ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROSPECTING OF PRECIOUS STONES ON EPL 3218 IN KARAS REGION

FOR

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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 Practitioners
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 Plan Report
GHG	Greenhouse Gasses
ISO	International Organization for Standardization
I&Aps	Interested and Affected Parties
MET: DEA	Ministry of Environment and Tourism's 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 Management Plan

This Environmental Management Plan follows on environmental flaws associated with the proposed mineral prospecting and exploration project, which were identified through the Environmental Impact Assessment. 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 Management Plan (EMP) for this proposed activity should be effectively implemented by the client, in order to ensure that adverse environmental impacts are mitigated and kept under control.

The framework within which this EMP is developed includes identifying various activities, their occurrence in the prospecting and exploration processes and the likely impacts that are associated with those activities.

It is therefore necessary to subcategorize the EMP into the mineral prospecting and exploration activities. The first category of the EMP which deals with project activities identified and highlight the activities' potential impacts and the respective phases they are likely to occur. In this respect, this EMP alludes to the planned ore excavation for bulk sampling activities and the mitigation measures needed to reduce or minimize potential negative on the surrounding environment. This will also include rehabilitation measures that will need to be implemented once the prospecting and exploration results do not warrant further development into a mine.

ii. EMP PRINCIPLES

The following principles have informed the compilation of this environmental management Plan:

- The environment is considered to be composed of both biophysical and social components.
- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Development must be socially, environmentally and economically sustainable.
- Mineral exploration, in general, is a disruptive activity and all due consideration must be given to the environment, particularly the social environment, during the execution of the project to minimize the impact on the affected parties.
- Minimization of areas disturbed by prospecting and exploration activities will reduce the severity of the prospecting and exploration related environmental impacts and reduce rehabilitation requirements and costs.
- As minimum requirements, relevant standards relating to international, national, regional and local legislation, where applicable, shall be adhered to. This includes

requirements relating to waste emissions (e.g. hazardous, airborne, liquid and solid), waste disposal practices, noise regulations, road traffic ordinance etc.

- Reasonable measures to avoid pollution and environmental degradation are to be provided for.
- The costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling, or minimizing further pollution, environmental damage or adverse health effects must be paid for by the person responsible for harming the environment.
- The responsibility for the environmental, health and safety consequences of the proposed development exists throughout its life cycle

1. CHAPTER ONE: BACKGROUND

1.1. Introduction

The applicant, Clear Sun NAFRIP Mining (Pty) Ltd (CSNM) planning to prospect and explore 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 if sufficient quantities of minerals are realised.

Mineral Prospecting and Exploration 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 prospecting and exploration activities should undergo an environmental impact assessment process and obtain and Environmental Clearance Certificate (ECC) before the activities can be carried out.

Table 1: Listed Activities relevant to the project

ACTIVITY	RELEVANT SECTIONS
MINING AND QUARRYING ACTIVITIES	- 3.1 The prospecting and exploration 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 prospecting and exploration activities on EPL 3218, Outrun Consultants was appointed by CSNM to conduct an Environmental Impact Assessment (EIA) to develop an Environmental Management Plan (EMP) for the undertaking of mineral prospecting and exploration activities and to support the application for an Environmental Clearance Certificate from the Directorate of Environmental Affairs (DEA) under the Ministry of Environment, Tourism and Forestry (METF)-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:

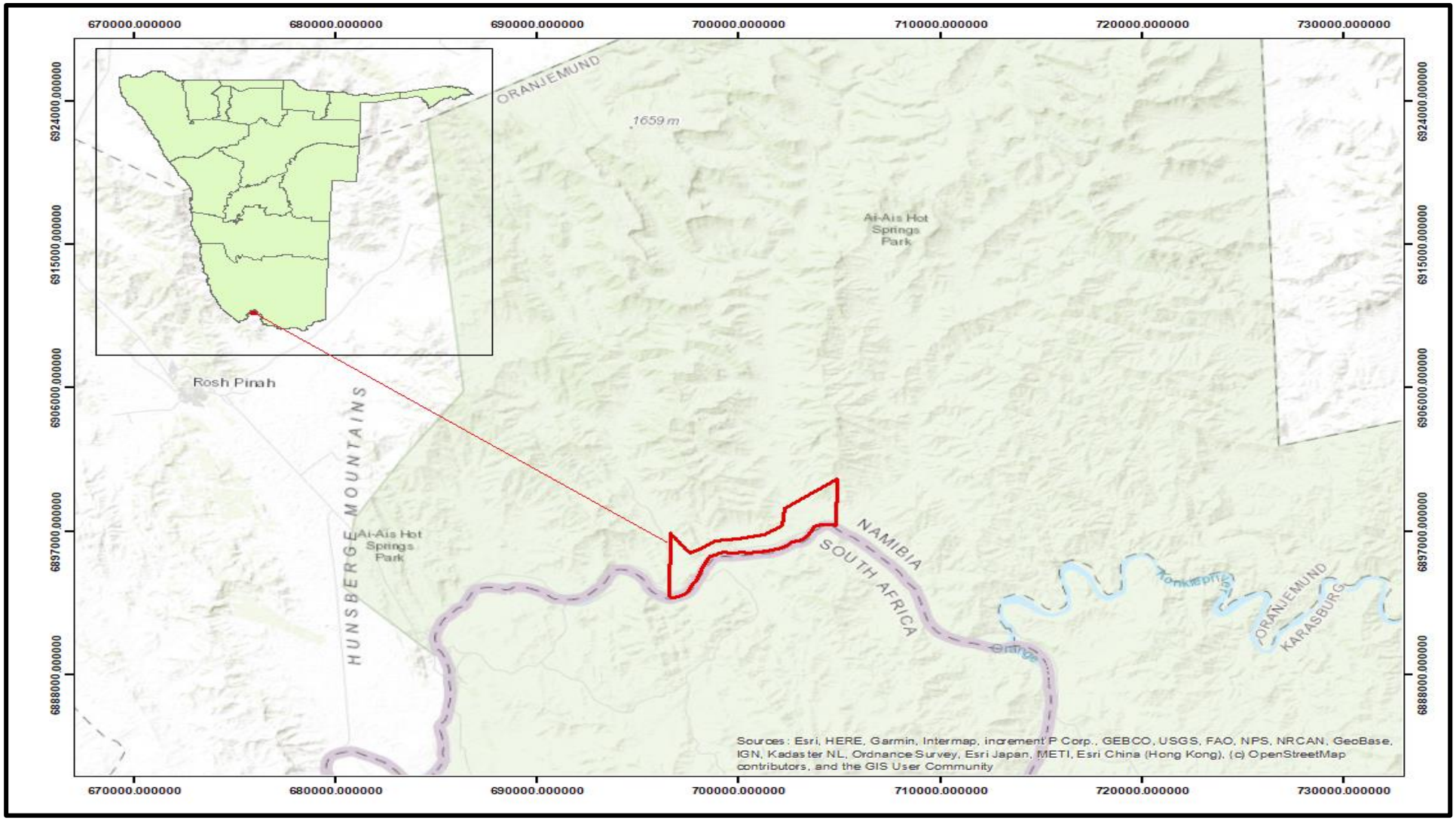

Figure 1: EPL 3218 locality

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 prospecting and exploration 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.

