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Environmental & Social Impact Assessment: Proposed mineral exploration and mining activities on mining claims numbers 72327- 72336, Okasandu farm Witvlei-Omaheke Region -Namibia

Environmental Scoping Report (ESR)

Version-Final 01

16-May-23

DOCUMENT DATA SHEET

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Project Name	Environmental & Social Impact Assessment: Proposed mineral exploration and mining activities on mining claims numbers 72327- 72336, Okasandu farm Witvlei, Omaheke Region -Namibia		
Document Type	Environmental and Social Impact Assessment (ESIA): Environmental Scoping Report (ESR)		
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ACRONYMS

TERMS	DEFINITION
BID	Background Information Document
DR	District Road
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA (R)	Environmental Impact Assessment (Report)
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EPL	Exclusive Prospecting license
GHGs	Greenhouse Gasses
HAIA	Heritage and Archaeological impact Assessment
ISO	International Organization for Standardization
I&Aps	Interested and Affected Parties
MEFT: DEAF	Ministry of Environment, Forestry and Tourism's Directorate of Environmental Affairs and Forestry
NHC	National Heritage Council
NEMA	Namibia Environmental Management Act
RA	Roads Authority
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

DEFINITION OF TERMS

The **'Consultant'** – this refers to the team that is conducting the ESIA and the preparation of the EMP for the development

The **'Proponent** – this refers to the institutions/departments that are directly involved in the implementation of the project, i.e. MAWF.

The **'Stakeholders'** – this refers to the people, organisations, NGOs that are directly or indirectly affected and interested by the project.

The **'Environment'** – this refers to the ecology, economy, society and politics.

ENVIRONMENTAL IMPACT ASSESSMENT

This Environmental and Social Scoping Report (ESSR) surveys on the scope of work outlined by Ministry of Environment, Forestry and Tourism (MEFT) and New Horizon Investment Group for the proposed exploration and mining activities. In compliance with the Environmental Management Act no 7 of 2007 and Environmental Impact Assessment Policy, New Horizon Investment Group is mandated to do an Environmental Impact Assessment (EIA) and develop an Impact Management Plan (IMP) for listed activities. Henceforth the project proponent should appoint an Environmental Assessment Practitioner (EAP) with experience to carry out an Environmental Impact Assessment and draft Impact Management Plan. The EAP will attend to comments from Interested and Affected parties as well as the authorization board (Ministry of Environment Forestry and Tourism, (MEFT). MEFT will review the scoping report and decide whether the IMP in the scoping report is adequate or there will be need for further assessment on the project initiative or the management plan to effectively and efficiently protect the environment throughout the project's Life Cycle.

Part VII of the **Environmental Management ACT no 7 of 2007**, ENVIRONMENTAL ASSESMENT gives a list of activities that cannot be undertaken without an Environmental Clearance certificate. This proposed project is a listed activity. The ENVIRONMENTAL MANAGEMENT ACT works hand in glove with other environmental legislations detailed in Chapter 4 as POLICY, LEGAL & ADMINISTRATIVE FRAMEWORK. This ensures a sustainable project development in the Republic of Namibia. Environmental impacts associated with the proposed exploration and mining activities were identified during the EIA process. A conscious decision was made based on the recommendations and guidelines by the Directorate of Environmental Affairs (DEA) EIA guidelines to assess both significant and less significant environmental impacts proposed by the development. The developed EMP for this proposed activity will have to be effectively implemented by the client, to ensure that adverse environmental impacts are considered and effectively mitigated. The detailed assessment of the anticipated impacts was undertaken with the purpose of highlighting any areas of concern regarding to the proposed project during its construction, operation, and decommissioning phases. In addition, an independent sensitivity analysis of the geohydrology associated with project site was undertaken. This analysis characterised the development site on the significant environmental aspects to reflect the sites suitable and unsuitable (no-go) development footprint areas. This action guided the final footprint of the proposed cattle feedlots, bee hives and access roads.

This ESSR will also be used to motivate and define the previously identified, project alternatives (i.e., site, technology,) based on the findings of the environmental baseline study and the suitability of the site to the type of development.

The EIA report aims to:

- Provide an overall assessment of the social, physical, and biophysical environments of the areas affected by the proposed exploration and mining activities

- Undertake a detailed environmental assessment, in terms of environmental criteria and impacts (direct, indirect, and cumulative), and based on environmental sensitive recommend sites for the establishment of staging areas or field camps.
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts; and
- Undertake a fully inclusive Public Participation Process (PPP)
- GIS sensitivity mapping 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.

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 will apply to the review and adjudication of the reports by the competent authority and other government departments; and
- Mandatory Environmental compliance control and Reporting will be undertaken each month once project is operational and this EIA Report will be upgraded if new project features are proposed.

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

1. CHAPTER ONE: BACKGROUND

1.1. Overview

The proponent, New Horizon Investment Group (NHIG) is an indigenous Namibian established in 2010. The company has identified the economic potential of mineral deposits found in Omaheke. NHIG plans to undertake mineral exploration activities, primarily targeting copper ore deposits. The project proponent intends to mine for copper (desktop geological study, collection of samples and mining of available ore deposits), and its most probably the mining claims will be lucrative since they discovered viable ore deposits in the same region.

As per the requirements of the Environmental Management Act No. 7 of 2007, an environmental clearance certificate is needed prior to commencement of exploration and mining activities. Enviroplan consulting cc (ECC) was appointed by NHIG to conduct an Environmental and Social Impact Assessment (ESIA) and develop an Environmental & Social Management Plan (ESMP) for the proposed project. This has been followed by the registration of an application for Environmental Clearance Certificate (ECC) with the Ministry of Environment, Forestry and Tourism (MEFT): Directorate of Environmental Affairs (DEA). Subsequently, this document forms part of the application to be made to the DEA's office for an Environmental Clearance certificate for the proposed activities, in accordance with the guidelines and statutes of the Environmental Management Act No.7 of 2007 and the environmental impact assessment regulations (GN 30 in GG 4878 of 6 February 2012).

Table 1: Listed Activities -Environmental Management Act No. 7 of 2007

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. -3.2 Other forms of mining or extraction of any natural resources whether regulated by law or not. -3.3 Resource extraction, manipulation, conservation and related activities.

1.2. The Environmental Consultant

NHIG has appointed EnviroPlan Consulting cc as the appointed Environmental Consultant to conduct an Environmental Impact Assessment (EIA) and 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.

1.3. Project Location

The project site is situated approximately 15km north of Witvlei (Omaheke Region). Access to the site can be obtained by gravel roads turning off from the National Road B 6 linking Windhoek and Gobabis. The MCs are in a commercial farmland. The map below (Fig 1) illustrate the farming area as well as the locality map for proposed mining activities.

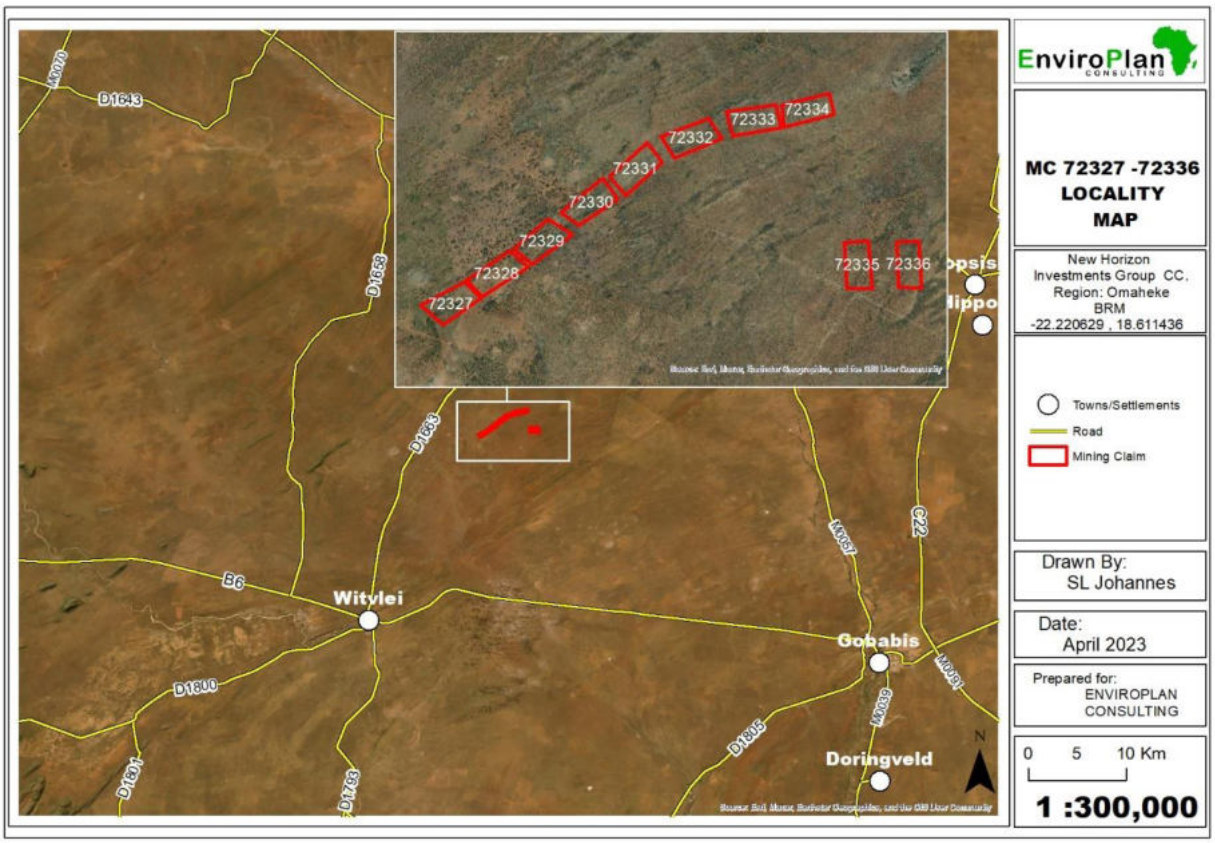

Figure 1: MCs 72327-72336 Locality.

