ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA) FOR THE PROSPECTING OF PRECIOUS STONES ON EPL 3218 IN KARAS REGION

FOR

CLEAR SUN NAFRIPP MINING (PTY) LTD

PREPARED BY

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building prosperous individuals, communities and organizations through

"RESEARCH, TRAINING & CAPACITY BUILDING"

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DOCUMENT CONTROL SHEET

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Definitions

TERMS	DEFINITION
BID	Background Information Document
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA (R)	Environmental Impact Assessment (Report)
ESIA	Environmental and Social Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
GHG	Greenhouse Gasses
ISO	International Standards Organization
I&Aps	Interested and Affected Parties
METF: DEA	Ministry of Environment, Tourism and Forestry Directorate of Environmental Affairs
NHC	National Heritage Council
NEMA	Namibia Environmental Management Act
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

i. Purpose of This Environmental Impact Assessment Report

This Environmental & Social Impact Assessment (ESIA) follows on the Scope of Work delineated by CLEAR SUN NAFRIPP MINING (PTY) LTD. Existing information and input from commenting authorities, Interested and Affected Parties (I&APs) was used to identify and evaluate potential environmental impacts (both social and biophysical) associated with the proposed mineral prospecting venture.

Environmental flaws associated with the proposed project were identified through the ESIA. A conscious decision was made based on the recommendations and guidelines by the Directorate of Environmental Affairs EIA guidelines in order to assess both significant and less significant environmental impacts proposed by the development. The developed Environmental & Social Management Plan (ESMP) for this proposed activity will have to be effectively implemented by the client, to ensure that adverse environmental impacts are not realised.

The detailed assessment of the anticipated impacts was undertaken with the purpose of highlighting any areas of concern regarding to the proposed mineral exploration activities. In addition, an independent sensitivity mapping analysis was undertaken. This analysis characterised the development site on the significant environmental aspects in order to reflect the sites suitable and unsuitable (no-go) development footprint areas.

This ESR will also be used to motivate and define the previously identified, project alternatives (i.e.site, technology and layout) based on the findings of the environmental baseline study and the suitability of the site to the type of development. This EIAR has been compiled in accordance with the regulatory requirements stipulated in the EIA Regulations (2012), promulgated in terms of the Namibian environmental legislation (Environmental Management Act (No. 7 of 2007))

The EIA aims to:

- Provide an overall assessment of the social, physical and biophysical environments of the area affected by the proposed establishment of the mineral exploration project;
- Undertake a detailed environmental assessment, in terms of environmental criteria and impacts (direct, indirect and cumulative), and recommend a preferred location for the proposed plant (based on environmental sensitivity);
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts; and
- Undertake a fully inclusive Public Participation Process (PPP)
- GIS sensitivity mapping was conducted to identify potential impacts, propose mitigation and inform the sensitivity analysis.

A systematic approach was adopted for the successful completion of the EIA in line with the regulated process. The diagram in Figure 1 below indicates the sequential process that was followed for this study.

ii. Assumptions and Limitations

The following assumptions and limitations underpin the approach to this EIA study:

- The information received from the stakeholders, desktop surveys and baseline assessments are current and valid at the time of the study;
- A precautionary approach was adopted in instances where baseline information was insufficient or unavailable;
- Mandatory timeframes apply to the review and adjudication of the reports by the competent authority and other government departments; and
- No land claims have been registered for the proposed site at the onset and registration of the study.

NB: The EAP does not accept any responsibility in the event that additional information comes to light at a later stage of the process. All data from unpublished research utilised for the purposed of this project is valid and accurate. The scope of this investigation is limited to assessing the potential biophysical, social and cultural impacts associated with the proposed project.

1. CHAPTER ONE: BACKGROUND

1.1. Introduction

The applicant, Clear Sun NAFRIPP Mining (Pty) Ltd (CSNM) contracted a local company to prospect for precious stones on EPL 3218 along the Orange River in Karas Region-Namibia. CSNM is jointly owned by the Namibian Former Robben Island Political Prisoners Trust (NFRIPPT) and Clear Sun (Pty) Ltd. Clear Sun (Pty) Ltd invests, facilitates and coordinates prospecting and subsequent mining operations, acting as contractors / sub-contractors. This venture is set to pave way for mining activities in the area is sufficient quantities of minerals are realized.

Mineral Prospecting is however a prescribed activity under the Environmental Management Act (2007) and the Environmental Assessment Regulations of 2012, as highlighted in table 1 below. In this respect, the proposed mineral exploration activities by CSNM should undergo an environmental impact assessment process and obtain and Environmental Clearance Certificate (ECC) before the mineral exploration activities can be carried out.

Table 1: Listed Activities relevant to the project

ACTIVITY	RELEVANT SECTIONS
MINING AND QUARRYING ACTIVITIES	- 3.1 The construction of facilities for any process or activities which requires a licence, right or other form of authorisation, and the renewal of a licence, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992. -3.3 Resource extraction, manipulation, conservation and related activities.

In respect of the commissioning of the mineral exploration activities on EPL 3218, Outrun Consultants has been appointed by CSNM to conduct an environmental Impact Assessment to develop an Environmental Management Plan (EMP) for the undertaking of mineral exploration activities and to apply for an Environmental Clearance Certificate with the Directorate of Environmental Affairs under the Ministry of Environment, Tourism and Forestry-Namibia.

1.2. Project Location

The diamondiferous gravel deposits are located along the Orange River about 40 km to the south-east of Rosh Pinah and 65 km to the north-western direction from Aussenkehr in the Karas Region, Luderitz Magisterial district. The mineral area is linear to the C13 road connecting Aussenkehr with Rosh Pinah. There is no electricity nor telephone connection in the project area. Please refer to the map below (Figure 1) giving a locality layout of the site:

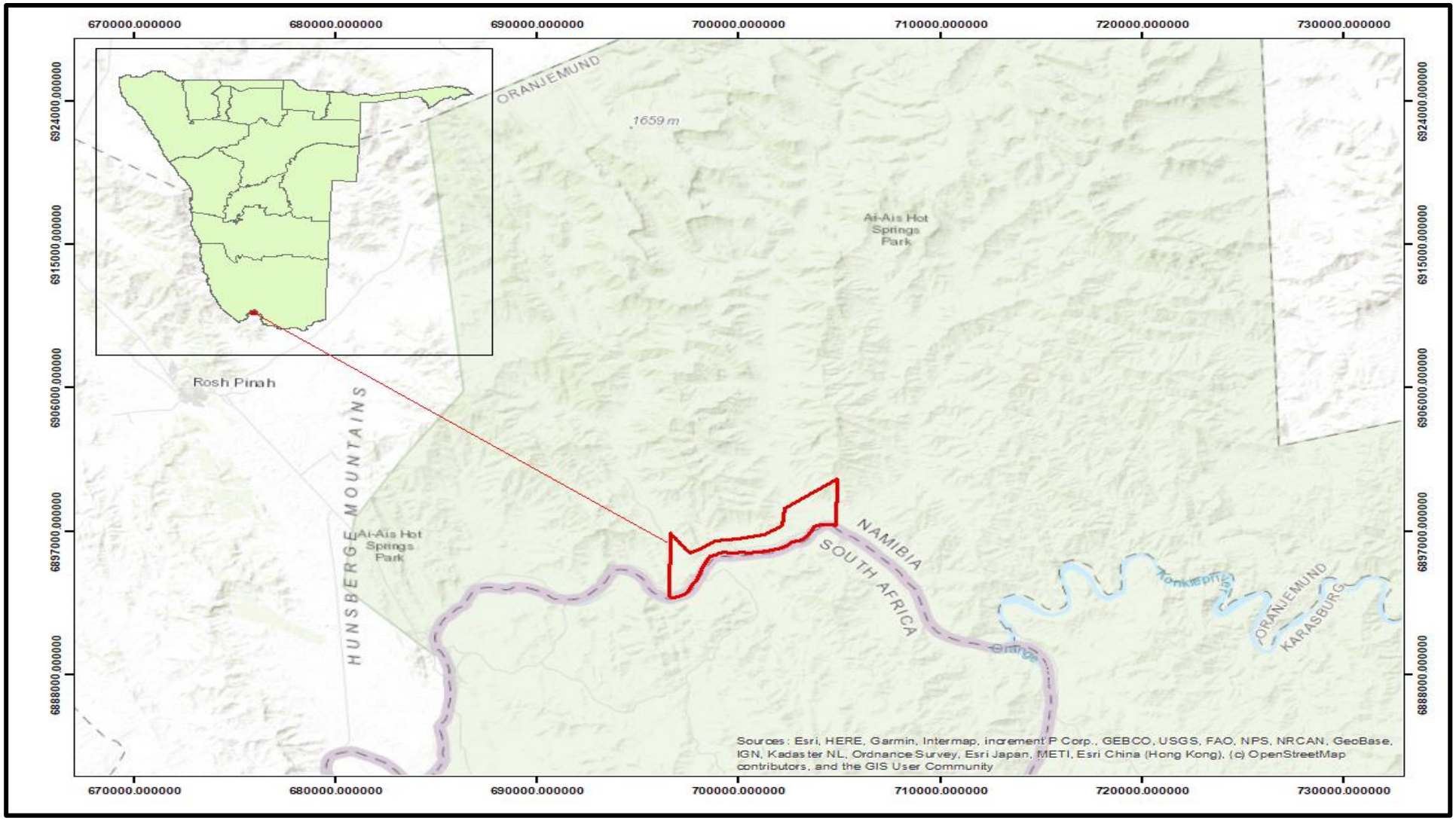

Figure 1: EPL 3218 locality

1.3. Exploration areas

NFRIPPT was granted with mineral rights title an Exclusive Prospecting License No. 3218 on 18 June, 2003 with a current renewal, expiring on 11 August 2021. During the time period some exploration and prospecting operations mainly within area 1 and 2 were conducted as well as construction and installation of a wash plant to the Eastern part of area 3 for processing and final recovery for precious stones (refer to Figure 2).

Executed prospecting and evaluation works at these diamondiferous deposits resulted in estimation of inferred reserves and forecasted resources of diamonds in gravel deposits of fluvial terraces of the Orange River. Those prospecting operations were done in the form of pits and trenches with small-scale bulk sampling on area 1 and 2. No rehabilitation has been done on the mineral area with previous operations. These pits, trenches and sampling holes / areas contributed during the site visits to determining which areas to focus on during the proposed Prospecting Operations.

Prospecting operations will be conducted on five demarcated areas as illustrated in Figure 2 (Area of EPL 3218 with demarcated areas for Prospecting Operations) and will focus mainly on areas 1, 2 and 3 as stipulated in the study below to determine the viability and feasibility of the diamondiferous gravel deposits on Block 3. If prospecting proves to be feasible, subsequent mining operations will be on the reserve deposits on an enlarged scale of operations in the next phase.