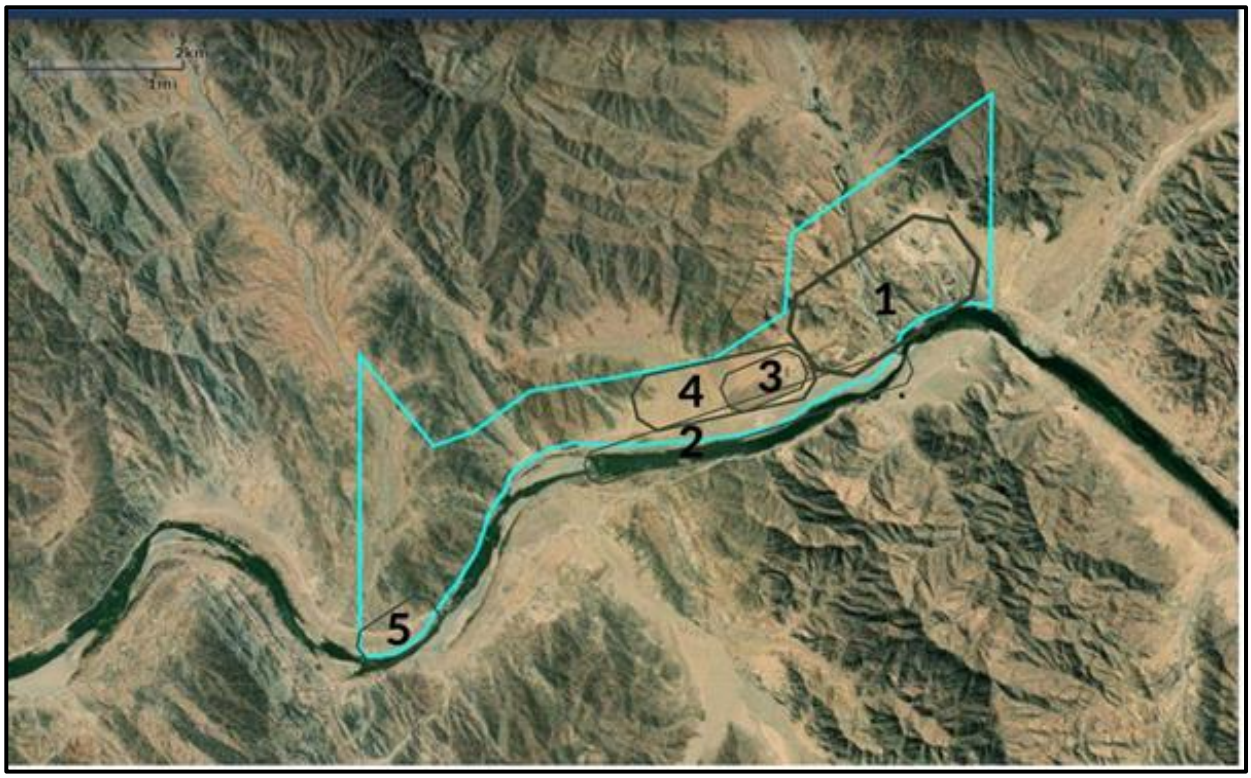

Figure 2: Targeted Exploration areas on EPL 3218

1.4. Technology and Exploration Approach

1.4.1. Selection of excavation method

Areas 1, 2, 3 & 5: Taking into consideration sizes of the target area, depth of the gravel deposits and a possibility of barren gravel dumps located in immediate proximity to be 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 930,00m^2 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 3m3 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 $3m^3$ 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 $3m^3$ 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 ($3m^3$) – 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 mine access road. Source: Own photograph.

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: Abandoned equipment on the ore recovery site on EPL3218.

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.

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, prospecting and exploration 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).	– This Act and its regulations should inform and guide this EIA process.

		– Details the requirements for what should be included in a Scoping Report (GN No 30 S8) an EIA report (GN No 30 S15).	
	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 prospecting and exploration 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 Act 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	– The proposed Mineral exploration operations will ensure that all possible “hazardous” categorised substances

		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"	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 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.	– Because the proposed activities are to be conducted in a protected area, there is need to ensure that the Parks and Wildlife management bill is taken into consideration with great emphasis and compliance.

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 MAWLR 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 were applied for and a valid water abstraction permit is annexed at the end of this report. – Pollution prevention mechanisms will be also put in place.
Health and Safety	Labour Act (No 11 of 2007) in conjunction with Regulation 156, 'Regulations Relating to the Health and Safety of Employees at work'.	– 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 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.	– The proponent will employ several people from the local and shall ensure securing a safe environment and 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 and Energy (MME)-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 and other relevant policies to develop a sustainable mining industry.	– The fact that mining involved extraction/interaction with the natural resources, environmental responsibility will be ensured by the 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)	– Although the project will not directly affect the major roads, the ore carrying trucks will at some point use the major roads.

		– Infringements and obstructions on and interference with proclaimed roads. (S37.1) – Distance from proclaimed roads at which fences are erected (S38)	– 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: ENVIRONMENTAL MANAGEMENT PLAN (EMP)

3.1. Introduction

This section is describing the Environmental Management Plan (EMP) for the proposed exploration activities. The EMP stipulates the management of environmental programs in a systematic, planned and documented manner. The EMP below includes the organizational structure, planning and monitoring for environmental protection at the proposed development and other areas of its influence. The aim is to ensure that the facility maintains adequate control over the project operations to:

- To prevent negative impacts where possible;
- Reduce or minimise the extent of impact during project life cycle;
- Prevent long term environmental degradation.

3.2. EMP Administration

There is a strong need to clearly outline the roles and responsibilities of all stakeholders to ensure that the EMP is fully implemented. There is also a need for the proponent to appoint an overall responsible person (project manager) to ensure the successful implementation of the EMP as highlighted below:

Table 3: Roles and Responsibilities in EMP Implementation

ROLE	ENVIRONMENTAL RESPONSIBILITIES
Clear Sun NAFRIPP Mining (Pty) Ltd (CSNM)	Responsible to enforce EMP implementation to contractors
Environmental Control Officer	Implement, review and update the EMP. • Ensure all reporting and monitoring required under EMP is undertaken, documented and distributed as needed • Conduct environmental site training (tool box talks) and inductions with the support of an environmental consultant. • Conducts environmental audit at work site with the support of environmental consultant. • Close out all non-conformances. • Ensure materials being used on site are environmentally friendly and safe.
The Department of Environmental Affairs	Approve the EMP and any amendments to the EMP. • Approve reports of environmental issues and non-conformances as issued. • Review and approve environmental reports submitted as part of EMP implementation
Project Manager/ Geologist	Control and monitor actions required by the EMP. • Report all environmental issues to HSE Manager. • Ensure documented procedures are followed and records kept on site. • Ensure any complaints are passed onto the management within 24 hours of receiving the complaint.
Employees	Follow requirements as directed by site engineers. • Report any potential environmental issues to site engineer/project manager, indicating spilt oil, excess waste, excessive dust generation, dirty water running off the site and other possible non-conformances