1.4. Need and Desirability of the Project

Namibia's economic model continues to be influenced by the exploitation of mineral resources. According to the National Planning Commission Report (2021), the average contribution of the mining sector to GDP between 1990 and 2018 is significant and favourably stand at 11.1 %. Mining remains the largest earner of Namibia's foreign exchange at about 45%. Mineral prospecting is enshrined in National Development Plan (NDP), Vision 2030. The Harambee Prosperity Plan II plan (Pillar 2) place emphasis on economic advancement with view to enhance the productivity of priority sectors such as mining. However, mining development can be constraint by insufficient investment in mining exploration. The project inherently promotes economic socio- advancement through employment creation. The 2018 Labour Force Survey 2018 indicates that mining employs 1.7% of the total employed persons (NSA, 2019). Mining exploration is thus encouraged so that the sector can contribute more to the Namibian economy (NPC, 2021).

At a global level, Industrialization continues to drive a high demand for industrial minerals. Notably mineral production continues to contribute significantly towards job and wealth creation amongst various nations. Copper prices traded at US 10 747 per tonne in May 2021 (Malango, 2021). Enabling the availability of mineral sources in combination of favourable prices worldwide has a positive effect on the world's economy. It's anticipated that copper and other minerals such as lead, and zinc will be Namibia's top performing exports in 2021. The proposed project presents an exciting market opportunity in respect of copper sales. Explorations relating to base and earth metals such as copper can contribute to national income as achieved through direct and indirect tax income (corporate, personal, VAT, secondary, others) levies and customs. Several long-term trends are presently driving growth in mineral demand and are expected to continue to do so in the coming decades. According to the World Bank (2017), a ten-fold rise in demand for metals by 2050.

Omaheke ranks low and falls within the category of least of developed administrative regions in Namibia. The economy of Omaheke is centred on commercial production of livestock. Exploration presents an interesting prospect for expanding and diversifying the regional economy that remains largely dependent on cattle production. Living conditions are expected to increase through economic spinoffs/investments.Equally the proposed development can have an impact on direct and induced employment realized through the supply chain, and provision of support services. The project would require approximately 15 employees during the initial phase. Indirect jobs will manifest due to the out-sourcing of short-term services (maintenance, transportation) to sub-contractors. Highly skilled workforce may be sourced from the broader region. Based on the assumption that exploration takes place over a period of 12 months, this can create additional income for local and distant communities alike. However, the impact of exploration is expected to be felt at household level with people in fulltime employment. The positive impact of job creation is considered to be of high significance due to the high unemployment prevalence rate amongst unskilled or semi-skilled population group of the Region.

Table 2: Sections Within Scoping Report

Description	Section of the Report
The need and desirability of the proposed project	Sub-Chapter 1.4
Project description	Chapter 2
Alternatives considered for the proposed project in terms of no- go option, design, and natural resources	Chapter 3
The relevant laws and guidelines pertaining to the proposed project	Chapter 4
Baseline environment in which the proposed activity will be undertaken	Chapter 5
The public consultation process followed (as described in Regulation 7 of the EMA Act) whereby interested and affected parties (I&APs) and relevant authorities are identified, informed of the proposed	Chapter 6

activity and provided with a reasonable opportunity to give their concerns and opinions on the project	
The identification of potential impacts, impacts description, assessment, mitigation measures and recommendations	Chapter 7
Recommendations and conclusions to the report	Chapter 8

2. CHAPTER TWO: PROJECT DESCRIPTION

2.1. Project Activities

The project proponent intends to conduct exploration and subsequent mining activities comprising of various phases. For this EIA, the phase-based activities were categorized to enable impact assessment and analysis. The different project phases are as follows:

2.1.1. Pre-development and Construction Phase (Site Preparation)

Access contracts will guide the working relationship between landowners and exploration team. The exploration team will undertake initial site visits to identify appropriate sites for the establishment of field camps. The field camps are for the safe keep of exploration equipment and vehicles before use. No employees will be housed in the Mining Claims (MCs). Pre-development phase involves maps review, detailed site survey of the targeted areas, as well as vegetation clearing, soil stripping (earthmoving) and drilling.

Land clearing: small land parcels will be cleared for the establishment of base or field camps and staging areas. Proponent shall ensure that areas identified are those that present minimal disturbance to the natural environment and wildlife.

Creation of access routes and haul tracks: Apart from the existing farm roads network leading to target areas, additional tracks (extensions from farm roads) may be created. Additional roadways may be considered for the purposes of accessing target sites. No permanent structures will be built for exploration works.

Fencing: Where deemed feasible, fences will be erected around field camps and target areas. Fencing will serve to keep out livestock and wild animals from target sites

2.1.2. Operational Phase

The phase typifies an advance level of exploration, mining of copper and related metal ore resources. The operational and maintenance phase is the phase during which mining project will be operational. The target areas within the MCs boundaries, identified during the pre-development phase will undergo quarrying works sampling will serve to validate prior exploration results of the mineral deposits. The appropriateness of the bulk sample will be related to the deposit morphology. Stripping will involve the removal of overburden material overlaying the ore deposits. The overburden material will comprise of topsoil and rock material. A bulldozer will be used to move over burden material. Trenches will be excavated mechanically up to a maximum depth of 5 meters, exposing the ore deposit. Trenches will be 50m long and 5m wide. Backhoe excavators will be used for excavations. Waste rock will be stockpiled adjacent to trenches.

The ores (oxides) anticipated are namely Malachite, Cuprite, Chrysocolla and Azurite. At the exploration site (staging areas), a primary crusher unit and an ore screen will be installed. Primary crushed ore will be crushed further to obtain a product of -150 mm and + 50mm to liberate the high-grade ore. Front end -Loaders will be used to load the ore onto 30 tonne haulage trucks. The crushed ore will be required for performing processing trials part of metallurgical testing programme.

Site Maintenance: Excavated trenches will be back filled with waste rock (gangue). Stockpiled top soil will be returned to the backfilled areas. Sites will also be re-vegetated and returned to its original state. Site maintenance/ Rehabilitation will be done concurrent with exploration (ore removal etc). This will be done to avoid open pits which might traps wild and domestic animals mostly at night.

Water requirements: Water will be sourced from existing boreholes. About 80,000 litres (80 m^3) per day would be required. This amount of water is aimed at suppressing dust around tipping areas and vehicle tracks. Approximately 300 liters of domestic water will be needed per day. Agreements to be made between the farm owner and the proponent on the use of water. If the existing boreholes does not withstand the required amount of water as required, the proponent will have to outsource water from offsite.

Waste management: Waste material generated will be in the form of rock material (non-mineral) and derived from trenching activities. Insignificant amounts of domestic waste will be generated by the mining team. Domestic or general waste will be transported out of the MCs area on a daily basis and disposed at an approved land fill site. There are no licenced waste disposal sites in the project area. The most used disposal site is temporarily available in Witvlei and managed by the village council.

Sewage Management: During exploration, sufficient portable chemical toilets will be provided for workers and appropriately emptied according to their manufacturer's operational standards and legislated occupational sanitary provisions. Licenced waste contractors will provide sewage removal services.

Mining equipment, Materials and Services: Mining equipment will be sourced from contractors proximate to the project site. Were deemed essential, equipment will need to be sourced from elsewhere in the country and/or abroad as per the required and approved operating standards.

Labour sourcing: Temporary employment opportunities will be created during the duration of exploration activities. Most labourers will be sourced from Witvlei (approximately 20 km from project site). The exact number of people to be employed could not be secured at the time of preparing this report as work will be outsourced to contractors as per NHIG procurement policy. Contractors will determine the exact number of the workers required. However, employment of locals is encouraged.

Housing: Personnel will not be accommodated in the Mining Claims area but will commute daily from Witvlei. The only personnel allowed on site during the night will be the security on duty.

2.1.3. Decommissioning/ Mine closure and Rehabilitation Phase

This phase will involve the removal of equipment and dismantling of facilities and safe closure. All trenches will be backfilled. The surface affected by mining activities will be rehabilitated and re-vegetated in accordance with applicable standards.

The mine closure and Rehabilitation phase is mainly reinforced through a decommissioning and rehabilitation plan, which consists of safety, health, environmental and contingency aspects. Uncertain or unstable economic situations or unconvincing results may force the proponent to cease the mining programme. Therefore, it is of best practice for the proponent to make sure they have a rehabilitation plan for the sites in anticipation of closure of the mining operations.

2.1.4. Environmentally sensitive areas identified

The proposed exploration activities are not in any sensitive protected areas such as community forests, conservancies, and areas with memorial sites. A Specialist Heritage and Archaeological impact Assessment was commissioned for the project area.

3. CHAPTER THREE: PROJECT ALTERNATIVES CONSIDERED

3.1. Alternative technology

Hydro excavation (Hydro Vac): Hydrovac excavation uses the power of pressurised water to breakdown overburden. The power of vacuum is used to extract the generated slurry and to deposit the waste material in special containers or holding tanks. After the work is complete, slurry is released from the holding tank back onto the ground to cover once again the exposed subsurface. Given the low ground water potential in the proposed project area, this method of trenching will not be appropriate as it is water intensive.

Blasting and Drilling: Blasting includes the use of explosives (dynamite). Blasting operations cause several adverse environmental effects: ground vibrations, air blast, fly rock, generation of fines, fumes and dust. The noise generated can stress livestock and wild animals. Unexploded explosives or by-products can be hazardous to the natural environment. Exploration drilling may make the aquifers more vulnerable to degradation and contamination by potentially allowing seepage (surface run-off to enter the aquifers).