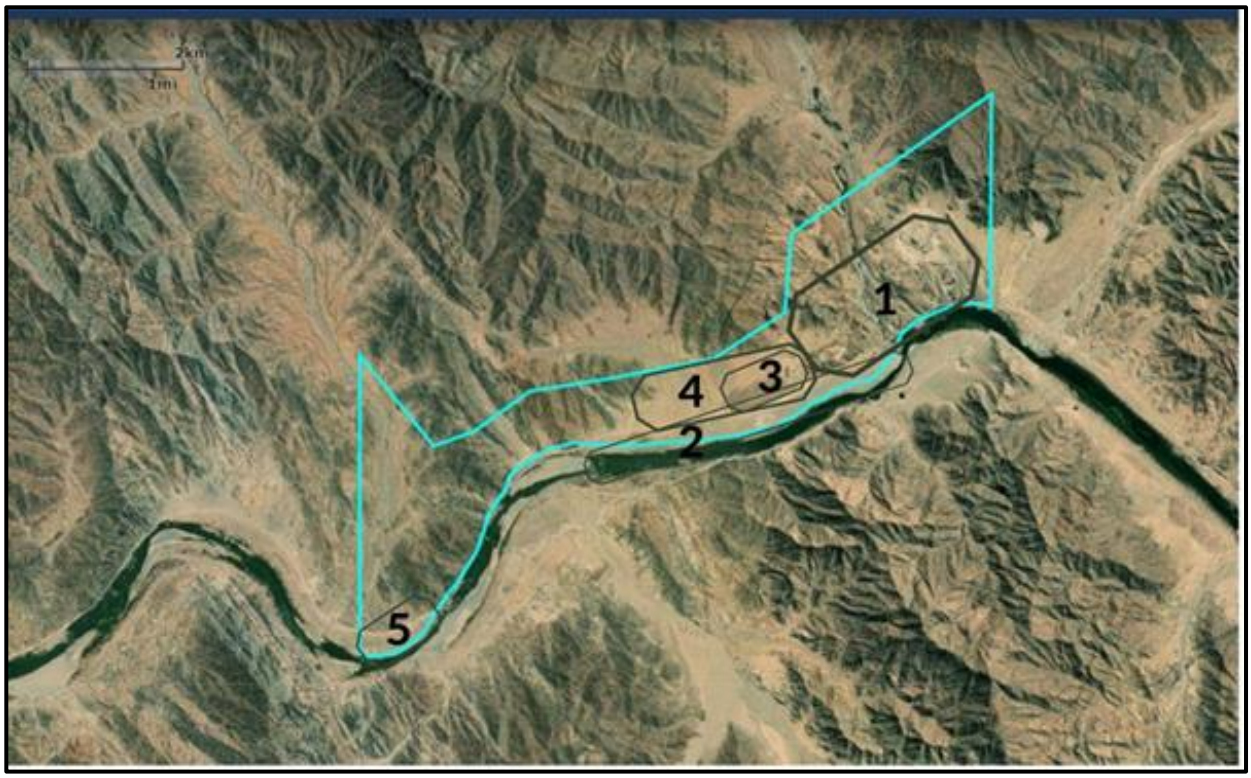

Figure 2: Targeted Exploration areas on EPL 3218

1.4. Technology and Exploration Approach

1.4.1. Selection of excavation method

Areas 1, 2, 3 & 5: Taking into consideration sizes of the mining blocks, depth of the gravel deposits and a possibility of barren gravel dumps located in immediate proximity to the blocks being stripped, it was decided to use a method of open excavation with further transportation of diamondiferous screened gravel to the processing plant by dumper trucks.

Gravel will be excavated and screened in the quarry by use of mobile screens and the screened gravel will be transported to the wash plant to be further screened and concentrated in order to recover diamonds in the final recovery.

Area 4: Area 4 has approximately 930,00m2 which is earmarked for a drilling operation. It is envisaged to drill approximately 100 holes over the span of this area to determine the following:

- Existence of diamondiferous gravel;
- Thickness and volume of the diamondiferous- and barren gravel;
- Reserve calculation of the area.
- If drilling results proof to be favorable, area 4 will be included under the operations of areas 1, 2, 3 and 5.

1.4.2. Works, Stripping and Transportation

It is planned to use a 70 Ton bulldozer to rip and strip the barren gravel (overburden). Once the overburden is stripped, gravel is loaded by a 70 Ton excavator onto dumper trucks (60 Ton) to be hauled to the plant for screening. Gravel excavation will be carried out in both side directions by horizontal or slightly inclined layers of small thickness contiguous chips. Foundation pits will become main strip openings.

At the mobile screen, gravel is stockpiled at the screen and gravel is fed to the screen with a 38 Ton excavator to remove oversize rocks. Screened gravel is loaded onto dumper trucks by a $3m^3$ loader and hauled to the wash plant.

During prospecting operations pits, trenches and large bulk sampling holes will be made on areas 1, 2, 3 and 5 to determine the viability of precious stones within the diamondiferous gravel and to target areas based on their potential and results obtained. Rehabilitation will be considered a going process and will be conducted in cooperation with any prospecting or mining.

While excavating diamondiferous gravel from foundation pits it is projected to use a shovel, which is to be chosen according to the principle of minimum necessity in order to maintain smooth running of washing device with $2618m^3$ per shift capacity. It was established by experiment that capacity of a shovel with $3,8m^3$ dipper's volume is $2736m^3$ per 12-hour shift. This means that in order to reach $2736m^3$ productivity per 12-hour shift an excavator shovel with $3,8m^3$ volume will be needed.

In gravel section of this deposit where it is necessary to loosen the gravel and strip the overburden with a bulldozer, a 70 Ton Dozer will be used to open an area of approximately 5000 tons / day. Transportation of gravel to the plant will be done by a Dump truck with 60 Ton load-carrying capacity.

A Front-end Loader with 3m3 bucket volume will be used to load screened gravel at the quarry onto the dump trucks and to remove/rehabilitate pre-screened gravel. A second front end loader with 3m3 will be used to feed the wash plant. Finally, the whole fleet of earth moving mining machines and mobile screen will include of the following items for the prospecting:

- Excavator (70 Ton) – 1
- Bulldozer (70 Ton) – 1
- Excavator (38 Ton) – 1
- Front end Loader (3m3) – 2
- Dump truck (60Ton/100Ton – 3
- Mobile Findlay Screen (600 Ton / hour)

1.5. Accessibility

The site is easily using the C13 gravel road and existing gravel roads cleared during the previous mining activities that took place in the past.

Figure 3: Existing EPL3218 access from C13 gravel road.

1.6. Infrastructure and Services

Water: Water will be abstracted from the Orange River and the abstraction permit is annexed at the end of this report.

Ablution: Temporary toilets will be used during the prospecting and exploration phase.

Electricity: There is an existing electricity connection line within 300m from the site, however most of the equipment will be diesel powered.

Communication: There are certain points with Mobile Telecommunications Network reception however satellite phones will be advised for efficient communication.

Figure 4: Previous mine processing site with existing abandoned recovery plant equipment. Source: Own photograph.

1.7. Need and Desirability

Mining is the biggest contributor to Namibia's economy in terms of revenue. It accounts for 25% of the country's income. It contributes to the gross domestic product (GDP), (10.4% in 2009, 8.5% in 2010, 9.5% in 2011, 12.3% in 2012, 13.2% in 2013, 11.6% in 2014) making it very important and one of the largest economic sectors of the country.

The majority of revenue (7.2% of GDP in 2011) comes from diamond mining. Namibia produces about 2 % of the world's gem quality diamonds making it the world's eighth producer in terms of value. Furthermore, mining contributes a significant direct and indirect jobs for the country. This project is being implemented in line with NDP 5 and to continue contributing to national economic development through precious minerals mining.

1.8. Alternatives Assessment

This section covers a discussion of alternatives to propose. The "NO-GO OPTION" alternative is also considered. Diamond exploration and mining on EPL 3218 in Karas Region.

1.8.1. No-go alternatives

The "no-go" option means maintaining the status quo were no diamond exploration and mining will take place. Usually, it is the best alternative for the environment since no environmental disturbances will take place. Currently, mining contributes significantly towards the country's economic growth and as a result the 'no go' option is not favored for the following reasons:

- No employment and business opportunities will be created for country.
- Reduced anticipated business in diamonds.
- The local people's economic status would remain unchanged.
- Locally available skills would remain under-utilized.

It is thus clear, that the 'No Go Option' alternative is not a favorable alternative for the Proponent and the Government of the Republic of Namibia (GRN) and her people.

1.8.2. Alternative site(s)

No alternative exploration sites will be considered apart from this EPL since this the only licensed area for diamond exploration in the Proponent's hands. However, as part of the specialist biodiversity study alternative sampling and mining sites should be identified based on the biodiversity sensitivity of the areas. Less sensitive areas should be preferred targets. The Proponent should sample and mine from existing old pits in order to minimize environmental damage. The same applies to access roads and tracks, old existing ones should be used.

1.8.3. Technological Alternatives

This part of alternatives will assess the various options available for the exploration and processing of extracted gravels based on machinery and techniques.

Ore Mining: Due to the loose gravelly nature of the targeted material no drilling will take place but excavation and screening. The bulk sampling method will be used in which the different target areas are excavated and the material processed in batches of 100 tones.

Energy: A diesel generator will be used to supply electricity for lighting during night operations. An above ground diesel storage tank will be erected on the project site. The Proponent is advised to use a hybrid system with solar.

Accommodation and sanitation facilities: There is an existing site with prefabricated structures, previously used on the EPL. To minimize land disturbances and environmental degradation, no new land opening will be realized, to cater for accommodation and sanitation facilities, instead existing structures will be upgraded and used. An underground conservation tank with soak away is already existing on site, and it will be regularly maintained.

Figure 5: Existing camp site on EPL 3218, left side.

2. CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

2.1. Introduction

An important part of the EIA is identifying and reviewing the administrative, policy and legislative frameworks concerning the proposed activity, to inform the proponent about the requirements to be fulfilled in undertaking the proposed project. This section looks at the legislative framework within which the proposed mineral exploration activities will conform to; the focus is on the compliance with the legislation during the planning, construction and operational phases. All relevant legislations, policies and international statutes applying to the project are highlighted in the table below as specified in the Environmental Management Act, 2007 (Act No.7 of 2007) and the regulations for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012).

