries. The Proponent should keep a buffer of 50 meters on all the archaeological/cultural sites observed within the project site and broader area throughout their stay (duration of their presence) in the area.
- A landscape approach of the site management must consider culture and heritage features in the overall planning of mining infrastructures within and beyond the license boundaries.
- The Proponent and Contractors should adhere to the provisions of Section 55 of the National Heritage Act in event significant heritage and culture features are discovered while conducting mining works.

- An archaeologist or Heritage specialist should be onsite or operational standby to monitor all significant earth moving activities that may be implemented as part of the proposed project activities.
- Show overall commitment and compliance by adapting “minimalistic or zero damage approach”.
- In addition to these recommendations above, there should be a controlled movement of the contractor, exploration crews, equipment, setting up of camps and everyone else involved in the project activities to limit the proliferation of informal pathways, gully erosion and disturbance to surface and sub-surface artifacts such as stone tools and other buried materials.

### 7.3.10 Noise and Vibrations

Prospecting and exploration work (especially drilling) may be a nuisance to surrounding communities due to the noise produced by the activity. Excessive noise and vibrations can be a health risk to workers on site. The exploration equipment used for drilling on site is of medium size and the noise level is bound to be limited to the site only, therefore, the impact likelihood is minimal. Without any mitigation, the impact is rated as of medium significance. To change the impact significance from the pre-mitigation significance to low rating, the mitigation measures should be implemented. This impact is assessed in **Table 18** below.

**Table 18: Assessment of the impacts of noise and vibrations**

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

#### ***Mitigations and recommendation to noise***

- Noise from operations vehicles and equipment on site should be kept at acceptable levels. Any vehicles producing excessive noise should be taken for service/maintenance.
- 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 Cumulative Impacts Associated with Proposed Exploration

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

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

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

#### 7.5 Mitigations and Recommendations for Rehabilitation

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

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

## 8 RECOMMENDATIONS AND CONCLUSIONS

### Conclusion

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

### 8.1 Recommendations

The potential positive and negative impacts stemming from the proposed exploration activities on EPL No. 8654 were identified, assessed and appropriate management and mitigation measures made thereof.

Most of the potential impacts were found to be of medium rating significance. With the effective implementation the recommended management and mitigation measures, this will particularly see the reduction in the significance of adverse impacts that cannot be avoided completely (from medium rating to low). To maintain the desirable rating, the implementation of management and mitigation measures should be monitored by the Proponent directly, or a project Environmental Control Officer (ECO) is highly recommended. The monitoring of this implementation will be done to maintain the reduced impacts' ratings or maintain low rating, and to ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and correctly addressed.

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

It is therefore, recommended that the proposed prospecting and exploration activities may be granted an Environmental Clearance Certificate, provided that:

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

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