'No Go' Alternative: The no go alternative may negatively affect regional economic development, consequently leading to a stagnant economy with lower levels of living standards especially for low-income groups. As such, reducing the high un-employment rate, ensuring greater social cohesion and reduction in poverty will remain a chronic challenge.

3.2. Resources alternatives

In terms of the resources that may be required for the proposed upgrade works, their alternatives are presented in Table 5 below.

Table 3: Alternatives considered in terms of services infrastructure

Services	Proposed source	Alternative source
Water	Water to be sourced from existing boreholes.	Piping water from other sources out of the project area. This would be done to augment local water supplies
Power	Electric drives and generators	Solar
Power for cooking	Gas stoves	Solar
Worker's accommodation	Outside project site	Accommodation in the nearest town, which is Witvlei (depending on commuting and accessibility)

Exploration and Mining Technology	Bulk Sampling	Diamond Drilling Air core drilling
Waste Management		
Sewage	Portable toilets – these are easily transportable and have no direct impact on the environment or ecology (if waste is properly disposed of)	Ventilated improved pit (VIP) latrine.
Domestic waste	Onsite waste bins, regularly emptied at the nearest landfill	Driving waste daily to the nearest town landfill
Hazardous waste (chemicals)	Waste generated is to be transported to and disposed of at an appropriate facility in the nearest town equipped for the disposal of hazardous waste	None

3.3. Conclusions on the Considered Alternatives

The alternatives considered for the project are summarized as follow:

- No-go vs. continuation of the proposed project: The no-go alternative is not considered to be the preferred option. Should the proposed project be discontinued, none of the potential impacts (positive and negative) identified would occur. Therefore, the road condition will remain unchanged and would not be improved.

- Project design: The proposed exploration methodology will be informed by this ESIA study to ensure minimal impacts on the receiving environment.
- Resources:
    - **Water**-Water for the proposed activity is to be sourced from boreholes.
    - Energy- Increased use of solar technologies is promoted within the development. Where it cannot be successfully employed the use of generators would be required.
    - Waste - Domestic and hazardous waste is to be disposed of appropriately. Portable toilets are to be made available at the construction site and the exploration camp and these are easily transportable and have no direct impact on the environment or area ecology (if waste is properly disposed of).

4. CHAPTER FOUR: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

4.1. Introduction

To ensure that the proposed development comply with the legal requirements for good practice and preservation of the environment, a review of applicable Namibian and international legislation, policies and guidelines have been consulted. This review serves to inform the project Proponent, Interested and Affected Parties and the decision makers at the DEA of the requirements and expectations, as laid out in terms of these instruments.

The project prompts the following Namibian legal instruments.

The Constitution of the Republic of Namibia (1990).

Environmental Assessment Policy of Namibia 1994.

Environmental Management Act No. 07 of 2007.

EIA Regulations GN 57/2007 (GG 3812).

The Water Act 54 of 1956.

The Water Resources Management Act No. 11 of 2013.

Pollution Control and Waste Management Bill.

Atmospheric Pollution Prevention Ordinance 11 of 1976.

National Solid Waste Management Strategy.

Soil Conservation Act 76 of 1969.

Road Traffic and Transport Act, No. 22 of 1999.

Forest Act 12 of 2001.

Mineral Policy of Namibia

National Policy on Climate Change for Namibia (2011).

National Climate Change Strategy & Action Plan 2013 – 2020.

Nature Conservation Ordinance (1996).

National Biodiversity Strategy and Action Plan (NBSAP2) 2013 – 2022.

Labour Act 11 of 2007.

Health and Safety Regulations GN 156/1997 (GG 1617).

Public Health Act 36 of 1919.

Public and Environmental Health Act 1 of 2015; and

National Heritage Act 27 of 2004.

These above-listed legislations and policies and their inclusion in the proposed project assessment are further presented in Table 4 overleaf.

Table 4: Policies, legal and administrative regulations

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
The Constitution of the Republic of Namibia (1990)	The articles 91(c) and 95 (i) commits the state to actively promote and sustain environmental welfare of the nation by formulating and institutionalising policies to accomplish the Sustainable objectives which include: Guarding against overutilization of biological natural resources, Limiting over-exploitation of non-renewable resources, Ensuring ecosystem functionality, Maintain biological diversity.	Exploration activities can interfere with ecological processes. Attention should be given to the state of water resources and biodiversity
Environmental Assessment Policy of Namibia 1994	The Environmental Assessment Policy of Namibia states Schedule 1: Screening list of policies/ plans/ programmes/ projects subject to environment must be accompanied by environmental assessments. “The development activities" are on that list.	The activity triggers an environmental impact assessment prior to commencement
	The policy provides a definition to the term “Environment” broadly interpreted to include biophysical, social, economic, cultural, historical, and political components and provides reference to the inclusion of alternatives in all projects, policies, programmes, and plans.	The proposed development requires the assessment of all possible environmental and social impacts to avoid, minimise or compensate environmental damage associated with the activities.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
Environmental Management Act No. 07 of 2007	Requires that activities with significant environmental impact are subject to an environmental assessment process (Section 27). Requires for adequate public participation during the environmental assessment process stakeholders to give 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 Section 3 (2) (b) states that "community involvement in natural resources management and the sharing of benefits arising from the use of the resources, must be promoted and facilitated" is key. Section 3 (2) (e) states that "assessments must be undertaken for activities which may have a significant effect on the environment or the use of natural resources".	The nature of the proposed exploration and interrelated activities has potential to cause adverse environmental impacts to the surrounding environment. Activities such as trenching can cause significant environmental impacts. Therefore, proper assessments should guide project planning The EIA study considered full stakeholder participation. Stakeholder consultation was fully conducted. The proposed development is involving the utilisation of natural resources (water and land). Therefore, benefits from the implementation of the project must be shared equally. Environmental cost relating to project shall not be borne by communities found in the project area and surroundings. Project shall not commence without an environmental clearance certificate
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 an Environmental Scoping Report (GN No 30 S8) and an EIA report (GN No 30 S15).	The implementation of the project triggers the need for consultation of all affected and interested stakeholders regarding the development at all project development phases from planning to operation of the facility. A public consultation meeting was held in respect to this, and all the concerns and issues were noted and addressed in this report.
The Water Act 54 of 1956	The Act was formulated to consolidate and amend the laws relating to the control, conservation and use of water for domestic, agricultural, urban, and	The activities directly affecting water conservation, management and use therefore, requires the implementation of water conservation measures.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
	industrial purposes; to make provision for the control, in certain respects, of the use of sea water for certain purposes; for the control of certain activities on or in water in certain areas.	
Minerals (Prospecting and Mining) Act, 1992 (Act no. 33 of 1992)	Act provides the licensing procedures, the rights of holders, the administration, and the ownership of minerals. In addition, the Act requires mining companies to provide detailed studies on the potential impact of the operations to the surrounding environment, how to mitigate them and rehabilitations plans	Prospecting or mining operations shall not commence except in accordance with license granted. Renewals of EPLs are accommodated twice for two-year periods, with the area decreasing by 25 per cent with each renewal
Pollution Control and Waste Management Bill	The bill aims to "prevent and regulate the discharge of pollutants to the air, water and land" Of particular reference to the Project is: Section 21 "(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse." Section 55 "(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or creates a significant risk of harm to human health or the environment."	The proposed activity triggers Section 21 and 22 of the bills. Activities such as trenching transportation, primary crushing may require the robust adoption of in-situ pollution mitigation measures. Contractors of the civil works of the project should make it mandatory that they manage their waste in a manner that do not cause environmental harm and risk both to the surroundings and the local communities.
Atmospheric Pollution Prevention Ordinance 11 of 1976	The law provides for the prevention of atmospheric pollution, and for matters incidental thereto. The law regulates and prohibit pollution from industries particularly smoke and dust. The ordinance	Mineral exploration processes will most likely affect ambient air quality. Efforts to suppress and monitor dust should be adopted as recommended in the EMP.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
	considers air pollution from point sources but does not address air quality standards,	
National Solid Waste Management Strategy	The Strategy ensures that the future directions, regulations, funding, and action plans to improve solid waste management are properly co-ordinated and consistent with national policy, and to facilitate co-operation between stakeholders Waste disposal presents a challenge to solid waste management in Namibia. The top priority is to reduce risks to the environment and public health from current waste disposal sites and illegal dumping in many areas of Namibia.	Exploration activities can potentially generate significant amount of waste material that need careful management. The obligation to meet waste management objectives should be borne by both proponent and contractors. The proponent should limit the exposure of waste to the natural environment and surrounding. In-situ waste management plans should be adopted and implemented prior the commencement of operations. Rock waste and other non-mineral waste should be stored and disposed in an environmentally friendly manner. Waste should be carted away to licences waste disposal sites.
Soil Conservation Act 76 of 1969	The Act established to consolidate and amend the law relating to the combating and prevention of soil erosion, the conservation, improvement, and manner of use of the soil and vegetation and the protection of the water sources in the Republic of Namibia.	The construction of auxiliary infrastructure such as access roads or tracks to exploration targets should include systems and mechanism for preventing erosion.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
Road Traffic and Transport Act, No. 22 of 1999	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto.	Mitigation measures should be provided for if the roads and traffic impacts cannot be avoided. Should the proponent wish to undertake activities involving road transportation or creation new access adjoining national roads, relevant permits will be required from the Ministry of Works and Transport
Forest Act 12 of 2001	Section 10 (1) set out the aim of the forest management as to: The purpose for which forest resources are managed and developed, including the planting of trees where necessary in Namibia is to conserve soil and water resources, maintain biological diversity and to use forest produce in a way which is compatible with the forest's primary role as the protector and enhancer of the natural environment.	The proposed project will likely result in the disturbance of indigenous vegetation of conservation significance including the disruption of biological processes.
	(b) any living tree, bush or shrub growing within 100 metres of a river, stream, or watercourse.	The project will not result in the removal of living trees, bushes and shrubs growing within 100m of a river, stream, or watercourse.
	(2) A person who wishes to obtain a licence to cut and remove the vegetation referred to in subsection (1) shall, in the prescribed form and manner, apply for the licence to a licensing officer who has been designated or appointed for the area where the protected area is situated.	The removal of trees in the above instances would require the contractors or sub-contractors to acquire necessary permits first.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
National Policy on Climate Change for Namibia (2011)	The National Policy on Climate Change pursues constitutional obligations of the Government of the Republic of Namibia, namely for "the state to promote the welfare of its people and protection of Namibia's environment for both present and future generation."	Measure should be adopted by NHIG to prevent or minimise toxic emissions into the atmosphere. Dust suppression and monitoring will be employed, to ensure that air quality objective tied to climate change mitigation are met.
National Climate Change Strategy & Action Plan 2013 - 2020	The Strategy outlines Namibia's response to climate change. The strategy aims to address and plan for action against climate change, both through mitigation and adaptation actions. In its adaptation strategy, the Strategy recognises the role of a sustainable water resource base.	The development should adopt measures that strengthen sustainable utilization of water resource the implementation should be very careful on not to cause harm to the available water resources but improve the management through various conservation technics.
	The Strategy proposed strategies that aim to: Strategic Aim 1: Further improve the overall climate change understanding and related policy responses in water resources sector. Strategic Aim 2: Monitoring and data collecting technologies of surface and underground water are developed and implemented at basin/watershed level.	The proponent should invest capital on strengthening climate change and adaptation through cleaner production systems implementation. Certification by international standards such as ISO14001 can help with climate sustainability, and is recommended.
Nature Conservation Ordinance (1996)	This ordinance relates to the conservation of nature; the establishment of game, parks, and nature reserves; the control of problem animals; and highlights matters incidental thereto.	The activities of the project are highly localized. The likelihood of project activities interference with any protected parks and nature reserves objectives is non-existent. However, there is need for proper designing and planning of the drainage and water network of the project to make sure that any service infrastructure is not in conflict with the provisions listed in the Nature Conservation Ordinance.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
		All species of birds are protected except the huntable game birds mentioned in Schedule 6
National Biodiversity Strategy and Action Plan (NBSAP2) 2013 – 2022	The action plan was operationalized 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.	The proposed project during construction and operation phases, potentially triggers ecosystem threats from pollution. As such mechanisms for environmental compliance and monitoring will be put in place, ultimately aimed at protecting biodiversity.
Labour Act 11 of 2007.	Empowers the minister responsible for labour to publish regulations pertaining to health and safety of labourers (S135). Details requirements regarding minimum wage and working conditions (S39-47).	Explorations invite significant amount of laborious work. Therefore, there is need to ensure that proponent without charge to employees provide a working environment that is safe, and adequate facilities provided for the upkeep of employee welfare standards. The Ministry of Labour and Safety demands that a health management policy will be drafted and instituted.
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety requirements.	-Occupational health and safety provisions during construction and operational phases should be clearly outlined. -Compliance monitoring and responsibilities for compliance monitoring should be clearly stated
Public Health Act 36 of 1919	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	Compliance to the Public health act will be ensured in relation to the following: - Sanitation facilities -Communicable diseases -Emergency healthcare provision - Covid workplace measures
Public and Environmental Health Act 1 of 2015.	To provide a framework for a structured uniform public and environmental health system in Namibia; and to provide for incidental matters.	