Table 2:Policies, legal and Administrative regulations

ASPECT	LEGISLATION	RELEVANT PROVISIONS	RELEVANCE TO THE PROJECT
The Constitution	Namibian Constitution First Amendment Act 34 of 1998	– Article 16(1) guarantees all persons the right to property, to acquire, own and dispose of property, alone or in association with others and to bequeath such property. – "The State shall actively promote and maintain the welfare of the people by adopting policies that are aimed at maintaining ecosystems, essential ecological processes and the biological diversity of Namibia. It further promotes the sustainable utilisation of living natural resources basis for the benefit of all Namibians, both present and future." (Article 95(I)).	– The project will enable the full execution of right to practice any profession, or carry on any occupation, trade or business by availing necessary provisions such as practising any profession, or carry on any occupation, trade or business in the country. – Through implementation of the environmental management plan, the proposed mineral exploration activities will ensure conformity to the constitution in terms of environmental management and sustainability.
National Development Plans		– Namibia's overall Development ambitions are articulated in the National Vision 2030. At the operational level, five-yearly national development plans (NDP's) are prepared in extensive consultations led by the National Planning Commission in the Office of the President. The Government has so far launched a 4th NDP focusing on high and sustained economic growth, increased income equality Employment creation.	– The proposed project will propel NDP4 targets in mining and development, adding on this will come with increased employment opportunities in the local communities and in Karas Region at large.
Archaeology	National Heritage Act 27 of 2004	– Section 48(1) states that "A person may apply to the Namibian Heritage Council (NHC) for a permit to carry out works or activities in relation to a protected place or protected object"	– Any heritage resources discovered would require a permit from the NHC for relocation.

			– Field assessment did not identify any special areas on National heritage within the EPL.
	National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979	– "No person shall destroy, damage, excavate, alter, remove from its original site or export from Namibia: – Meteorites, fossils, petroglyphs, ornamental infrastructure graves, caves, rock shelters, middens, shells that came into existence before the year 1900 AD; or – any other archaeological or palaeontological finds	– The proposed site of development is not within any known monument sites, both movable and immovable as specified in the Act, however in finding any materials specified in the Act, contractors on site will take the required route and notify the relevant commission. – An archaeological impact assessment was deemed not necessary for this piece of land because of its locality and field reconnaissance survey conducted.
Environmental	Environmental Management Act 7 of 2007	– Requires that projects with significant environmental impacts are subject to an environmental assessment process (Section 27). – Requires for adequate public participation during the environmental assessment process for interested and affected parties to voice their opinions about a project (Section 2(b-c)). – According to Section 5(4) a person may not discard waste as defined in Section 5(1)(b) in any way other than at a disposal site declared by the Minister of Environment and Tourism or in a manner prescribed by the Minister. – Details principles which are to guide all EIAs	– This Act and its regulations should inform and guide this EIA process. – The project proponent will ensure that all provisions of the mineral exploration EMP are implemented and regular environmental compliance auditing conducted by independent consultants.

	EIA Regulations GN 57/2007 (GG 3812)	− Details requirements for public consultation within a given environmental assessment process (GN No 30 S21). − Details the requirements for what should be included in a Scoping Report (GN No 30 S8) an EIA report (GN No 30 S15).	− This Act and its regulations should inform and guide this EIA process.
	Pollution and Waste Management Bill (draft)	− This bill defines pollution and the different types of pollution. It also points out how the Government intends to regulate the different types of pollution to maintain a clean and safe environment. − The bill also describes how waste should be managed to reduce environmental pollution. Failure to comply with the requirements considered an offence and is punishable.	− The project should be executed in harmony with the requirements of the act to reduce negative impacts on the surrounding environs from waste during construction or operation. − A waste management strategy that follows recycling, reuse and reducing will be commissioned throughout the operations.
	Soil Conservation Act 76 of 1969	− This acts makes provision for combating and for the prevention of soil erosion, it promotes the conservation, protection and improvement of the soil, vegetation, sources and resources of the Republic of Namibia.	− The Project impact on soil will rather be localised, however this document aims at guiding the proponent during their mineral exploration activities to prevent soil erosion and contamination during operation.
	National Biodiversity Strategy and Action Plan (NBSAP2)	− The action plan was operationalised in a bid to make aware the critical importance of biodiversity conservation in Namibia, putting together management of matters to do with ecosystems protection, biosafety, and biosystematics protection on both terrestrial and aquatic systems.	− Forming part of the EIA of and EMP for this Project, the proponent will consider all associated impacts, both acute and long term, and will propose methods and ways to sustain the local biodiversity.

	Hazardous Substance Ordinance 14 of 1974	– Provisions for hazardous waste are amended in this act as it provides "for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances; to provide for the prohibition and control of the importation, sale, use, operation, application, modification, disposal or dumping of such substance; and to provide for matters connected therewith"	– The proposed Mineral exploration operations will ensure that all possible "hazardous" categorised substances and waste will be handled by a certified hazardous waste handler.
	Atmospheric Pollution Prevention Ordinance 11 of 1976;	– This regulation sets out principles for the prevention of the pollution of the atmosphere and for matters incidental thereto. Part III of the Act sets out regulations pertaining to atmospheric pollution by smoke. While preventative measures for dust atmospheric pollution are outlined in Part IV and Part V outlines provisions for Atmospheric pollution by gases emitted by vehicles.	– The proposed mineral exploration activities will involve the use of combustible engines for vehicles and machinery, and thus appropriate vehicle servicing should be ensured to minimise pollution – Dust generation and release of other particulate matter should be minimised by following the dust suppression procedures in the EMP.
	Parks and Wildlife Management Bill of 2006;	– The act enacts the legal framework, to provide for and promote the maintenance of ecosystems, essential ecological processes and the biological diversity of Namibia, and the utilisation of living natural resources on a sustainable basis for the benefit of Namibians, both present and future, and to promote harmonious and mutually beneficial co-existence of humans with wildlife, to give effect to Namibian's obligations under relevant	– Because the proposed activities are to be conducted in a conservancy area, there is need to ensure that the Parks and Wildlife management bill is taken into consideration with great emphasis and compliance.

		international legal instruments including the Convention of Biological Diversity – Provisions with regard to declaration of protected areas, entry into and residence are made in chapter V. Regulations on the protection of species of wildlife and plants are provided in Chapter VII of the Act.	
Forestry	Forest Act 12 of 2001	– Tree species and any vegetation within 100m from a watercourse may not be removed without a permit (S22(1) – Provision for the protection of various plant species.	– The clearing of vegetation is prohibited (subject to a permit) 100m either side of a river. Certain tree species occurring in the area are protected under this Act. – Permits must be obtained from MAWF in accordance with the Act.
Water	Water Act 54 of 1956	– The Water Resources Management Act 24 of 2004 is presently without regulations; therefore, the Water Act No 54 of 1956 is still in force: – A permit application in terms of Sections 21(1) and 21(2) of the Water Act is required for the disposal of industrial or domestic wastewater and effluent. – Prohibits the pollution of underground and surface water bodies (S23(1). – Liability of clean-up costs after closure/ abandonment of an activity (S23(2)). – Protection from surface and underground water pollution	– All water requirements for the proposed mineral exploration activities will be in accordance to the requirements of the ACT. – Water use licenses will be applied for. – Pollution prevention mechanisms will be also put in place.
Health and Safety	Labour Act (No 11 of 2007) in conjunction with	– 135 (f): “the steps to be taken by the owners of premises used or intended for use as factories or places where machinery is used, or by occupiers of such premises or by	– The proponent will employ several people from the local and shall ensure securing a safe environment and

	Regulation 156, 'Regulations Relating to the Health and Safety of Employees at work'.	users of machinery about the structure of such buildings of otherwise to prevent or extinguish fires, and to ensure the safety in the event of fire, of persons in such building;" (Ministry of Labour and Social Welfare). − This act emphasizes and regulates basic terms and conditions of employment, it guarantees prospective health, safety and welfare of employees and protects employees from unfair labour practices.	preserving the health and welfare of employees at work. This will include applying appropriate hazard management plans and enforcing Occupational Health and Safety (OHS) enforcement by contractors.
	Public Health and Environmental Act, 2015	− Under this act, in section 119: "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 project will ensure compliance to the terms of the Act.
Mining	Minerals (Prospecting and Mining) Act, 1992	− The Minerals Act governs minerals prospecting and mining. The Act provides for the reconnaissance, prospecting and mining for, and disposal of, and the exercise of control over minerals in Namibia; and to provide for matters incidental thereto. − The Act also ensures that mining entities undertake environmental responsibility which includes rehabilitation and waste management. − A new Minerals Bills is currently under preparation.	− This document has been conducted in compliance to the requirements of the Act, as well as ensuring that the sought after mineral exploration authorisation is granted by the ministry of Mines-Namibia.
	Minerals Policy 2004	− The Minerals Policy is developed to ensure long-term sustainable growth in the mining sector of Namibia. One of the objectives of the Policy, relevant to EIAs is to ensure compliance with national environmental policy	− The fact that mining involved extraction/interaction with the natural resources, environmental responsibility will be ensured by the

		and other relevant policies to develop a sustainable mining industry.	proponent as part of compliance to the Minerals policy. - Further on the policy calls for value addition, and the proposed project will entail mineral processing.
Services and Utilities Infrastructure	Road Ordinance 1972 (Ordinance 17 0f 1972)	- Width of proclaimed roads and road reserve boundaries (S3.1) - Control of traffic during operational activities on trunk and main roads (S27.1) - Infringements and obstructions on and interference with proclaimed roads. (S37.1) - Distance from proclaimed roads at which fences are erected (S38)	- Although the project will not directly affect the major roads, the ore carrying trucks will at some point use the major roads. - No new road developments, power lines or sewer reticulation systems will be constructed, thus there will be minimal environmental impacts from Services and utilities infrastructure.

3. CHAPTER THREE: RECEIVING ENVIRONMENT

3.1. Climate

Classification of climate: Rosh-Pinah has a desert climate (BWk, according to the Köppen climate classification), with pleasant temperatures throughout the year.

Average rainfall: 50mm - 100mm per year

Average Evaporation: Evaporation in the area is averaged 2600-2800mm.

Precipitation: Sporadic and unpredictable, high intensity, highly localised storm events between December and March.

Temperature: During the hottest month of the year, which is mainly November, the average maximum temperature is about 30 - 37 °C. During July which is the coldest month the average minimum temperature is 8 - 10 °C.

Wind direction: Winds and weather in the region are controlled by the interaction of the south Atlantic anticyclone, the northward-flowing and cold Benguela Current (with associated upwelling), eastward moving mid latitude cyclones and the atmosphere pressure field over the subcontinent (Kamstra, 1985).

3.2. Current State of Mining area on EPL3218

It is imperative to understand that EPL 3218 is not entirely a virgin area to have mining activities conducted, instead the EPL has some areas where mining has been conducted and the mine camp is already in existence as illustrated on Figure 3. The proponent will be conducting mineral exploration activities on a previously mined area, as well as utilisation of existing infrastructure and services such as mine camp, access tracks, borehole and some mine pits. Below is an illustration of the current land disturbances existing in the area.

Figure 6: Left- Processing Site from abandoned historical mining activities (Unrehabilitated)
Figure 7: Centre-Stockpiles form historical mining activities (Unrehabilitated)
Figure 8: Right-Unrehabilitated mining Pits and Stockpiles

3.3. Topography

The topography rises from the sea level in the western part of the region towards the east and north eastern parts of the region. The study area lies along the Orange River which is characterized by mountainous inselbergs forming high altitudes.