Table 4: Camp set up and Exploration Operations

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
Ensure exploration contractors are aware of the required management measures stipulated in the EMPr.	1)	This EMP must form part of the contractual agreements with the specific exploration contractors.	Once Off	Project Manager	ECO	Prospecting and Exploration
Ensure all exploration staff is familiar with the Environmental awareness Plan.	2)	-The contractor is expected to have safety "tool box" talks in accordance with the risks and trends associated with the project. Proof of these talks shall be kept on site.	Daily	Contractor	ECO	Prospecting and Exploration
	3)	- The contractor will develop a specific emergency procedure and plan.	Once Off	Contractor	ECO	Prospecting and Exploration
Increase employment Opportunities.	4)	Labour (skilled and unskilled) and contractors employed for the proposed project should be sourced locally.	Once Off	Contractor	Project Manager	Prospecting and Exploration
	5)	Local business will be used where unskilled labour is required. Reputable local business will be used where available.	Once Off	Contractor	Project Manager	Prospecting and Exploration
Minimise the impact on surrounding land uses and employees due to dust emissions.	6)	-Exploration and prospecting and exploration dust must be contained in the processing plant area, such that it does not affect neighbouring land uses	Continuous	Project Manager	Project Manager	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
	7)	Excavation overburden should be stockpiled in a way that minimise dust pollution to working areas and mine camp, in relation to wind direction.	Continuous	Project Manager	Project Manager	Prospecting and Exploration
Minimise the potential exposure of employees and neighbouring operations to diseases.	8)	-Dust suppression and provision of PPE will be prioritised to prevent dust related illnesses such as Bronchitis. -Prior to employment, employees should be medically tested for fitness.	When Required	Project Manager	Project Manager	Prospecting and Exploration
	9)	Clean overalls, gumboots and face protection PPE will be provided for.	Continuous	Project Manager	Project Manager	Prospecting and Exploration
	10)	Workers should be adequately trained to follow all safety procedures and wear protective equipment provided.	Once Off	Project Manager	Project Manager	Prospecting and Exploration
Minimise the impact of migrant workers and possible crime increase.	11)	No recruitment “at the gate” will be allowed.	Daily	Contractors	Project Manager	Prospecting and Exploration
Reduce misconduct by employees on site.	12)	No alcohol /drugs are permitted on the exploration campsite.	On going	Contractor, Employees	Project Manager	Prospecting and Exploration
	13)	Each contractor will employ their own Safety Officer to monitor the safety conditions during the exploration phase.	Daily	Employees/Contractor	ECO	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
	14)	No unauthorised ignition sources will be permitted on site and debris/waste shall not be burnt under any circumstances.	Daily	Employees/Contractor	ECO	Prospecting and Exploration
	15)	All provisions of the Labour Act Nr 11 of 2007 in conjunction with Regulation 156, 'Regulations Relating to the Health and Safety of Employees at work' must be complied with	On-going	Employees/Contractor	ECO	Prospecting and Exploration
Prevent the loss of soil resources as a result of soil stripping.	16)	The excavation footprint will be restricted to the marked working areas and unnecessary disturbance will be minimised.	On-going	Employees/Contractor	ECO	Prospecting and Exploration
	17)	Topsoil stripped will be stockpiled and reused for rehabilitation purposes following exploration completion.	On-going	Contractor	ECO	Prospecting and Exploration
	18)	All excavations will be backfilled with sub soil and topsoil in the reverse order to which the soil profiles were removed.	On-going	Contractor	ECO	Prospecting and Exploration
Prevent sterilisation of soils as a result of hydrocarbon / chemical / waste contamination.	19)	No foreign matter such as rubble, waste or hazardous material will be mixed with the topsoil or used to backfill excavation.	On-going	Contractor	ECO	Prospecting and Exploration
	20)	Spills will be cleaned up immediately after the incident. Contaminated soil will be disposed of as hazardous waste at a licensed hazardous landfill facility.	On-going	Contractor	ECO	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
	21)	Drip trays or a Polyvinyl chloride (PVC) lining shall be provided for equipment utilising hydrocarbons.	On-going	Contractor	ECO	Prospecting and Exploration
	22)	No waste will be buried or burned on site, unless authorised or approved by relevant authorities.	On-going	Project Manager	Project Manager	Prospecting and Exploration
	23)	Under no circumstances may open areas or the surrounding vegetation be used as toilet facilities. Temporary toilets should be provided for at all times.	On-going	Project Manager	Project Manager	Prospecting and Exploration
	24)	Toilets, permanent or portable/temporary, shall be maintained in a hygienic state and serviced regularly. Portable toilets, should they be required, should be serviced by a reputable contractor and the contents shall be removed to a licensed disposal facility.	On-going	Contractor	Project Manager	Prospecting and Exploration
Prevent contamination of surface water resources and onsite erosion as a result of contained runoff.	25)	No project infrastructure will be located within the 1: 100year flood lines or within 100 m of any perennial tributaries.	On-going	Project Manager	Project Manager	Prospecting and Exploration
	26)	The development footprint will be landscaped in order to prevent pooling of water.	On-going	Project Manager	ECO	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
Prevent the pollution of the surrounding environment as a result of waste generation, incorrect waste disposal and housekeeping.	27)	Waste will be sorted at source.	Daily	Employees/ Contractor	ECO	Prospecting and Exploration
	28)	Waste receptacles will be kept closed at all times when not in use.	Daily	Employees/ Contractor	ECO	Prospecting and Exploration
	29)	Littering on site is forbidden and the site must be cleared of litter at the end of each working day.	Daily	Employees/ Contractor	ECO	Prospecting and Exploration
	30)	Wastewater Ponds should be lined and compacted according to acceptable guidelines and prevention of groundwater and or surface water pollution should be prioritised at all times.	On-Going	Employees/ Contractor	ECO/ Project Manager	Prospecting and Exploration