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY
National Heritage Act 27 of 2004	Section 48(1) states that "A person may apply to the (Heritage) Council for a permit to carry out works or activities in relation to a protected place or protected object" Protects and conserves cultural heritage and cultural resources with special emphasis on places and sources of National heritage including graves, artefacts, and any objects older than 50 years.	The project impacts are localized and there are no heritage or cultural artefacts relating to project area. However, if heritage resources (e.g., human remains etc.) discovered during implementation, guidelines dictate that a permit be acquired from the National Heritage Council of Namibia for relocation of any artefacts or specimen.
SANS 1929: 2005	Dust particulates from excavations /ore crushing that are smaller than 1mm are deemed dangerous to both plants and humans. As such a dust monitoring following the ASTM D1739 method should be used for monitoring dust emissions from any crushing plant anticipated. Dust chemical analysis and fallout quantities are specified for industrial and residential environs.	A dust fallout monitoring plan can be instituted around project area

5. CHAPTER FIVE: ENVIRONMENTAL AND SOCIAL BASELINE

5.1. Introduction

The proposed project will be undertaken in a specific biophysical and social environment. The baseline conditions of these environmental features are described in the following subchapters. The baseline conditions are described for the subject area, which is the area/regions through which the project road traverses. The MCs are located within Okarukambe Constituency in the Omaheke Region. The nearest village town is Witvlei with about 15 km away from the project site.

5.2. Socio-economic profile

5.2.1. Historic & Cultural Context

The proposed exploration area is situated in Omaheke Region. The name Omaheke (sand veld in Afrikaans) means 'deep sand' (Lindholm, 2006). It is one of the fourteen regions of Namibia, the least populous region. Its capital is Gobabis. It lies in eastern Namibia on the border with Botswana and is the western extension of the Kalahari Desert. The self-governed villages of Otjinene, Leonardville and Witvlei are situated in the region. Witvlei is the nearest administrative centre to the proposed site. The original name of the village in Khoekhoegowab (Damara/Nama) is !Uri !Khubus (white fountain). The settlement was the place of the Battle of Witvlei in the First Herero-Nama War in March 1864. Maharero, with the help of the hunter Frederick Green (known among the Ovaherero as Kerina), led a contingent of 1,400 Ovaherero from Otjimbingwe against the Orlam Afrikaners under Jan Jonker Afrikaner. Afrikaner's forces were defeated and fled, although a number of other battles followed elsewhere.

The San were the earliest inhabitants of Omaheke Region and practiced a nomadic lifestyle, relying on hunting and gathering (Sylvain 1999: 22). Around the turn of the 18th century, new inhabitants, mainly Mbanderu, Herero and Tswana people, started settling in the area. At the beginning g of the 20th century and just after the Herero-German war (1904-1907), the biggest influx of settling communities were of European and South African descent. By the 1950s, more than 700 farms were established in the area, with fencing being well advanced (Sylvain 2001)

5.2.2. Demographics, Culture and Literacy

The population of Omaheke is estimated at 75,734 (NSA, 2018). The population growth in the entire Omaheke Region is expected to decrease gradually from 3.21% in 2001 to 1.37% in 2021. The population growth in rural areas, however, is negative because most of the productive age groups have moved to urban areas, leaving behind the elderly and very young people. By comparison, the region has more males (52.9%) than females (47.1%). Given the growing households population, it is projected that there are about It is estimated that there are about 17613 households in the region, equating to a household size of 4.3 people (NHIES, 2015). The literacy rate for the age group between 15 and above is estimated at 71.8%. Most of the inhabitants are of Herero descent, but there are Damara, Ovambo, Herero, Kavango, and inhabitants of mixed ethnicity. Otjiherero is the language predominantly spoken in the region.

5.2.3. Economic Activities

The regional economy continues to be dominated by three (3) economic drivers i.e. livestock production. Figure 3 below shows that extensive cattle ranching dominates land-use. As such, inhabitants of the region refer to it as the 'cattle country' as it has some of the best grazing areas in Namibia" (Werner et al 2010). This region includes Gobabis, which is the centre of the area. The region's economic activities are centred on cattle farming. There is a need in the region for diversify into cash crops.

In Namibia livestock production recorded the highest on total agricultural output. In 2018, the cattle industry fetched an income of N$ 2.7 billion (Shikangalah et al, 2020). Farms within the proposed project area have stocking density ranges between 0-19 per km² and 20-39 per km². In recent times, commercial livestock farmers have increasingly diversified their income strategies by expanding into game farming, hunting, tourism activities, wood and charcoal production. Namibia ranks amongst the world's top 12 charcoal producing countries contributing 2.6 % of the world's output. Hence, charcoal production remains a source of income especially farmers combating bush-encroachment driven by invader bush, lack of game browsers and overgrazing by cattle. The density of the invader bush species (Acacia mellifera) is estimated at 2000 per hectare (Shikangalah et al, 2020). Charcoal and wood are sold at about N$ 1000 per tonnage (Shikongo, 2021).

Due to scarcity of water, rain-fed agriculture is not very reliable due to poor soils. Also, the region is unsuitable for crops due to low dependable growing period and the soil texture and productiveness. Additional farm income is generated through trophy hunting. The farm Okasandu have 8 guest houses and periodically hosts trophy hunting events. The farm has a shooting range, an abattoir and wildlife. Farm workers and their respective families receive monthly income.

5.2.4. Employment

The economically active population in Omaheke is estimated at 65 percent, 42.3 percent of which is unemployed. About 45 percent of the employed population is in the agriculture sector. Tourism accounts for 5 percent of the employed population in the region, while manufacturing and logistics each account for 2 percent. Construction is a key sector, yielding about 7 percent of the region's employment. The National Labour Survey (2018) revealed a 46.6 percent unemployment rate amongst the youthful age group (15 to 34 years).
Omaheke has a high poverty prevalence rate. The severe poverty rate is above the national average of 10.7%.

5.2.5. Infrastructure and Services

Roads: An open road network exists in proposed exploration and mining area. Primary access can be gained from the existing D1663 road. The road's width is adequate for transportation services and two-way vehicular traffic. Access to the pre-identified targets (exploration areas) will secured through access agreements prepared in conjunction with the landowners.

Water Supply: Safe drinking water is available and accessible to everyone in the region. Water for domestic use and livestock comes from wind and solar powered boreholes. The proponent will make use of borehole derived water for dust suppression and domestic use. Agreements to be made for the land owner to provide water from existing or new boreholes. Monitoring boreholes to be set to quantify the water table fluctuations and water quality that might bring changes due to the exploration and mining activities. During the site visit the consultant recorded a total of 4 working boreholes in the farm. The farm owner testifies that the water was enough for domestic, wildlife and all other uses at the farm. However, the needy for water during the exploration activities is likely to result in drilling of a new borehole.