3.4. Geology and soils

Diamond deposition in coastal Namibia and along the Orange River System was due to large scale fluvial conveyor belts. Research into sediment transport pathways associated with diamond movement from the sources in the interior of Southern Africa to sinks along the Atlantic margin has demonstrated that the Orange–Vaal drainage is the principal conduit for such movement. Moreover, sediment movement (including diamonds) is linked to tripartite conveyor-like system that involves the Orange-Vaal drainage, the Atlantic seaboard and the Namib Desert repository.

Significantly, this interaction between fluvial, marine and desert processes in a Cratonic source to passive margin sink setting has given rise to the most spectacular regional gem diamond occurrence yet discovered-an area stretching from the Namaqualand cost of South Africa northwards to skeleton Coast of Namibia.

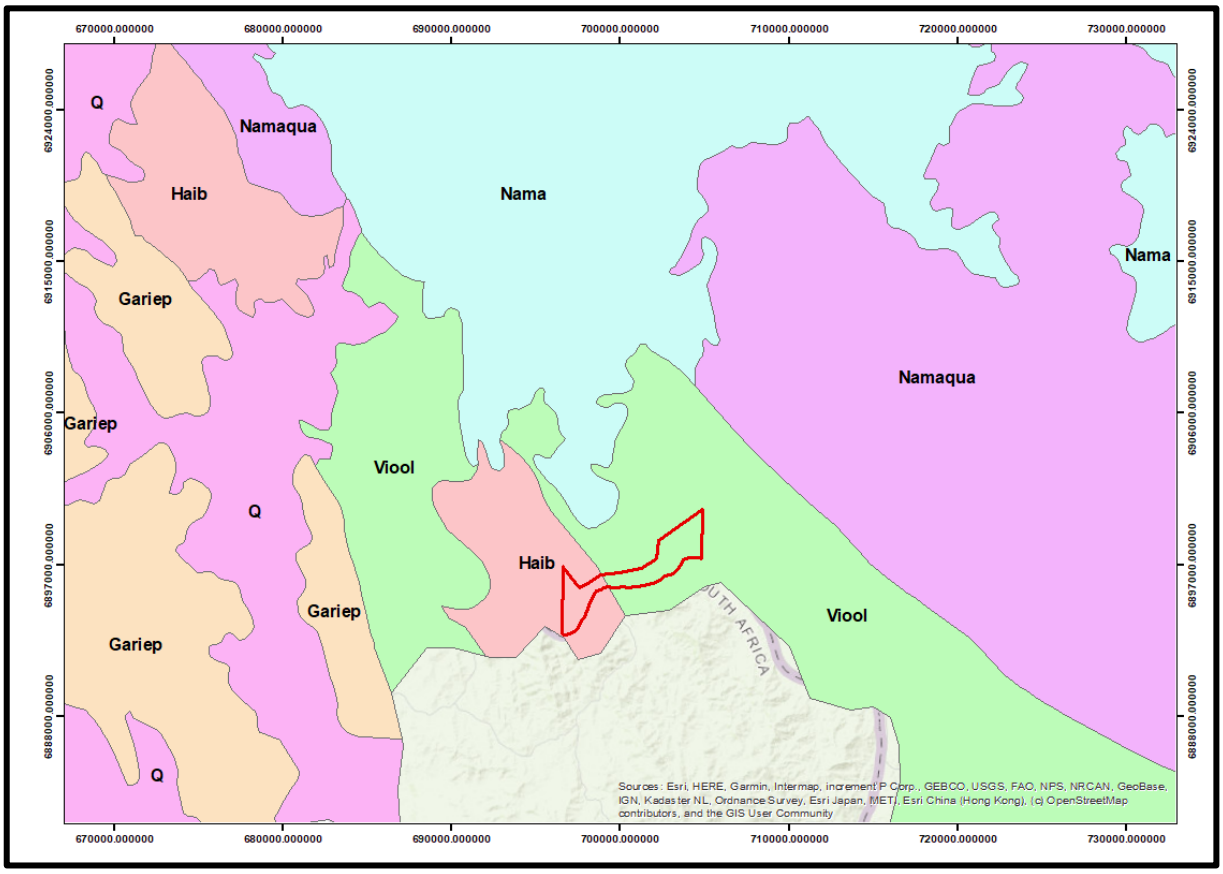

Figure 9: EPL 3218 Geology

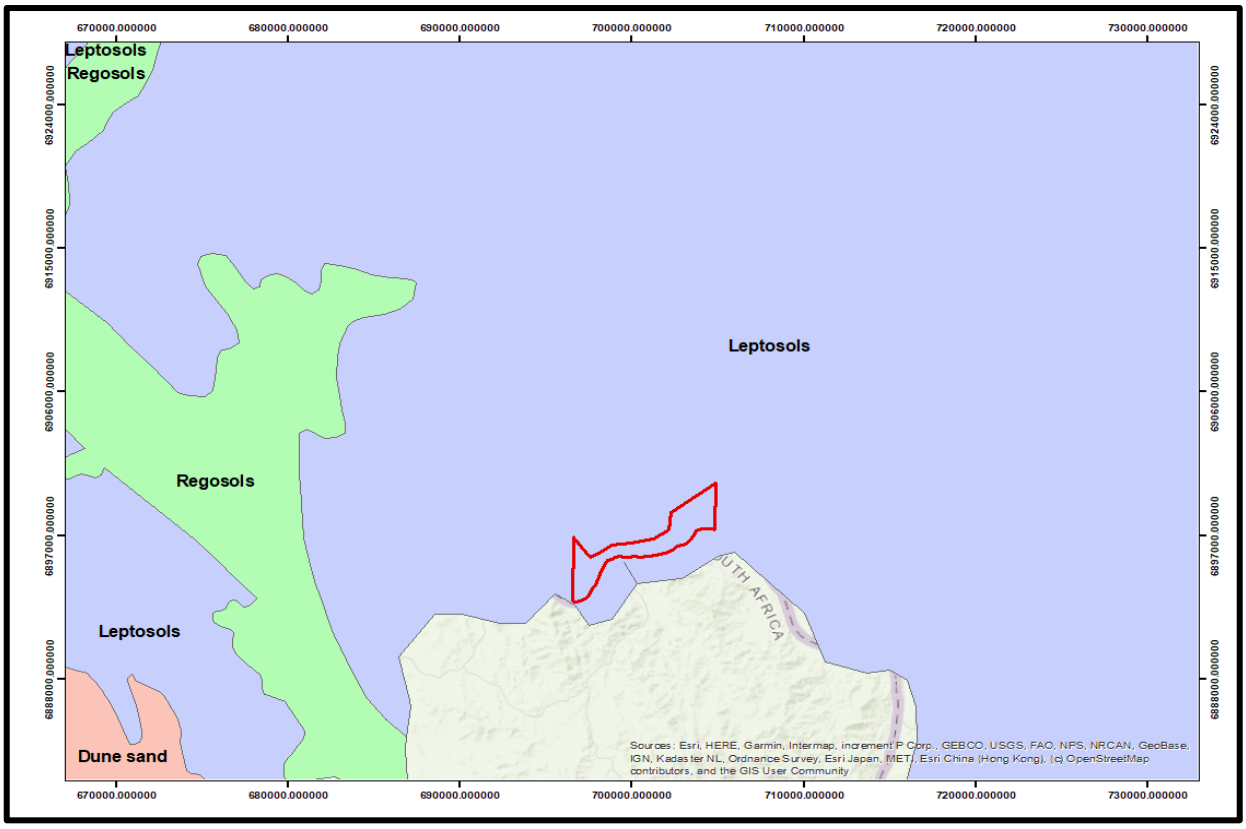

Figure 10: EPL 3218 Soils

3.5. Surface Water

The Boom, Nuab and Orange Rivers are the major rivers within the EPL, and Nuab River pass through the EPL. Nuab and Boom rivers are ephemeral rivers. The rivers are however important ecologically supplying water to both plants and animals in the biodiversity sensitive areas. The water quality in the Boom River show high salt content making the water hard and high level of total dissolved solids. Total P is very low, 0.27 mg / l hence no signs of contamination. Although the water quality of the Boom River is not suitable for human consumption there are no signs of industrial contamination.

Within the project are of the /Ai-/Ais-Richtersveld Transfrontier Park lies the Fish River which is 800 kilometres long and thus the longest river of Namibia. It has its source in the eastern parts of the Naukluft Mountains. After about 200 km the river flows into the Hardap Dam which is the largest water reservoir of the country with a circumference of 30 km and a surface area of 28 km².

After being retained the Fish River does not carry water continuously, only during the rainy season the river might turns into a torrent. During the dry season sporadic pools supply water to many animals. The Fish River Canyon is the second largest canyon worldwide after the Grand Canyon in the USA. The Canyon forms part of the state-run Ais-Ais Richtersveld Transfontier Park.

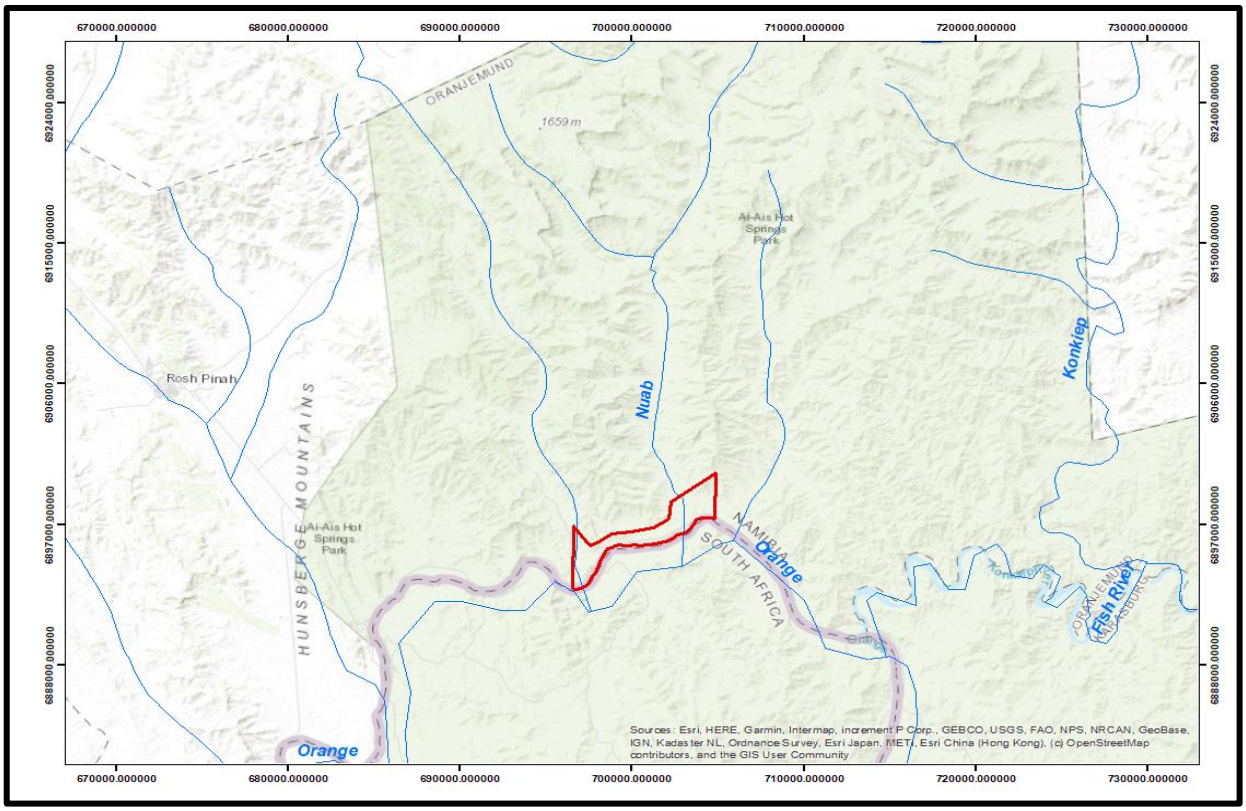

Figure 11: EPL 3218 Surface Hydrology

3.6. Terrestrial Ecology

3.6.1. Biodiversity study findings

This study is site specific but will be supported by relevant literature of the studies done in the surrounding areas especially on the Succulent karroo biome of North –west South Africa which stretches into south western Namibia where our study area lies. Some authors refer to it as the Richtersveld ecoregion.