	31)	Waste will not be stored for a period exceeding 90 days Or volumes exceeding 100 cubic metres.	Weekly	Employees/ Contractor		Prospecting and Exploration
	32)	Waste generated on the proposed site should be collected by authorised waste contractors and frequently disposed of at a licensed landfill site as the last resort. Recycling/reuse of waste should be enforced where feasible.	Weekly	Employees/ Contractor	ECO/ Project Manager	Prospecting and Exploration
Prevent the impact on water and soil resources through the accidental spillage or leakage of	33)	Wastewater Ponds should be spill proof and regularly maintained to ensure that they do not pose risk to nearby waterways and groundwater.	On-Going	Employees/ Contractor	ECO/ Project Manager	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
waste or the incorrect storage/handling of hazardous substance.	34)	Cleaning of equipment/vehicles should be done in a designated area to prevent soil and water pollution.	Weekly	Employees/ Contractor	ECO/ Project Manager	Prospecting and Exploration
	35)	Remediation of spillages must be conducted as far as practically reasonable.	On-Going	Employees/ Contractor	ECO/ Project Manager	Prospecting and Exploration
	36)	When mortar is used on site, the following guidelines apply: - Carefully control all on-site operations that involve the use of mortar and concrete; - Limit mortar mixing to single sites where possible; - Use plastic trays or liners when mixing mortar and concrete: Do not mix mortar and concrete directly on the ground; - Dispose of in the approved manner	Daily	Employees/ Contractor	ECO/ Project Manager	Prospecting and Exploration
Prevent possible sedimentation of water resources as a result of runoff from cleared areas.	37)	No alterations to banks or beds of watercourses are allowed (a dry gully is also recognized as a water course);	On-going	Contractor/Employees	ECO	Prospecting and Exploration
	38)	Stockpile will be shaped to divert storm water around the site to minimise soil erosion of the site as well as to prevent the contaminated water runoff.	On-going	Contractor	ECO	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
Ensure conservation of Flora and vegetative plant species	39)	**Translocation of plants** The study area may have the following vegetation *protected species* plants. As these are charismatic species of high conservation importance, transplanting trials would be a very valuable exercise enabling the proponent to demonstrate its commitment to biodiversity conservation. The exploration areas were marked, and they fall on the previously mined areas. We recommend translocation of the secondary specimens that are recolonizing the area to a suitable site selected for a transplant trial. Involvement of the National Botanical Research Institute would be essential to obtain permits and relevant expertise.	On-going	Proponent	ECO	Prospecting and Exploration
	40)	Design footprints of all facilities to be as small as is practically possible and restrict unnecessary collateral damage. • Mark out all exploration footprints and clearly convey the rule of staying inside these boundaries to all prospecting and exploration crews; make environmental management of prospecting and exploration an explicit part of	On-going	Proponent	ECO	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		contractors contracts with non-performance linked to a meaningful penalty clause. Hold main contractor responsible for all transgressions of subcontractors. • Use existing mine pits as far as possible. Clearly mark the access tracks to be used, and designate turning points. •Try to use previously damaged areas for installation purposes. Avoid marble, granite and pegmatite ridges and drainage lines as much as possible. •Unavoidable exploration activities at such landscape features should be conducted as carefully as possible.				
	41)	No new land clearances should be realised if there is possibility of using existing mine pits.	On-going	Contractor/Employees	ECO	Prospecting and Exploration
	42)	The exploration contractor must provide written communication to the Park authorities before exploration begin, and they should develop a Solid waste and pollution prevention Plan prior to exploration activities. Furthermore, the maintenance tracks/road must be used whenever possible as it has the	On-going	Contractor/ Proponent	ECO	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		least traffic impact. Speed limits must be enforced on the access roads.				
	43)	• Clearly demarcate access roads. • Educate staff about track control and familiarise them with roads and boundaries of prospecting and exploration area. • Avoid excessive use of water during prospecting and exploration to reduce the attraction to animals.	On-going	Contractor/ Proponent	ECO	Prospecting and Exploration
	44)	• Before exploration begins, the proposed exploration areas should be inspected in collaboration with the ECO, Chief Control Warden for the Game Park for any vegetation. Where possible, the unnecessary destruction of habitat (including vegetation) or degradation of the environment, including the sensitive drainage lines and other vegetated areas, should be avoided. • A Biodiversity Inspection Report should be compiled by the Proponent or an Environmental Practitioner of the biodiversity inspection on the exploration areas.	On-going	Contractor/ Proponent	ECO	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		• Avoid disturbance to sensitive vegetation (Adenia pechuelii, Anacampseros, Lithops ruschiorum and Sarcocaulon marlothii) wildlife (springbok, ostrich). •When disturbance to sensitive vegetation cannot be avoided, rehabilitation (replanting of sensitive vegetation) must be considered. • On-going awareness should be promoted about the value of biodiversity and the negative impacts of disturbance, especially poaching and road kills. At the same time, the need for reporting incidents should be stressed, and reporting procedures clarified. Biodiversity awareness and training must be provided to the contractor before to prospecting and exploration commences. • The contractor is to report all biodiversity (fauna and flora) related incidents in report format and incident investigation must be completed. Report incidents to MEFT and/or Directorate of Forestry. • Anti-poaching measures should be strictly enforced, with zero tolerance, and this should be emphasised during induction to				