Sanitation: There project area is within a fully operational farm. Farm Okasandu uses septic tanks to cater for waste water treatment. Some of the landowners have constructed French drains (sewage facilities) on their farms. The proponent plans to introduce mobile chemical toilets for all workers.

Energy sources: Charcoal and firewood is a common source of energy for cooking. According to the National Census Report (2011), approximately 73% of the communities in the Omaheke use wood/charcoal for cooking and heating and only 33% use electricity. Solar installations are commonly associated with residential homes (farmhouses) and boreholes. Exploration teams will make use of diesel fuel to power equipment. For protecting exploration equipment, solar power will be used to light field camps during the evenings.

Telecommunication Services: The proposed project area is well connected to the rest of the country and world via local network service providers. The main providers of this service in the area are Telecom Namibia, Mobile Telecommunications Company (MTC Namibia) as well as satellite phones. Therefore, the site operations will be communicated smoothly between onsite and offsite project personnel using either of the communication services.

5.3. Biophysical Environment

5.3.1. Climate

Witvlei receives an average of 317.7 millimetres (12.51 in) of rainfall per year. In the 2010s drought, the lowest figure was 67 millimetres (2.6 in) in the 2018/2019 rainy season, (Menges et al 2019).
The project area has a semi-arid climate that is associated high temperature during summer months, which are from December to February, and lowest temperature in winter months, which are from June to August. Figure 2 overleaf shows average temperature and precipitation records in Witvlei.
Precipitation: Summer rainfall varies from 350 – 400 mm per year.

Temperature: Warm climate. Average maximum temperatures are between 32^{o} C and 34^{o} C, whilst average minimum temperatures are around 8^{o} C.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	25.5	25	24.5	23.6	20.4	17.6	17.4	20.1	24.3	26	26.1	25.7
Min. Temperature (°C)	19.2	19	18.1	16.1	11.5	8	7.5	10	14.8	17.8	18.9	19
Max. Temperature (°C)	31.8	31	31	31.1	29.4	27.3	27.4	30.3	33.8	34.3	33.4	32.4
Avg. Temperature (°F)	77.9	77.0	76.1	74.5	68.7	63.7	63.3	68.2	75.7	78.8	79.0	78.3
Min. Temperature (°F)	66.6	66.2	64.6	61.0	52.7	46.4	45.5	50.0	58.6	64.0	66.0	66.2
Max. Temperature (°F)	89.2	87.8	87.8	88.0	84.9	81.1	81.3	86.5	92.8	93.7	92.1	90.3
Precipitation / Rainfall (mm)	134	127	101	40	4	0	0	0	2	18	62	100

Figure 2: Average temperature and rainfall at Witvlei (Source: https//www.meteoblue.com)

Wind & Evaporation: High evaporation which peak in the windy months of September and October. Winds are however moderate and mostly from the east, throughout the year. Figure 5 overleaf shows a wind rose recorded of wind speed and direction recorded in the project area over a 12 months period from March 2020 to March 2021. The wind rose shows that the prevailing wind speed is 15-24 kmph in the south westerly direction.

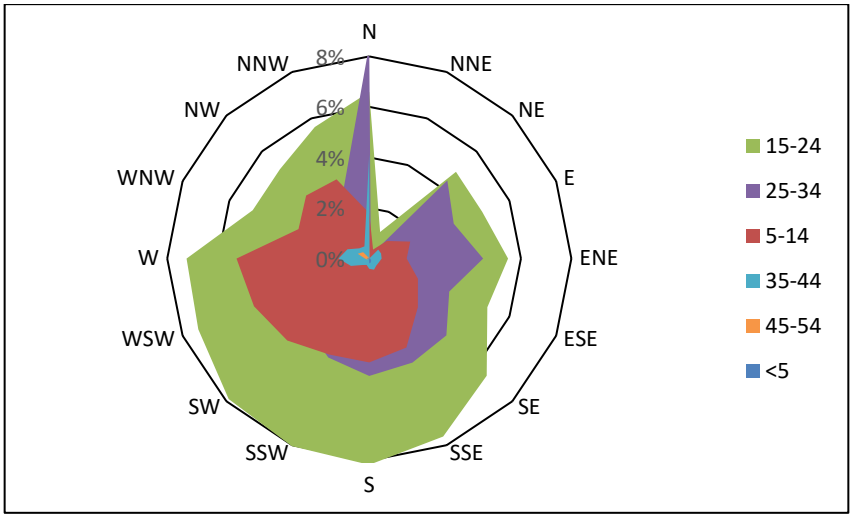

Figure 3: Wind direction and speed (kmph) over a 12-month period

5.3.2. Climate Sensitivity

The following (Table 5) overleaf is a depiction of the area's climatic condition as well as potential sensitivities and impacts associated with the identified features.

Table 5: Climate Sensitivity Index

Environmental Features	Description	Sensitivities	Potential impacts of features on project
Average rainfall – 351 to 400 mm per year. Evaporation averages 2800 – 3000 mm annually, exceeding precipitation by approximately 93%.	Capacity of the environment to absorb impacts is lower than in wetter areas. Groundwater is an important source of water	Exploration and mining activities causes an increase in water demand. Run-off from cleared areas causes erosion	Average rainfall – 351 to 400 mm per year. Evaporation averages 2800 – 3000 mm annually, exceeding precipitation by approximately 93%. Typically, sporadic, and unpredictable. Localized storm events.
Temperature	In summer, the highest temperature range between 32C° and 34 C°. Winter temperatures, measured in July with an average daily maximum of 20°C and minimum of 8°C	Contributes to high evaporation rate. Semi-arid climate. Water resource is a scarce commodity. High temperatures in summer.	Wellness, health, and safety of the workforce.
Wind Direction	The wind blows mostly from North East throughout the year.	Dust can be a nuisance to approximate farm communities	Dust particles and nuisance

5.3.3. Topography and Elevation

Namibia is divided into three main topographic elements, (a) An extensive plateau, b) A narrow coastal plain and (c) an eroded escarpment that is characterized by dissected and rugged topography (Bee Pee & SRK). The area falls under the Khomas Hochland Plateau, which is the ridge of higher ground found in the centre of Namibia. The altitudes in the plateau range between 1700 m to 2000 m above mean sea level as shown on Figure 5 overleaf. The area has a flatter topography compared to the western parts of the plateau. The broad landscape is generally flat to rolling, with 6° – 9° slopes (Strobach et al,2004). Plains are incised by Omuramba valleys or alternated with vegetated fossil (no longer actively moving) dunes (Landholms**, 2006).** The project site has a generally flat terrain, and the area drains towards the Southeast, (refer to fig 4 overleaf)

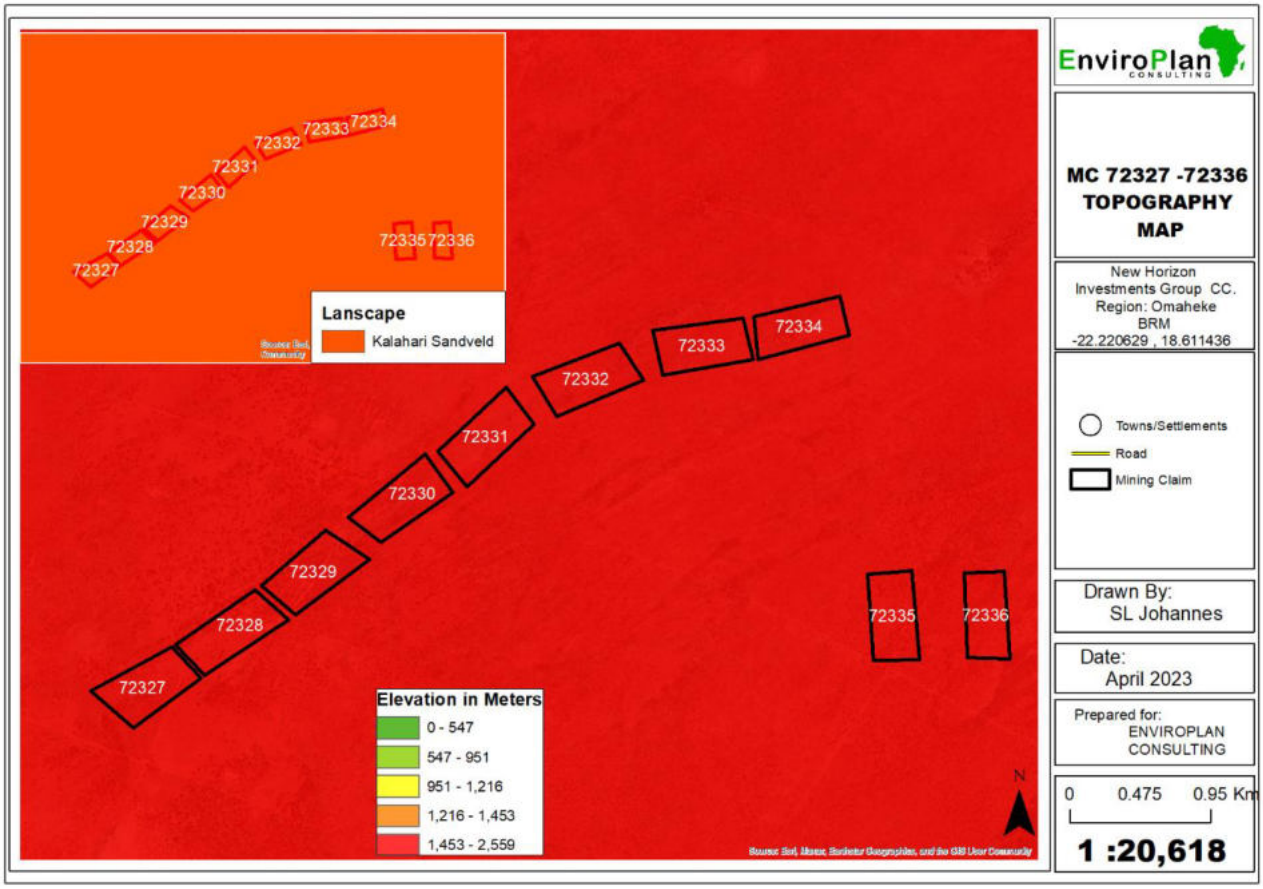

Figure 4: Project site Topography Map

5.3.4. Geology and Soil

Geology: The MCs lie between the synclines of the Damara supergroup. These rocks are overlain by a Karoo and Kalahari succession (Miller, 2008). The rocks of the Damara supergroup are formed because of a collision between the Kalahari and Congo Cratons approximately 800- 500 Ma. The Karoo and Kalahari Super groups formed between 300-200 million years ago and 70-65 million years ago respectively (Mendelsohn et. al.2002). The area is made up of Kamtsas quartzite and limestone of the Nossob Group and sediments of the Kuibis Subgroup (Nama Group), locally overlain by diamictites (tillites) and shale of the Dwyka Formation (Karoo Sequence) (Christelis & Struckmeier 2001). The general stratigraphy of the region is characterised by basement gneisses unconformably overlain by bimodal volcanic on which siliciclastic sediments and minor carbonates rest.