It covers 116 000 square kilometers of desert and is the richest succulent flora on earth, as well as high plant, reptile and invertebrate diversity. The Succulent Karoo biome is believed to support over 6, 000 plant species, 250 species of birds, 78 species of mammals, 132 species of reptiles and amphibians, and an unknown number of insects, it is extremely diverse and yet it is the world's most arid environment. Most impressive, however, is that over 40 % of these species found here are found nowhere else on earth, (Farmer, 2003 - 2004).

The study area lies in the /Ai /Ais Hotsprings Game Park, a site of national and global significance. It is considered to be a Biodiversity Hotspot being part of the Succulent Karroo Biome. A biodiversity hotspot is a biogeographic region that is both a significant reservoir of biodiversity and is threatened with destruction. The term biodiversity hotspot specifically refers to 25 biologically rich areas around the world that have lost at least 70 percent of their original habitat. The remaining natural habitat in these biodiversity hotspots amounts to just 1.4 percent of the land surface of the planet, yet supports nearly 60 percent of the world's plant, bird, mammal, reptile, and amphibian species.

Plant diversity is the biological basis for hotspot designation. Plants have been used as qualifiers for Hotspots because they are the basis for diversity in other taxonomic groups and are well-known to researchers.

The hotspot concept targets regions where the threat is greatest to the greatest number of species and allows conservationists to focus cost-effective conservation efforts there. The world's 25 biodiversity hotspots contain 44 percent of all plant species and 35 percent of all terrestrial vertebrate species in only 1.4 percent of the planet's land area, (Farmer, 2003 - 2004; Daily, 2015).

The /Ai-/Ais-Richtersveld Transfrontier Park (ARTFP) jointly conserves a large part of the Succulent Karoo Biome which is an international biodiversity hotspot. It was established by the governments of Namibia and South Africa and provides for joint management of the Richtersveld National Park (South Africa) and /Ai-/Ais Hot Springs Park (Namibia).

The area is well known for its rugged landscapes, including Namibia's Fish River Canyon, the Orange River, and unique plant life such as the quiver tree (Aloe dichotoma), maiden's quiver tree (Aloe ramosissima), the rare giant quiver tree (Aloe pillansii) and the halfmens (Pachypodium namaquanum). The ARTFP is the furthest developed of the three transboundary conservation initiatives in which Namibia is involved. The DWNP leads the MET's efforts in this bilateral initiative.

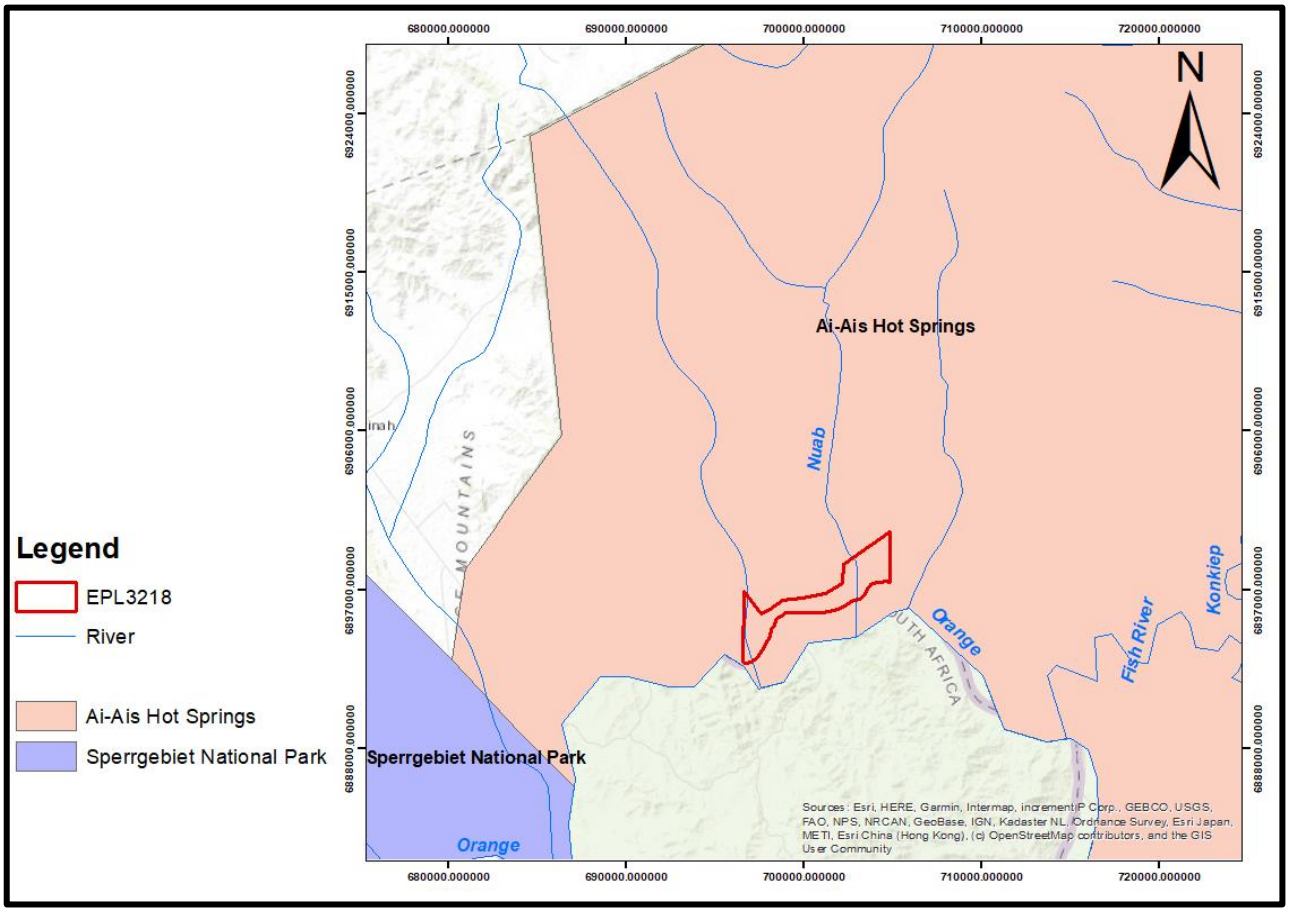

Figure 12: Protected Areas

3.7. Fauna in the study area

3.7.1. Insects of the Richtersveld Area

Semi-arid areas of the world are surprisingly rich in in insects and the Richtersveld ecoregion which covers our study area, EPL 3218 is no exception. It is a centre of diversity for solitary bees, certain wasps, monkey beetles, grasshoppers, flies and lacewings.

In contrast butterflies and moths are poorly represented here. They emerge for a very short period of time in spring and summer. These insects are ecologically important as pollination agents in the plants reproduction cycle e.g. the tangle-veined fly pollinates over 20 different species of iris and pelargonium. The bees and wasps are vital pollinators of wild flowers.

Common Name	**Scientific Name**
Namaqualand Tangle – veined fly	*Prosoeca peringueyi*
Brush jewel beetle	*Julodis sp.*
Toktokkie	*Moluris sp*
Foam grasshopper, Rooibaadje ,	*Dictyophorus spumans*
Corn crickets	*Acanthoplus sp*
Painted lady	*Vanessa cardui*
Toad grasshopper	*Batrachotetrix sp*
Stone grasshopper	*Trachypetrella sp*

Figure 13: Julodis sp Observed in Field

3.7.2. Reptiles of the Richtersveld eco-region

At least 22% or 55 species of Namibian lizards are classified as endemic. The occurrence of reptiles of "conservation concern" includes about 67% of Namibian reptiles (Griffin 1998b). The diversity and uniqueness of the reptiles found in the study area make it a herpetological paradise, more than 50 reptile species have been recorded including 3 species of tortoise and one terrapin. Over grazing and mining in critical habitats are some of the biggest problems facing reptiles in Namibia (Griffin 1998b).

The Angulate tortoise and the Namaqua Speckled Padloper are common in the study area. Although not studied in the /Ai /Ais Hotsprings Game Park per se, tortoises are found in high densities and their biomass measured as the weight of tortoises per hectare can exceed that of many antelope species. In the Addo Elephant National Park, their weight was only exceeded by that of the elephants. They have poor digestion and eat large quantities of plants and as a result their faecal matter are full of undamaged seeds like elephant dung but theirs have a chance of germination since they are deposited in bushes as opposed to the open. This makes them very important ecosystem members for seed dispersal, (Branch, 2008).

3.7.3. Avian Diversity

Namibia with approximately 658 species of birds is considered very small as compared to other areas in Africa especially the equatorial regions with high rainfall and characterized by thick evergreen forests. The avian diversity expected to occur in the study area is indicted in the table below.

Table 3: Bird expected and / or known to occur in the Study Area.

Common Name	**Scientific Name**
Common ostrich	*Struthio camelus*
Southern black korhaan	*Eupodotis afra*
Cape spurfowl	*Francolinus eapensis*
Pied crow	*Corvus albus*
Blacksmith lapwing	*Vanellus armatus*
Namaqua sandgrouse	*Pteroctes namaqua*
Jackal buzzard	*Buteo rufofuscus*
Southern pale chanting goshawk	*Melierax canorus*
Rock kastered	*Falco rupicolus*
Bokmakierie Telophorus zeylonus	*Telophorus zeylonus*
Pale- neinged starlingn	*Onychognathus nabouroup*
White backed mousebird	*Colius colius*
Namaqua done	*Oena capensis*
Ant- eating chat	*Myrmecocichla formicivora*
Cape weaver	*Ploceus capensis*
Cape sparrow	*Passer melanurus*
Yellow canary	*Crithagra flavi ventris*

3.7.4. Mammal diversity in the Richtersveld area, EPL 3218

Namibia harbours about 75 % of the Southern Africa's species richness represented by 250 mammal faunal species (Griffin, 1998), 83 % of generic richness and 98 % of familial richness. 14 % are recognized as endemic mammals. The endemic mammals are characterized by the monotypic Petromurodae and the rodent genera Gerbillurus and Petromyscus. Currently 94 species (38 %) are classified as under or probable threat, 19 species (8 %) are classified as under definite threat. Major threats to mammals are invasive aliens, risk of genetic pollution, habitat alteration etc, (Griffin, 1998).