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		contractors; prospecting and exploration workers should be under supervision at times to prevent poaching; offenders should be prosecuted.				
Ensure fauna conservation and protection is included in project execution	45)	No new land clearances should an existing mining pit within the working area be available.	On-going	Project manager	ECO	Prospecting and Exploration
	46)	Habitat conservation of both avifauna and terrestrial fauna should be ensured that no modifications to habitats outside of the exploration footprint	On-going	Contractor/Employees	ECO	Prospecting and Exploration
	47)	Marking of more sensitive sections of exploration areas to increase visibility to contractors.	On-going	Contractor/Employees	ECO	Prospecting and Exploration
Prevent possible groundwater contamination as a result of hazardous waste spillage and uncontrolled waste handling.	48)	No equipment or tools with oil or grease is allowed to be placed on bare ground, these must always be placed on a lined surface.	Weekly	Contractor/Employees	ECO/ Project Manager	Prospecting and Exploration
	49)	Cement mixing will take place on a lined surface. No Cement will be mixed on a bare surface.	Weekly	Contractor/Employees	ECO/ Project Manager	Prospecting and Exploration
	50)	No waste will be allowed to be disposed of into excavations.	Weekly	Contractor/Employees	ECO/ Project Manager	Prospecting and Exploration
	51)	Cleared areas will be rehabilitated as soon as these areas are not in use anymore.	Following	Proponent	ECO	Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
			Prospecting and exploration			
Reduce the impact of noise on surrounding land uses and employees.	52)	Prospecting and exploration activities should be restricted to 07:00hrs to 17:00hrs during weekdays and 08:00hrs to 13:00hrs during weekends.	Daily	Contractor/Employees	ECO	Prospecting and Exploration
	53)	Machinery will be kept in good working order to reduce noise emissions.	Daily	Contractor/Employees	ECO	Prospecting and Exploration
	54)	Should noise be problematic, silencers will be fitted to prospecting and exploration vehicles and generators.	Weekly	Contractor/Employees	ECO	Prospecting and Exploration
	55)	Demolish and remove all infrastructure not required post prospecting and exploration.	Following Prospecting and exploration	Contractor/Employees	ECO	Prospecting and Exploration
	56)	Any complaints received must be recorded in the Complaints Register.	Daily	Contractor/Employees	ECO	Exploration
Protect artefacts of cultural or archaeological importance.	57)	If any human remains (or any other concentrations of archaeological heritage material) are exposed during prospecting and exploration, all work must cease and it must be reported immediately to the nearest museum/archaeologist or to	Daily	ECO	Project Manager	Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
		the NHC, so that a systematic and professional investigation can be undertaken				
	58)	Prospecting and exploration workers will be made aware of the requirement to report archaeological discoveries	Weekly	ECO	Project Manager	Prospecting and Exploration
Minimise the impact on the visual character of the surrounding areas by the prospecting and exploration of the plant infrastructure.	59)	Artificial lighting will be restricted to areas under prospecting and exploration. Yellow sodium lights are recommended on site as they do not attract as many invertebrates at night and will not disturb the wildlife.	Once Off	Project Manager	Project Manager	Prospecting and Exploration
	60)	Natural vegetation, wherever possible, must be retained.	On-going	Project Manager	Project Manager	Prospecting and Exploration
	61)	The structures on site must be designed to minimise visual intrusion.	Once Off	Project Manager	Project Manager	Prospecting and Exploration
	62)	The colour selection and tone must be carefully considered to mitigate visual impacts.	Once Off	Project Manager	Project Manager	Prospecting and Exploration
Minimise the safety risks due to increased possibility of crime and safety conditions of employees.	63)	Clear sign boards should be erected at the entrance to the site to indicate that a prospecting and exploration area is being entered and safety precautions should be followed;	Once Off	Contractor/Employees	Project Manager/ECO	Prospecting and Exploration