Soil: The dominant soil type in the entire Namibian Kalahari is ferralic Arenosol. This type of soil is a

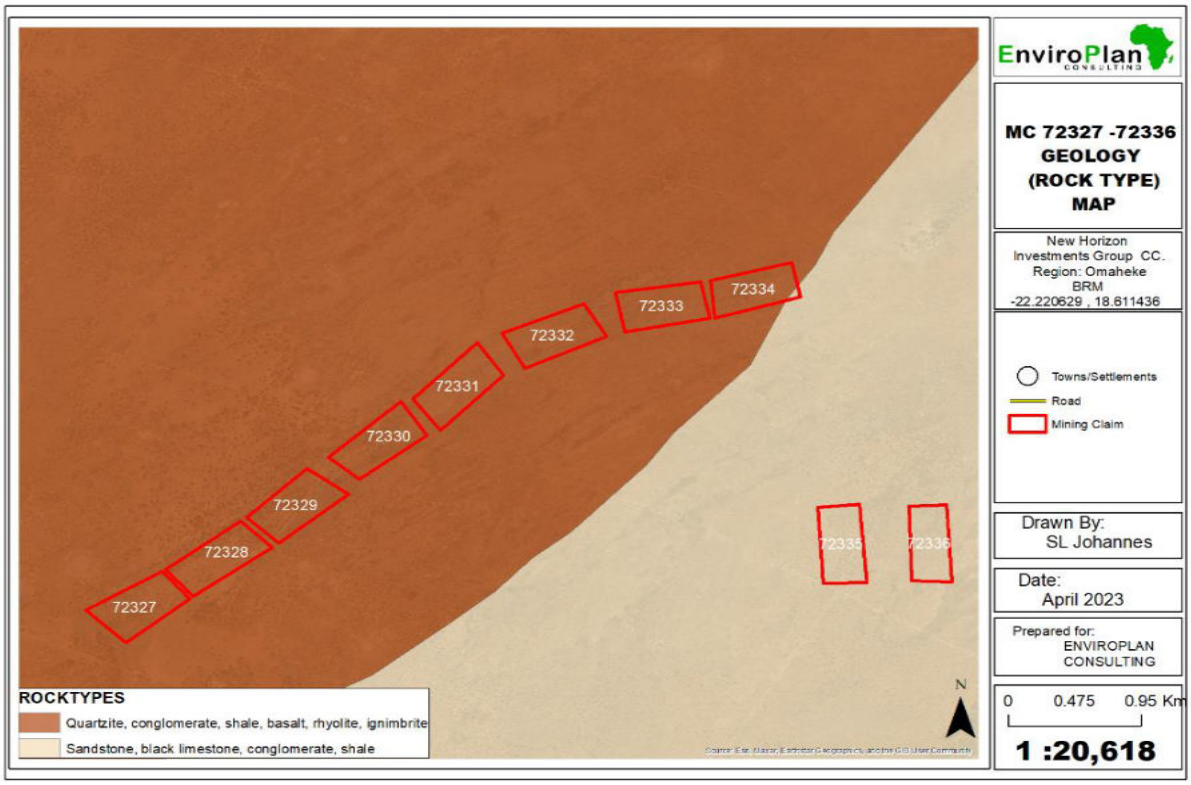

Figure 5: Geology on proposed project site

typical dryland soil and has a high content of combined oxides of iron with a low relative soil fertility which makes it poor soil for crop production. This sandy soil dominates both the east and north-eastern regions of Namibia in what is mostly referred to as the Kalahari basin. It is formed from wind-blown sand and usually extends to a depth of one metre (Mendelsohn *et al*. 2002 as cited by IECN, 2012)). The sandy portion generally makes up more than 70% of the soil, and the rest of the soils consist of particles of clay and silt. Little run off and water erosion takes place on such soils. The project area is also characterized by young sand (alluvium and surficial deposits). Eutric regosols dominate the proposed project area. Soils reveal limited –run-off. Figure 6 overleaf reviews the eutric regosols dominating in the project site.

Figure 6: Soil type on proposed project site

5.3.5. Geohydrology

The geohydrological assessment for the proposed exploration area was carried out by Tjelos et al (2021). A summary on the geohydrology is presented in the sections below. Based on the literature review conducted, the project site is within the groundwater basin of the Hochfeld-Dordabis-Gobabis, which according to Christelis and Struckmeier (2001, 2011) stretches from east of Windhoek to the eastern border of Namibia. It mainly includes sandveld between the Kalahari basins of northern Omaheke-Epukiro and the Stampriet artesian basin. The eastern Khomas Region, up to the Hosea Kutako International Airport, is mountainous, drained in an easterly and south-easterly direction.

The hydrogeology and ground water potential maps on the proposed project site is shown in Figure 7 and 8 overleaf. According to this map, groundwater potential of rock bodies in the project site area are generally low, locally moderate with moderate porous, fractured, fissured and karstified aquifers the ephemeral Seeis, White Nossob and Black Nossob.