Winter rains falling in the study area used to attract annual migrations of herds of grazer and browsers from further inland such as springbok, hartebeest, wildebeest, eland and zebra but most of them are now restricted to conservation areas of Botswana, (Manning, 2008). The area's resident mammals comprise mostly of smaller species of rats, mice, gerbils and other rodents.

Table 4: Larger mammals expected and / or known to occur in the study area.

Common Name	**Scientific Name**
Steenbok	*Raphiceras campestris*
Gemsbok	*Oryx Gazelle*
Rock Dassie, Hyrax	*Procavia capensis*
Suricate	*Suricatta suricatta*
Bat-eard fox	*Otocyon megalotis*
Whislting Rat	*Parotomys spp.*
Hare	*Lepus spp.*
Harmann's Mountain Zebra	*Equus zebra hartmannae*
Klipspringer	*Oreotragus oreotragus*
Leopard	*Panthera pardus*
Chacma baboon	*Papio ursinus*

3.7.5. Amphibian Diversity in the Area

An amphibian is a cold-blooded vertebrate animal of a class that comprises the frogs, toads, newts, salamanders, and caecilians. They are distinguished by having an aquatic gill-breathing larval stage followed (typically) by a terrestrial lung-breathing adult stage. A differentiation process called metamorphosis. Amphibians evolved from fish about 350 million years ago. They were the first vertebrate animals to inhabit land and are the ancestors, not only of modern frogs, but also of all reptiles, birds and mammals including human beings, (Carruthers, 2012).

Like most of the species, amphibians are decreasing the world over due to various factors including habitat destruction or alteration. Most amphibian species are aquatic and more rivers and streams are drying or becoming intermittent which alters biotic communities significantly as well as the biogeochemical processes of the river, (Thibault Datry, 2014). Research has been focused on perennial rivers for decades with ephemeral or intermittent rivers being neglected. As a result, basic information on habitats and species lists are not always available including here in Namibia and elsewhere.

There are about 4 000 species of amphibians worldwide with just over 200 species known from southern Africa and at least 57 species expected to occur in Namibia. Some authors say Namibia has 50 species of frogs with 3 endemics, (Barbara Curtis, 1998). Griffin (1998a) also put this figure at 50-recorded species and a final species richness of approximately 65 species, 6 of which are endemic to Namibia. All this could be an underestimate due to reasons mentioned earlier-on.

Most amphibians require water to breed and are therefore associated with the permanent water bodies, our study site has two ephemeral rivers cutting through it and are ephemeral becoming very dry the greater part of the year.

It therefore gives an indication of species which are known or may be expected to occur in the study area.

Table 5: List of Amphibian Species that are known / expected to occur in the Richtersveld Area, EPL 3218.

COMMON NAME	***SCIENTIFIC NAME***
Amatola Toad; Karoo Toad; Paradise	*Vandijkophrynus spp.*
Common Platanna; Cape Platanna;	*Xenopus spp.*
Muller's Platanna	
Common River Frog; Cape River Frog,	*Amietia spp.*
Drakensburg River Frog	
Beaded Sand Frog; Cape Sand Frog;	*Tomopterna spp.*
Knocking Sand Frog	
Karoo Caco; Namaqua Caco; Striped	*Cacosternum spp.*
CAco; Mountain Caco; Bronze Caco	

3.7.6. Plant or Flora Diversity

Namibia's vegetation map shows the existence of 3 main vegetation zones (Giess, 1971), deserts, savannas and woodlands. These are made up of 15 vegetation types, 5 of which fall under deserts, 8 under savannas and 2 under woodlands.

Vegetation population and diversity is influenced by climatic factors such as rainfall and temperature as well as substrate / soil and topography. The project area being largely arid, rainfall limits the distribution of plant species.

This has also resulted in sparse and short vegetation in the project environment identified around EPL 3218. Apart from low rainfall. High evaporation rates exceeding rainfall received also stresses biota. Furthermore, rainfall variability from area to area and / or within seasons influence the variable annual cycle of plants significantly. Although rainfall mostly falls over Namibia in summer, the South West area commonly receives rainfall in winter. Fog is also an important water source for plants in this area and the desert in general.

Topography influences plant distribution as well, shaping habitats and microhabitats e.g. mountains and hills serve as traps intercepting rainfall and at the same time protecting plants harsh conditions such as the sun and wind. Plant species that one would not find in less protected areas occur in this biozane. Mountains provide diverse habitats preferred by different species e.g. tops, slopes etc. As a result, mountains and hills are expected to have higher diversity than the surrounding plains, thus the project impacts on plant species will not be on the mountainous areas. The list of higher plants expected or known to occur in the Succulent Karoo biome of the Orange River Area: EPL 3218 and their conservation status, (Curtis, 2009) is attached in Appendix D. Below is a table highlighting sensitive plants identified in the project area.

Table 6: EPL 3218 Major Plant Species Identified

 The *Conophytum calculus*. It grows in rock crevices.	 *Hoodia gordonii* (Bushveld ghaab). The plant grows in a wide variety of habitats and is treasured for its medicinal and de-appetizing properties.
 *Aloe dichotoma* (Quiver tree). It grows in rocky habitats especially on slopes of escarpment and inselbergs.	 *Ruschia muelleri,* grows mainly on rocky substrates and all Ruschia species in Namibia are protected.

<table>
<tr>
<td> 
Zygophyllum prismatocarpum . A shrub that is widely distributed in the succulent Karoo ecosystem and grows on mountains, hill slopes and drainage lines.</td>
<td> 
Sarcocaulon crassicaule (Bushman Candle)</td>
</tr>
<tr>
<td> 
Euphorbia gariepina found on rocky flats and lower rocky slopes.</td>
<td> 
Euphorbia spp. This group of species is listed under CITES Appendix II. Above is the *Euphorbia ephedroides* found on sandy flats and rocky slopes in South Western Namibia.</td>
</tr>
<tr>
<td> 
Dracophilus dealbatus (Mesembryelcanthemaceae). It a protected leaf succulent of the southern Namib and the northern Richtersveld.</td>
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</table>

As mentioned earlier-on in this chapter the study area is a national and global biodiversity heritage site endowed by rich diversity of plant life, dominated by succulents. Figure 6 shows

that the project area lies in a highly sensitive biodiversity area of /Ai-/Ais Hot Springs Game Park, which happens to be Africa's largest natural gorge, some of the world's oldest rock paintings, one of the richest botanical hot spots on earth and Namibia's most popular hiking trail. Figure 12 below illustrates the location of the EPL and the Biodiversity importance map within the /Ai-/Ais Game Park.

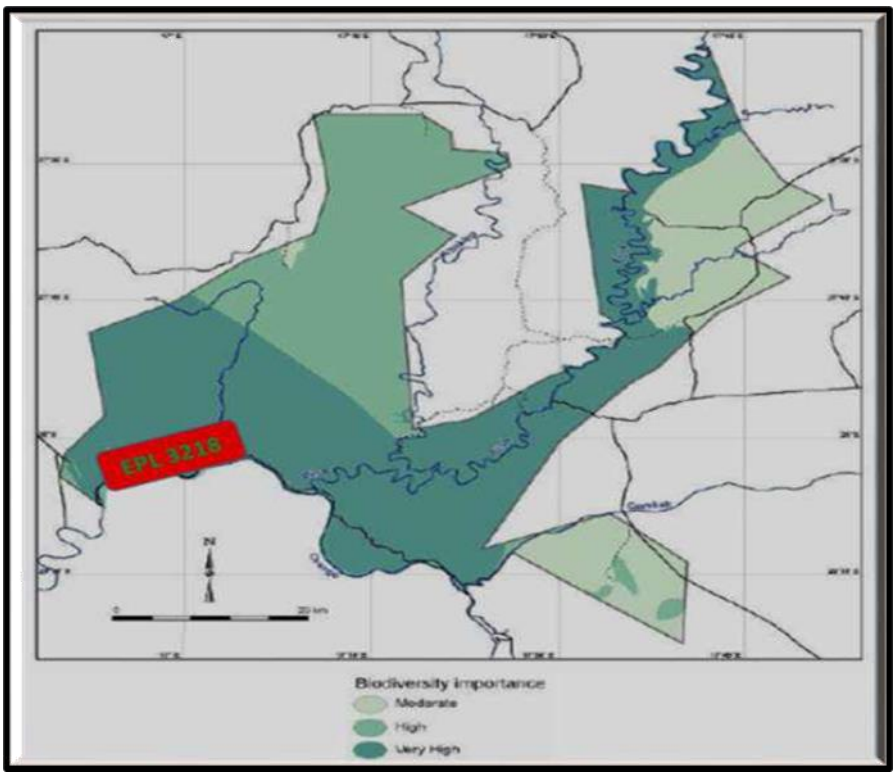

Figure 14: /Ai-/Ais Hot Springs Game Park Biodiversity Importance Map

3.7.7. Current Impacts of Mining on Fauna and Flora

Proposed on EPL 3218 is mineral exploration activities, however within the project area there is evidence of severe damage caused by mining in the past. It indicates to the fact that EIA studies should be thorough and be supported by stricter measures to ensure compliance to proposed mitigation measures, EMP implementation and rehabilitation plan. Although environmental damage is not visible from the southern end along the road, old plant works, access roads and pits scarring the landscape are very distinct from the northern side facing south of the mining area. During the field visit it was found that all the terraces were at least sampled or mined in the past. However no attempt to rehabilitate the area was done at all.

It is evident that due to topographical variations, the affected terraces formed different habitats harboring different forms of life. As a result, they were affected differently. If we make reference to (Burke A. , 2012), a total of fourteen terrestrial and aquatic biotopes were mapped along the Orange River, but of course not all of them are found in the study area. A biotope is defined as an area of uniform environmental conditions providing a living space for a specific assemblage of plants and animals, the subject of which is a biocoenosis or a biological community. The sampled and mined areas were overlaid on the biotopes to show the affected areas.

“Area 2 and Area 5 of the mining area indicated on figure r” on the map covers the riverine area which is very important ecologically was disturbed almost entirely except on the western side of the EPL. The Boom River area, which is much bigger spatially have at least 4 sample pits that where never rehabilitated. “Area 3” has at least 4 pits identified, with one on the south western end of the EPL showing signs of recolonization by natural indigenous succulent plant species. This area shows evidence of foot hill mining visible along the road along the Orange River. “Area 3” is a flood plain adjoined to a wide drainage line running from the mountains in the middle of the EPL. It is sandy and has many grasses and a few salt points where game feeds and leeks salts on the extreme eastern side adjoining areas ‘2’ and ‘1’. “Areas 4 and 5” were heavily damaged due to sampling and mining destroying the hill tops, western slopes with access roads cutting through. Below are drone images illustrating the mining areas that are mostly affected as of now.