Objective	No.	Monitoring				Project Stage
		Mitigation and Management Measures	Timeframe	Executing Party	Monitoring Party	
	64)	Notification signs must be posted around the site warning residents and visitors about the hazards around the prospecting and exploration site;	Once Off	Contractor/Employees	Project Manager/ECO	Prospecting and Exploration
	65)	Workers should be adequately trained to follow all safety procedures and wear protective equipment where required;	Continuous	Contractor/Employees	Project Manager/ECO	Prospecting and Exploration
Prevent the impacts resulting from traffic intrusion (Air and Road)	66)	Reduce the number of trucks entering the premises by transporting larger loads;	Continuous	Contractor/Employees	Project Manager/ECO	Prospecting and Exploration
	67)	Speed limits will be restricted on the access road to 10 km/h.	Continuous	Contractor/Employees	Project Manager/ECO	Prospecting and Exploration
	68)	Air traffic intrusion should be avoided through visible towers and a blinking tower light.	Continuous	Contractor/Employees	Project Manager/ECO	Prospecting and Exploration
	69)	The operational footprint will be kept as small as possible. All disturbed areas will be rehabilitated.	Continuous	Project Manager	Project Manager/ECO	Prospecting and Exploration

3.3. Environmental Monitoring Plan

Monitoring component is very important for identifying successfulness of mitigation measures formulated for the significant impacts identified. The monitoring works will identify impacts that have not been foreseen and give enough time to analyse the situation and formulate measures to minimise impact. Survey records and results must be maintained for these monitoring and inspections, highlighting any problems and the measures taken to address it.

Prior to site preparation and exploration activities, the main contractor should be presented with a copy of this environmental management plan (including, *inter alia*, location of exploration camp and toilet facilities, location of material storage areas, solid waste management plan, dust control measures, activity schedule, etc.) and be sure that he is aware and understands the contents and implementation procedure.
The major elements of the environmental impact monitoring programme to be implemented during the prospecting and exploration phase of the project are as follows:

- Mobilization and setup: to ensure that virgin areas are left untouched and that access roads are limited to existing ones only and the camp be on the existing old site.
- Protected plants are relocated before any excavations are done from any sampling point.
- Ensure transportation of earth materials is done by covered trucks and from approved sites.
- The contractor must immediately and completely clean up spills of materials other areas.
- Solid waste disposal practices to ensure appropriate on-site management and final disposal at approved dump.

3.4. External Auditing

The key to a successful EMP is appropriate monitoring and review to ensure effective functioning of the EMP and to identify and implement corrective measures in a timely manner. In the event where discrepancies are identified, the problem must be investigated and attended to. All the results obtained during environmental monitoring must be documented for audit purposes.

An audit of the environmental management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Audits should be conducted during the prospecting and exploration phase of the facility to ensure adherence to the management measures contained in the EMP. The exploration audit schedule will be determined by the conditions of the EMP.