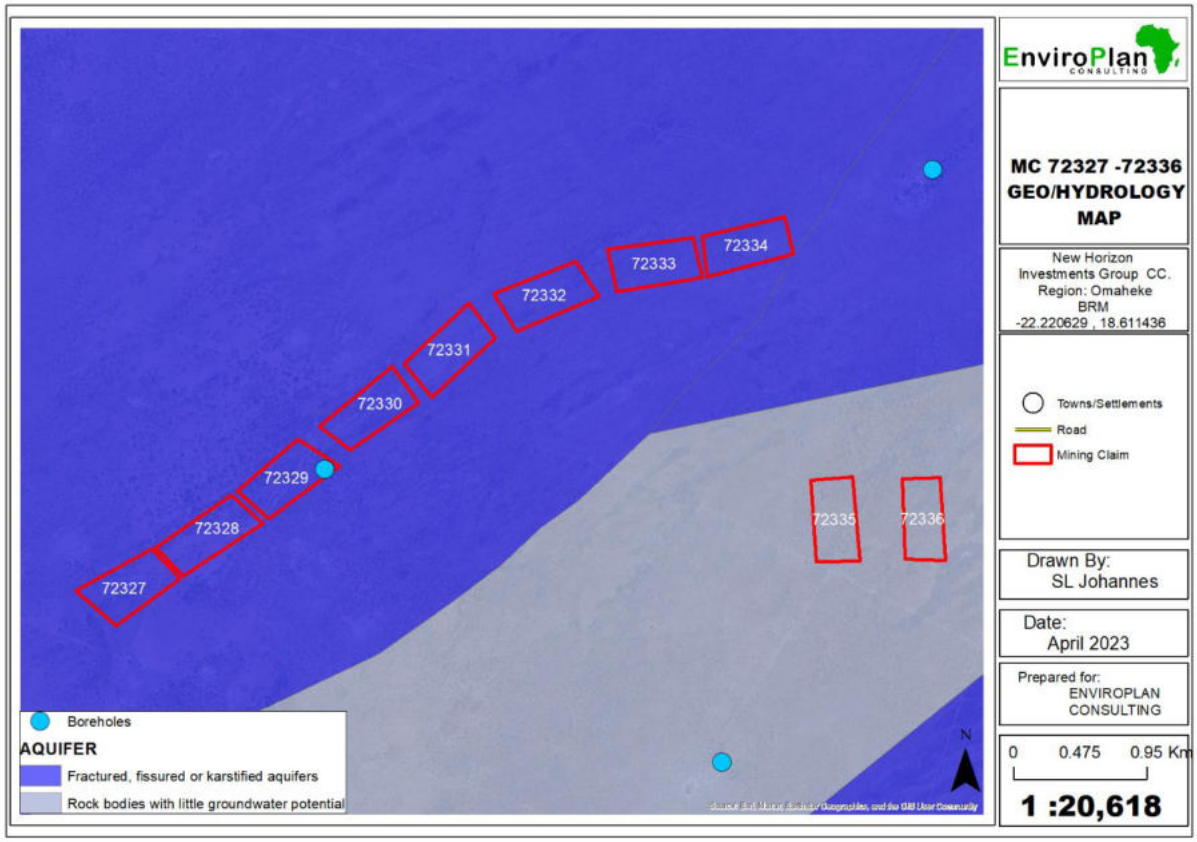

Figure 7:Geo/Hydrology Map on proposed project site

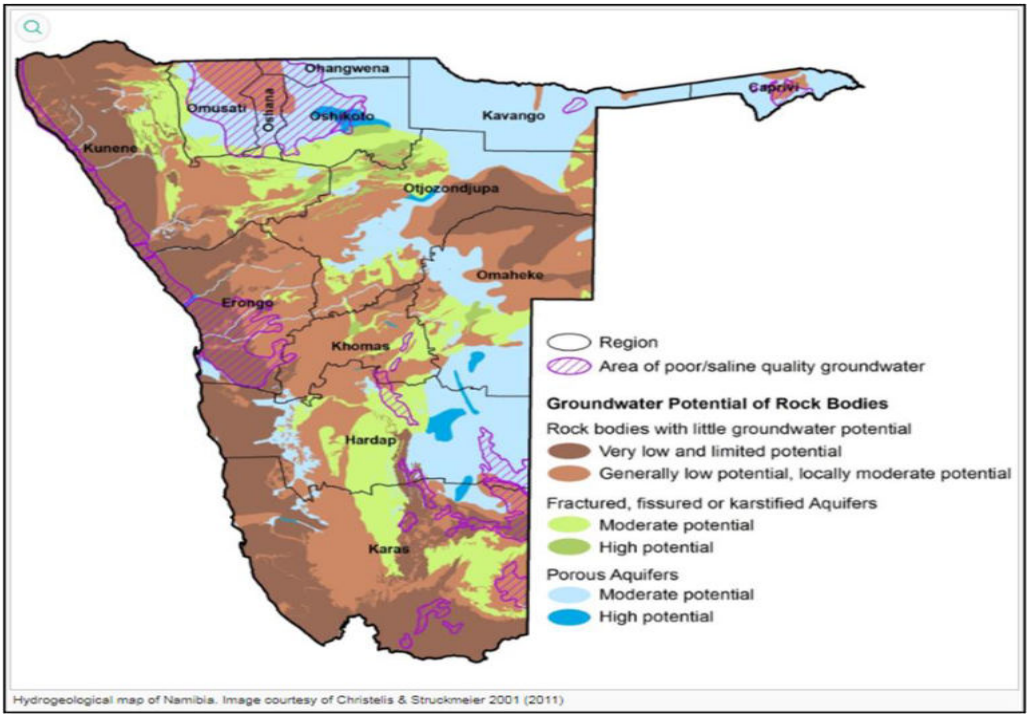

Figure 8: Groundwater potential Map of Namibia (Christelis et al 2011)

5.3.6. Aquifer Types

As detailed above, the study area (Mining Claims 72327-72336) stretches across the boundary between the Hakos Zone and the Southern Foreland where all the basement rock sequences have

been affected by low temperature – high pressure metamorphism, which was associated with the reverse movements of the Damara Orogenesis. Therefore, the area is underlain by metamorphic rocks with no primary porosity such as Schists, phyllites, quartzites, Marbles, Metagryewackes, etc). The sedimentary rocks such as sandstones, mudstones, limestones, shales, siltstones, etc., mainly restricted to the Nama Group, also do not possess primary porosity due to effects of tectonic deformation. The alluvial aquifers are absent locally in the area, as they are only restricted to the White and Black Nossob tens of kilometres to the southwest and northeast, respectively, where the thickness is ranging between 10 and 15 meters below ground level (mbgl).

5.3.7. Groundwater Recharge and Flow Direction

The project area is not located only on the subduction zone of the ancient Kalahari Craton where the basement geology has been affected by the tectonic, reverse movements, but also in the transition zone from the Dama Orogen to the thorn bush savannas of the Southern (Nama) Foreland. The geomorphology in the area is defined by fracture patterns which are generally striking Northeast-Southwest within the north-eastern parts of the White Nossob catchment area.

The groundwater recharge in the area is by means of direct rainfall infiltration through the thin cover of the Kalahari sediments into the fractures, joints, and faults, as well as other secondary structures within the metamorphic and metasedimentary bedrock. There is also deep inflow of groundwater, which is seasonally recharged by stream flow of the Back Nossob to the northeast of the area.

The water table is gently sloping in the south-westerly direction where the groundwater is flowing through the fracture pathways towards the White Nossob. The groundwater flow patterns are related to the surface drainage system, which contributes to the recharge zones of the Stampriet Artesian Basin to the Southeast.

5.3.8. Contamination Pathways

The risk of groundwater contamination from potential sources of pollution depends on the protective soil cover, depth to groundwater, geological structures, predominant flow and recharge. Considering these variables, contamination pathways in this area consist of stream network draining to the White Nossob, minor surface water ponds, and tectonic structures in the bedrock, boreholes, and the thick cover of Kalahari sediments. Figure 9 overleaf shows groundwater vulnerability to pollution.

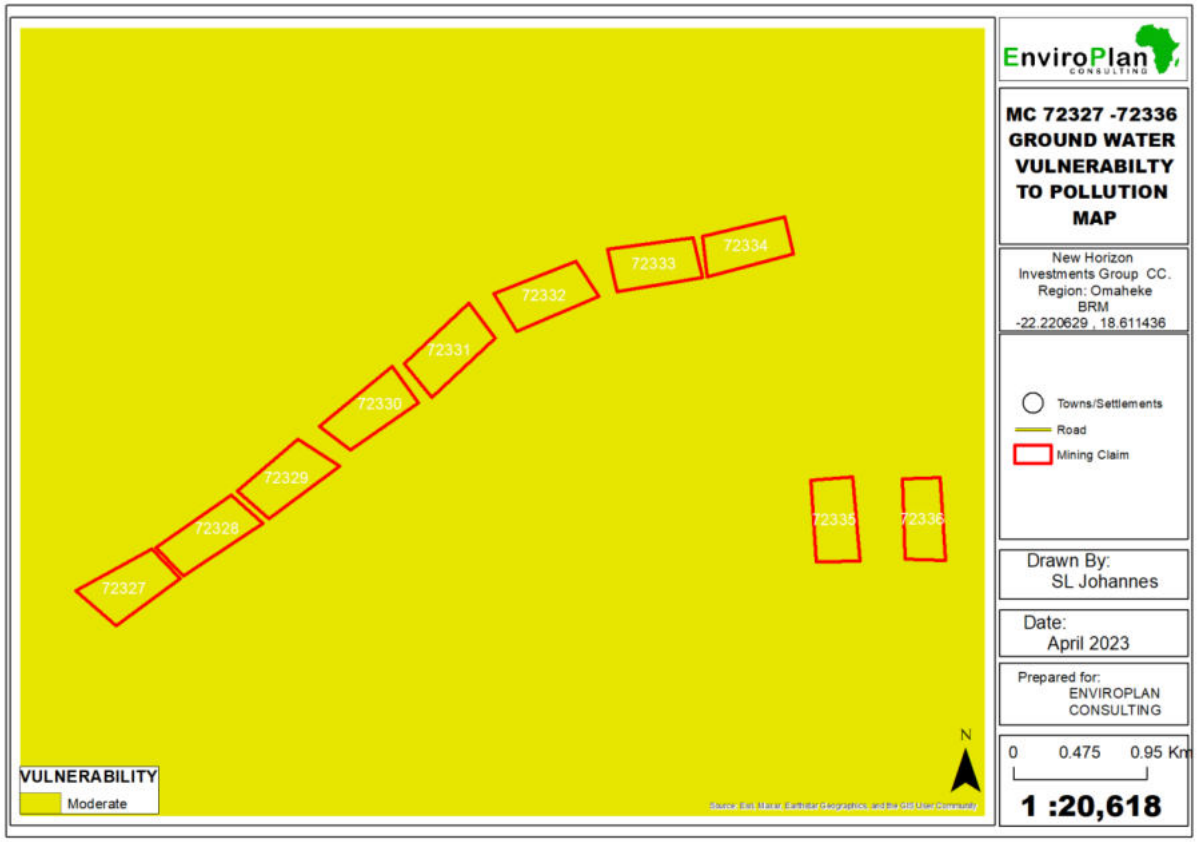

Figure 9: Groundwater vulnerability to pollution Map

5.3.9. Groundwater Use and Quality in the Area

The area is merely covered by agricultural lands mainly for livestock farming. As the area is of moderate groundwater potential, there are no large groundwater-abstraction activities such as large-scale irrigated agriculture. Groundwater is rather abstracted for domestic water supply and livestock watering as well as small scale irrigation activities of one (1) hectare at most.

Groundwater in the area is classified as fresh based, on salinity ranges, and known to be of quality ranging from Class B (good quality water) to Class C (low risk water) according to the drinking water standards in Namibia. Water quality of Class C was reported in a few boreholes due to high concentrations of Nitrate, which originated from animal wastes.

5.3.10. Aquifer Vulnerability

This section assesses the aquifer vulnerability not only to pollution but also to the depletion of groundwater storage. As explained in the preceding sections, the project area is underlain by fractured aquifers in Tsumis, Hakos, Nossib, Khomas, Witvlei, and Nama sequences with higher fracture density in the central to southwestern parts of the proposed project site. The non-porous nature of the bedrock has restricted groundwater storage to the to the fracture zones. Furthermore, the bedrock is overlain by a thin layer of less permeable (hence protective) sediments of the Kalahari Group, results in high net infiltration rates and hence reducing the residence time in the unsaturated zone.

It is, therefore, against this background the project area is moderately vulnerable due to unhindered migration of potential contaminants through the unsaturated zones to the groundwater table. Unlike surface water, which is highly vulnerable to depletion by direct evaporation, the groundwater storage is stable in the area, affected only by evapotranspiration and abstraction from boreholes. However, despite this stability, the groundwater storage in this area is very limited due limited rainfall and very high evaporation rates. This implies that most of the rainwater is lost to the atmosphere by evaporation and evapotranspiration before it percolates to the water table. Therefore, and as indicated by low borehole yield of 2.92m^3/h on average, (Tjelos (2021). The groundwater storage is vulnerable to excessive abstraction rates, which can result in draining of fractures and hence a decline in water table. This will lower the yields of or drain the shallower boreholes in the surrounding.