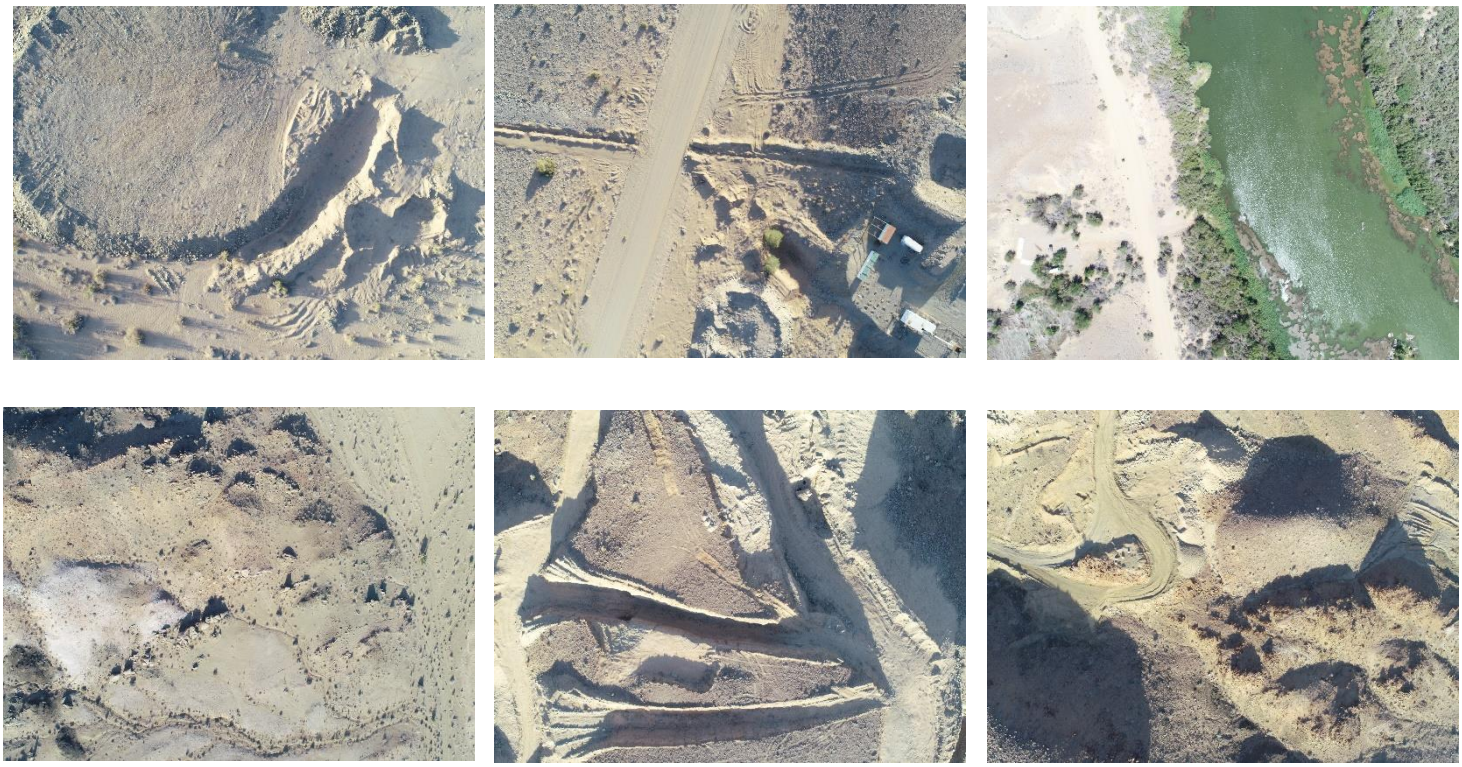

Figure 15: Image series of the unrehabilitated historical mining activities on EPL 3218

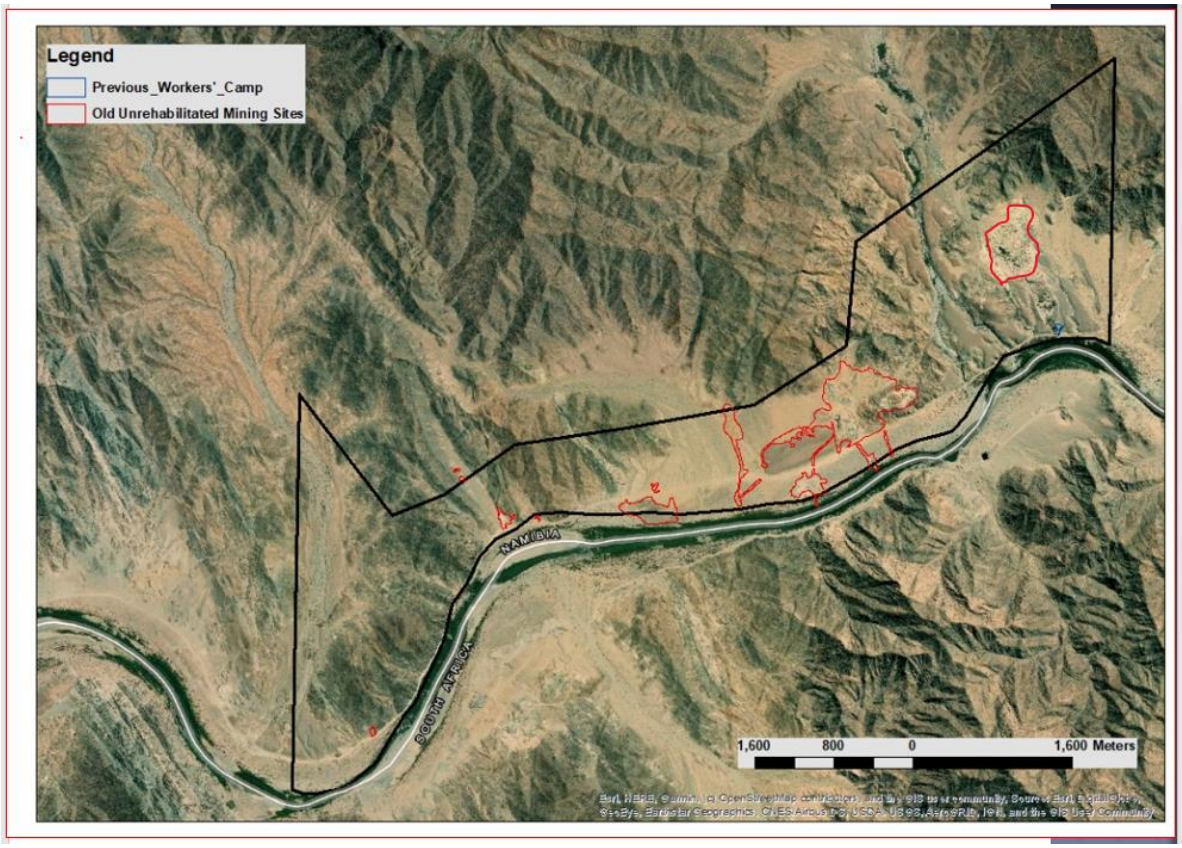

Figure 16: Some of the identified unrehabilitated damaged areas. Source: Own Map

4. CHAPER FOUR: PUBLIC CONSULTATION

4.1. Overview

The public consultation process forms an important component of the Environmental Assessment process. It is defined in the EIA Regulations (2012), as a "*process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters*" (S1). Section 21 of the Regulations details steps to be taken during a given public consultation process and these have been used in guiding our process.

Formal public involvement has taken place via public consultations and focal meetings, newspaper announcements to inform the public that such a large-scale project is under consideration. The public consultation process has been guided by the requirements of Environmental Management Act (EMA) No. 7 of 2007 and the process has been conducted in terms of regulation 7(1) as well as in terms of the EMA Regulations of GN 30 of 6 February 2012 and the World Bank EIA standards and project ToR.

Its overriding goals have been to ensure transparency in decision making and to.

- Ensure stakeholder concerns are incorporated in project design and planning;
- Increase public awareness and understanding of the project and
- Enhance positive development initiatives through the direct involvement of affected people.

The objectives of the public participation are to build credibility through instilling integrity and of conducting the EIA, Educate the stakeholders on the process to be undertaken and opportunities for their involvement and build stakeholders by establishing an agreed framework accordingly. This requires accessible, fair, transparent and constructive participation at every stage of process. Inform stakeholders on the proposed project and associate issues, impacts and mitigation and using the most effective manner to disseminate information.

In this section of the report, the results of consultations with various classes of stakeholders are summarized. The results of consultations with other stakeholders and community members who took part in this EIA are attached as Appendices.

The consultation was facilitated through the following means:

- A Background Information Document (BID) containing the project description, the EIA process and an invitation to participate was shared with stakeholders and community members.
- Invitation to participate notices were published in the local newspapers (New Era and Windhoek Observer) as shown in Table 6 below and Appendix A of this document.
- Announcement of EIA process verbally in the common public meeting points.
- Placement of a public notice at the project site and in Rosh Pinah.

Table 7: Details of public notification of the EIA study

Method	Area of Distribution	Language	Date Placed
New Era	Country Wide	English	04 September 2020 11 September 2020
Windhoek Observer	Country Wide	English	04 September 2020 11 September 2020
Site notices	Project site	English	01 September 2020
	Rosh Pinah	English	01 September 2020
Public Meeting	Online Zoom Meeting	English	14 September 2020

- *Key Stakeholder Engagement*

Due to the fact that the mining area does not have communities or residents within the EPL area or around the area, a Public Meeting was not planned. However, due to te nature of the project location and sensitivities, an Online ZOOM meeting was prepared for. In addition, all stakeholders were notified through the Notices and Newspapers and they could comment on the email platform. Proof of public consultation is given in Appendix A of this document as well the key comments from the stakeholders.

- ***Identification of Interested and Affected Parties (I&APs)***

The EIA team identified and consulted the following I&APs & key stakeholders for the proposed project:

- Ministry of Environment, Tourism and Forestry,
- /Ai-/Ais-Richtersveld Transfrontier Park,
- Sperrgebiet National Park.

Other I&APs were allowed to register to the EIA team and compiled a database containing their names and correspondence details. The registration was accomplished over a period of 21 days.

- ***Consultation with Stakeholders***

Experts in relevant fields, leaders of thought in environmental matters have been consulted for their opinions on issues relating to the potential ecological and socio-economic impacts of the proposed project.