During exploration, audits will also be undertaken by an appointed consultant, in addition, once the Environmental Clearance Certificate is issued, biannual reports should be compiled on environmental performance for the 3-year validity period.

It is imperative to understand that a clearance certificate is valid for 3 years only, after which a renewal will have to be applied for along with performance report over the past years in terms of environmental compliance to existing legislation and this EMP.

3.5. Decommissioning

In terms of EMA it is necessary to consider the environmental impacts of decommissioning of any development, however, the prospecting and exploration program will take place for a short period of time, 3 to 5 years. Thereafter, depending on the results, a mine is planned for further development if the results are good, if not, no further development is planned then the place is closed.

In this study, decommissioning is considered as a separate activity which should be dealt with on its own. The decommissioning of the prospecting and exploration activity would therefore be addressed in a new EIA process to be conducted prior to the site being decommissioned. This section makes recommendations that should be considered in the new EIA process prior to decommissioning.

The Project Proponent should develop a closure plan to be updated on an annual basis commencing at least 1 year prior to the envisaged decommissioning. The closure plan should identify the targets and objectives for closure, and will be important in allowing operations to work toward closure objectives. The Project Proponent should commission specialist inputs from time to time to provide direction on the closure plan to ensure the end result is as closely aligned with prevailing best practice as is possible, thereby minimising the risk and potential costs associated with decommissioning phase. The various stakeholders should also be engaged as early on in the closure planning process to ensure their interests are known and catered for from the point of origin. The exploration phase EMP could be used as a guideline to facilitate the detailed decommissioning phase EMP.

Specific mitigation measures have been recommended for the decommissioning phase of the project and are listed below. It should however be noted that these conditions are subject to change.

3.6. Recommended Mitigation Measures for the Decommissioning Phase

3.6.1. Ecology

The following mitigation measures are recommended from an ecological point of view as part of the closure phase:

- Rehabilitate all areas impacted on by the infrastructure
- Remove all processing or recovery waste; lose temporary tracks, if feasible, and replace the topsoil.

- Re-introduce indigenous vegetation (especially protected species – i.e. Succulents) should form part of the rehabilitation process

3.6.2. Visual

The following mitigation measures are recommended from a visual point of view as part of the closure phase:

- All associated structures and fencing must be removed and recycled as far as possible. Where it is not possible to recycle material, the waste shall be disposed of at a registered landfill site.
- Rehabilitate internal roads that cannot be used by the tourists.
- Rehabilitate and restore all impacted footprint areas as per the requirements of the ecological assessment.
- Rehabilitation of all impacted areas must continue until the state of the vegetation meets the requirements of the ecological assessment and is satisfactory to the ECO.

3.6.3. Socio economic

The following mitigation measures are recommended from a socio-economic point of view as part of the closure phase:

- Maximise the use of local labour on decommissioning activities;
- Provide adequate notification to staff and other stakeholders of the pending decommissioning;
- Provide staff with references so that they can pursue work with other companies;
- If feasible, assist staff in finding employment at other operations.

3.6.4. Surface water

The following mitigation measures are recommended for surface water management as part of the closure phase:

- A decommission plan should address the removal of the infrastructure. Such a plan must address aspects such as monitoring and management of surface water flows and erosion.

4. Conclusion and Recommendations

4.1. Conclusion

The prospecting and exploration for precious stones has negative environmental impacts. The EIA study findings showed negative environmental impacts to the environment to varying degrees depending on the nature of the activity and impacts arising thereof. Management and corrective

measures were formulated and implementation timelines proposed depending on the gravity of threat to human life and the environment.

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 and an Environmental Management System formulated and implemented based on the EIA study findings. 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 and sound SHE policies and supportive programmes implemented.

4.2. Recommendations

Recommendations were developed to guide the Proponent on the key activities that should be done to effectively manage safety, health and environment:

- Give proper induction to the Contractor to avoid unwarranted environmental degradation.
- Provide the Contractor with visual aides to identify protected plants for relocation from site.
- Contractor should contact National Botanic Association for possible relocation of any identified protected plants.
- Develop SHE policies based on the study findings and use impacts evaluation to formulate the objectives.
- Develop and implement Environmental Management Systems.
- Develop an occupational health and safety plan
- Adhere to the environmental management obligations upon which the EIA clearance certificate will be issued by the METF: DEA.
- The EIA clearance will not exempt the Proponent from obtaining other relevant permits and should do as such:
    - Permit to remove protected trees on a portion of the project site.
    - Water abstraction;
    - Connection to the National Grid;
    - Access roads etc.

Provide relevant training to capacitate the workers with knowledge and skills to manage safety, health and the environment.