Table 8: Key findings of the public consultation process:

SUMMARY OF ISSUES	
THEME	**ISSUE**
Economic	• Employment of general labour must consider employing local people from Rosh Pinah and Karas Region. • The company must take the social responsibility • Improve the life being of the employees and Park welfare.
Health and Safety	• Potential air, noise and water pollution due to development. • The company must provide enough health care to employees
Ecological	• Strict compliance to the EMP • Ensure that there is quarterly environmental Reports to MET and to the Parks management bodies. • Conservation of fauna and flora.
Hydrology	• Pollution of groundwater and surface water should be prevented and continuous monitoring every quarter should be conducted.
Communication	• Clear communication needs to be promoted between the proponent and park authorities

4.2. Printed Media

4.2.1. Background Information Document

A Background Information Document (BID) was drafted at the onset of the EA process to act as a useful information handout about the proposed mineral exploration activities. In addition, the BID provided details on the public consultation process with contact details for further information. This document was advertised for availability through various means of newspaper articles, Public meeting and electronic mail.

4.2.2. Newspaper Advertisements & Articles

Newspaper notices about the proposed project and related EA processes was circulated in two newspapers for two weeks. These notices appeared in the “Windhoek Observer” and “New Era” newspapers, shown in Appendix B.

4.2.3. Building a Stakeholder Database

A stakeholder database for the project collected through a variety of means. During the advertisement of the project (though public notices in local newspapers and site-notices) the list was augmented as Interested & Affected Parties (I&AP) registered and contact information of stakeholders updated, Please refer to Appendix B.

5. CHAPTER FIVE: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

5.1. Overview

The proponent Clear Sn Contracting Services Namibia (Pty) Ltd has committed itself to sustainable mineral exploration through drafting a corrective action plan for all anticipated environmental impacts associated with the project. This is also in line with the Namibian Environmental Management legislation and International best practices mineral exploration and related activities.

The proponent will implement an Environmental Management Plan (EMP) to prevent, minimise and mitigate negative impacts. The environmental management plan is being developed by EnviroPlan Consulting cc to address all the identified expected impacts, the plan will be monitored and updated on a continuous basis with aim for continuous improvement to addressing impacts.

5.2. Impact Assessment Methodology

An impact assessment matrix was used to assess all possible impacts of the project on the environment. In line with Namibia Environmental Management Act No. 7 of 2007 and the Environmental Impacts Regulations (GN 30 in GG 4878 of 6 February 2012) with the direction on impacts analysis the following impact assessment criteria was identified by the team and deemed suitable.

Table 9: Impact Screening Criteria

Aspect	Description
Nature	Focuses on the type of effect that the project will have on environmental components. Addresses questions related to "what will be affected and how?"
Extent	Spatial extend of the project and anticipated spatial extend of impacts indicating whether the impact will be within a limited area (on site where construction is to take place); local (limited to within 15km of the area); regional (limited to ~100km radius); national (extending beyond Namibia's boarders).
Duration	This looks at the temporal issues pertaining to time frames e.g., whether the impact will be temporary (during construction only), short term (1-5 years), medium term (5-10 years), long term (longer than 10 years, but will cease after operation) or permanent.
Intensity	Establishes whether the magnitude of the impact is destructive or innocuous and whether it exceeds set standards, and is described as none (no impact); low (where natural/ social environmental functions and processes are negligibly affected); medium (where the environment continues to function but in a noticeably modified manner); or high (where environmental functions and processes are altered such that they temporarily or permanently cease and/or exceed legal standards/requirements).
Probability	Considers the likelihood of the impact occurring and is described as uncertain, improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of prevention measures).
Significance	Significance is given before and after mitigation. Low if the impact will not have an influence on the decision or require to be significantly accommodated in the project design, Medium if the impact could have an influence on the environment which will require modification of the project design or alternative mitigation (the route can be used, but with deviations or mitigation) High where it could have a "no-go" implication regardless of any possible mitigation (an alternative route should be used).

The application of the above criteria will be used to determine the significance of potential impacts using a combination of duration, extent, and intensity/magnitude, augmented by probability, cumulative effects, and confidence. Significance is described as follows:

Table 10: Impact Significance Rating Criteria

Significance Rating	Criteria
Low	Where the impact will have a negligible influence on the environment and no modifications or mitigations are necessary for the given development description. This would be allocated to impacts of any severity/ magnitude, if at a local scale/ extent and of temporary duration/time.
Moderate	Where the impact could have an influence on the environment, which will require modification of the development design and/or alternative mitigation. This would be allocated to impacts of moderate severity/magnitude, locally to regionally, and in the short term.
High	Where the impact could have a significant influence on the environment and, in the event of a negative impact the activity(ies) causing it, should not be permitted (i.e. there could be a 'no-go' implication for the development, regardless of any possible mitigation). This would be allocated to impacts of high magnitude, locally for longer than a month, and/or of high magnitude regionally and beyond.

5.3. Impact Assessment

By subjecting each of the potential impacts to the matrix above, the EIA team established the significance of each impact prior to implementing mitigation measures and then after mitigation measures have been implemented. Some of the mitigation measures are mentioned but detailed descriptions of management actions are contained in the accompanying EMP.

Table 11: Environmental impact assessment matrix for the proposed Mineral Exploration activities

Environmental Impact	Element	Impact	Phase	Duration	Magnitude	Extent	Type	Probability	Significance
TOPOGRAPHY	Topography and Landscape	Alternation of existing topography	Exploration	Short term	Low	Local	Direct	Probable	Low
	Topography and Landscape	Topographic changes and Visual Impact from overburden material.	Exploration	Medium term	Moderate	Local	Direct	probable	Moderate
SOILS	Soil	Loss of usable topsoil material	Exploration	Long term	Low	Local	Direct	Highly probable	Moderate
	Soil	Contamination to soil from waste disposal	Exploration	Long term	Moderate	Local	Direct	Improbable	Low
LAND CAPABILITY	Socio Economic Activities	Land utilisation for the benefit of the people	Exploration	Long term	High	National	Indirect	Probable	Moderate
	Terrestrial ecology and biodiversity	Decreased in vegetated land (biodiversity zones) within the Exploration zones	Exploration	Long term	Low	Local	Direct	probable	Low
	Groundwater quality	Groundwater source and soil may be polluted vehicular movements, mineral exploration excavation work, etc.	Exploration	Short term	High	Local	Direct	probable	Moderate

	Surface water quality	Increased sediment load into the nearby rivers from exposed surfaces	Exploration	Short term	Low	Local	Direct	Probable	Moderate
	Surface water quality	Stormwater generation from, the large open surface area may create stormwater which may result in pollution.	Exploration	Long term	High	Local	Direct	Highly Probable	Moderate
	Surface water quality	Increase in surface water run- off from a large open surface area on site because of vegetation removal	Exploration	Short term	Moderate	Local	Direct	Improbable	Low
AIR QUALITY	Air Quality	Generation of dust during excavation and camp site construction.	Exploration	Short term	Low	Local	Direct	Probable	Moderate
	Noise Pollution	Generation of dust during excavation work and camp site construction.	Exploration	Long term (operation)	Low	local	Direct	Probable	Low
	Topography and Landscape	Visual impacts due to use of unsustainable disposal methods	Exploration	Long term	Low	Local	Direct	Probable	Moderate
	Terrestrial ecology and biodiversity	Loss of habitat, and clear or damage to vegetation	Exploration	Long term	Moderate	Local	Direct	Probable	Low
FAUNA	Terrestrial ecology and biodiversity	Loss of habitat and clearing or damage to vegetation	Exploration	Short Time	Moderate	Local	Direct	Highly Probable	High

FLORA	Terrestrial ecology and biodiversity	Proliferation of invasive species Establishment of bush encroachers in disturbed areas.	Exploration	Long Term	Low	Local	Direct	Probable	Low
	Terrestrial ecology and biodiversity	Illegal collection of firewood	Exploration	Long Term	Low	Local	Direct	Probable	Low
	Terrestrial ecology and biodiversity	Clearing of land may lead to destruction of protected vegetation and loss of biodiversity. Loss of mature and protected tree species due to clearing of land for parking space.	Exploration	Short Term	Moderate	Local	Direct	Highly Probable	Moderate
	Terrestrial ecology and biodiversity	Uncontrolled/accidental fires	Exploration	Long Term	High	Local	Direct	Probable	Moderate
	Protected Species damage and or harvesting	Certain areas of ecological importance especially along the river may be affected, and there may be a risk of harvesting of some plant species due to their economic value.	Exploration	Short term	Moderate	Local	Direct	Improbable	Low
Socio-economic	Socio Economic Activities	Temporary employment prospects in the area	Exploration	Short Term	Low	Local	Direct	Probable	Moderate Positive
	Socio Economic Activities	Security concerns due to increased number of persons in areas	Exploration	Long	High	Local	Direct	Probable	Moderate Positive

	Socio Economic Activities	Job creation construction workforce	Exploration	Long term	High	Local	Direct	Highly Probable	Moderate Positive
	Socio Economic Activities	Job creation permanent workforce	Exploration	Long term	Moderate	Local	Direct	Probable	Moderate Positive
	Contribution to Local Economy	Employment and local procurement.	Exploration	Long Term	Moderate	Local	Direct	Probable	Moderate Positive

5.4. Risk Analysis

Based on the impacts identified by this study during site visit, process analysis, desk study and stakeholder consultations conducted, an integrated environmental risk analysis was carried out using the DEFRA Guidelines for Environmental Risk Assessment and Management 'Green Leaves III' (latest edition) as well as the international Procedures for best practices.

The risk analysis shows that the project will have some negative impacts on the environment (Biophysical, economic, social and political), it has been also noted that the project will deliver some positive impacts on the receiving environment, as well as on social and economic aspects. In order to prevent or mitigate negative impacts and to increase positive impacts a coordinated project management strategy in form of an Environmental Management Plan will be put in place taking into cognisance environmental issues associated with the project implementation.

6. Conclusion, Recommendations and Action Plan

6.1. Conclusion

The proposed activity, the prospecting and exploration of precious stones on EPL3218 has potential negative environmental impacts. The evaluation recommends that with specified mitigation and monitoring, the project will have no significant environmental impacts (minor negative impacts). The targeted sampling areas were previously mined but left unrehabilitated. The identified impacts, mitigation and monitoring activities, indicators, responsible parties and monitoring frequency are indicated in the EMP. The EMP should form the obligatory conditions upon which the EIA clearance certificates will be issued and non-compliance attracts prosecution. The EMP should be implemented throughout the project lifecycle. Environmental monitoring and performance evaluations should be conducted and targets for environmental improvement set and monitored throughout the project lifespan. It is also our determination that the findings should be incorporated earlier in the planning phase and includes the Contractor's environmental obligations in the Contractual agreement conditions for the prospecting and exploration.

6.2. Recommendations

- The Proponent is advised to contact the National Botanic Research Institute to facilitate relocation of any protected plant species should they encounter on any of their target areas on EPL3218.
- The proponent is advised to do its best by compilation of quarterly reports in the event that this project has been authorized by the Environmental Commissioner.
- The EIA clearance will not exempt the Proponent from obtaining other relevant permits and should do as such. This includes permit to abstract water, clearing of land, and mining issued by MAWF, METF and MME respectively.

6.3. Action Plan and / or Way Forward

The report will be submitted to METF: DEA. The decision made by METF: DEA will be made known to the Proponent and I&APs.

7. References