5.3.11. Mineral Occurrence

Omaheke Region

Copper in the region contributing to the geological character is the Kalahari Copper Belt which stretches discontinuously from western Namibia to northern Botswana for about 1000 km and hosts significant stratabound copper-silver deposits such as Klein Aub, Oamites, Dordabis, Witvlei in Namibia (Anhaeusser et al 1987) and the ones along the Ghazi-Chobe belt in Botswana (Borg et al 1987).

The mineral deposits are hosted in Meso- to Neoproterozoic metasedimentary rocks that have been deformed and metamorphosed to greenschist facies during the Pan-African Damara Orogeny (Borg et al 1987/ 1989; Modie, 1996; Hitzman et al., 2005). All deposits along the Kalahari Copperbelt have been proven to have similar lithological features with respect to age, geotectonic position and depositional environment (Borg et al 1987) and they are thought to share similarities with the Kupferschiefer of Poland and Germany, and with the central African Copperbelt of Zambia and Democratic Republic of Congo (Borg, 1987; Modie, 2000; Hall, 2012; Hitzman et al., 2005).

Mining Claims 72327-72336

The mineral deposits being targeted are located in the 'Witvlei area' (a segment of the Kalahari Copper Belt. The Witvlei area comprise of multiple areas namely Gemsbokvlei, Christiadore, Okasewa NW, Witvlei pos, Malachite and Daheim. Based on reports of past airborne magnetic surveys and exploration drilling derived from the Geological Survey of Namibia (MME), the Witvlei area is known to have a high mineral occurrence, predominantly copper. Past drilling results and radiometric data show large copper reserves associated with the proposed project site. An estimated copper ore deposit of 15 840 000 (NHIG, 2021; Henry et al 2006).

5.4. Biodiversity

5.4.1. Habitat

The MCs are located in the camelthorn savannah vegetation biome (Fig 10 below). Dominant vegetation forms are woody tree species, dense thickets of shrubs and grasses. Riverine thickets are common as defined by a network of shallow drainage channels with some connected to. Small pans are dominated by open to dense shrub lands. The broader landscape is gently undulating with many flat areas that allow for infiltration of water. The water-holding capacity is low to moderate (Strohbach, 2012), and the area has medium to high average vegetation biomass production that supports livestock farming.

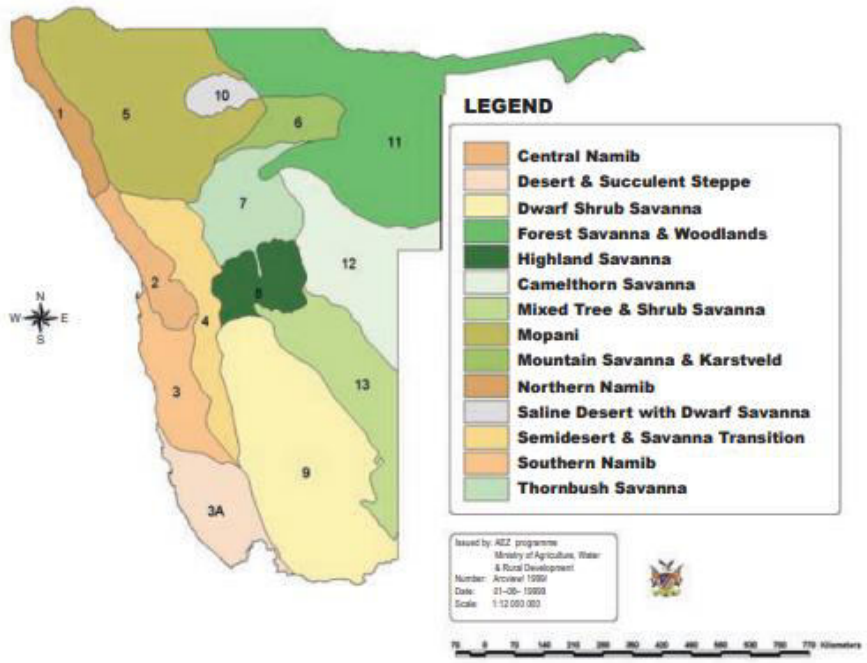

Figure 10: Biomes and broad vegetation types (Adapted from Giess,1971, MAWLR)

Based on the Normalised Difference Vegetation Index (NDVI) derived from Sentinel 2A satellite imagery (16 May 2021) and using high resolution (10 m,) NDVI values ranged between 0.09 to 0.6. The latter is an indication of a low to medium amount of green vegetation biomass present in the areas. Higher values of NDVI represent areas with a higher density of green vegetation while lower values represent areas with a low density of green vegetation.

Figure 11: A vegetation structure map on proposed project site

5.4.2. Fauna

The wildlife found in the proposed project area comprise of birds, reptiles, amphibians and a few mammal species like jackals, wild beasts and kudus. The project area has few of the mammal species used for trophy hunting which is done periodically. Farm Okasandu has a licensed shooting range an abattoir and trophy hunting equipment. Much of the wildlife that used to occur in Witvlei has now disappeared because so much of the natural vegetation has been cleared (Mendelsohn 2009). As a result, most remaining wildlife is now concentrated in the surrounding private farms. The project site is one of the farms trying to integrate domestic and wildlife animals and it has a larger land than surrounding farms.

Figure 12: A heard of Wildebeests spotted during a field tour

There are no known species of rare or endemic status in the proposed exploration and mining site. Some fauna species that occur in the area such as Wildebeest (*Connochaetes taurinus albojubatus*), Springbok (*Antidorcas marsupialis*), Duiker (*Sylvicapra grimmia*), Black-backed jackal (*Lupulella mesomelas*), Eland (*Taurotragus oryx*), Hartebeest (*Alcelaphus buselaphus*), Black faced impala (*Aepyceros melampus*), Warthog (*Phacochoerus africanus*), Zebra (*Equus quagga*), and Steenbuck

(*Raphicerus campestris*) (Environmental Compliance Consultancy, 2020). Birds' species that are found there include the **black backed vulture spp**, *Agapornis roseicollis* (rosy-faced lovebird) which is known to be endemic to the area, *Falco chicquero* (red necked falcon), *Apus coffer* (little swift), *Oena Namaqua* (Namaqua dove), *Falco rupicolis* (Rock kestrel) and *Vidua regio* (Shaft-tailed whydah). The area is also associated a high number of reptiles such as *Pseudaspis cono* (Mole snake), **black mamba** *Python notalensis* **(Southern african python), *Heliobolus lugubris* (Bushveld lizard), *Pedioplanis nomaquensis* (Namaqua sand lizard) and *Bitis orietons (*Puff adder) (Environmental Compliance Consultancy, 2020).**

5.4.3. Amphibians & Reptiles

About 263 reptiles occur in Namibia (Cunningham,2018)**.** Large scale clearing as envisaged in the worst-case scenario would have major impacts on arboreal reptiles, (M. Griffin,2018).

5.4.4. Avifauna- Birds

Approximately 174 bird's species are likely to occur in the general area. Twenty-one (21) species were sighted during the field excursion. Species observed include Helmeted Guineafowl, White-Backed vulture, Ring-necked Dove, Namaqua Dove, Gray Go-away-bird, Crowned Lapwing, Pale Chanting-Goshawk, Red-crested Bustard, Great Rufous Sparrow, Common Scimitarbill, Crimson-breasted Gonolek, Mariqua Sunbird, Red-billed Francolin, Blacksmith Lapwing, Crimson-breasted Gonolek, Blacksmith Lapwing, Red-faced Mousebird, Southern Pied-Babbler, Rufous-eared Warbler, Laughing Dove, Red-crested Bustard, Pale Chanting-Goshawk, Violet-eared Waxbill. One species listed under the IUCN Red-List Category and commonly occurring in the project area is the *Gyps africanus* (White backed vulture) that remain critically endangered (CE). The latter's survival is threatened by version poisoning meant for combating predation on commercial farms. Figure 14 overleaf is a White baked vulture spotted on its nest (top part of the tree).

Figure 13: White baked vulture spotted during a field tour

5.4.5. Flora

Plant diversity in the area is estimated to be 400 - 499 species (Mendelsohn et al, 2002. Acacias, shrubs and grasses are dominant. Most common Acacias include *Acacia erioloba* (Camelthorn), the Black thorn (*Acacia mellifera*), Red umbrella thorn (*Acacia reficiens*) and Umbrela thorn (*Acacia tortilis)*. The latter three (3) are classified as encroacher bushes. The dominant grasses observed include *stipagrostis uniplumis, Microchloa caffra(Mendelson et al.2009) and Eragrostis rigidior*. Terminalia sericea is the second most common tree species in the area. Common bushes observed during the study include *Grewia flava, Grewia flavensis*. Plants primarily associated with pens are *Ziziphus mucronata*, *Catapractes alexandrii*, and Acacias (Lindholmes, 2006). A species inventory (checklist) of species likely to occur in the project area is attached as (Appendix A of main report).

Table 6: Common plant species occurring on the project area

SPECIES	COMMON NAME	STATUS
Acacia mellifera	Black thorn	Not threatened
Acacia fleckii	Sand-veld acacia	Not threatened
Acacia karroo	Sweet thorn	Not threatened
Acacia tortolis	Umbrella thorn	Not threatened
Brachiaria serrata	Rag bush	Not threatened
Acacia erioloba	Camelthorn	Protected
Rhigozum brevispinosum	Simple-leaved rhigozum	
Terminalia sericea	Silver cluster-leaf	Protected

6. CHAPTER SIX: PUBLIC CONSULTATION

6.1. Overview

Public and Stakeholder involvement is a key component of the EA process. The public consultation process, as set out in Section 21 of Regulation No 30 of EMA (Act no 7 of 2007, has been followed during this assessment and the details thereof documented below.

6.2. Printed Media

6.2.1. 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 project. 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; see Appendices section of this document.

6.2.2. 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 “Confidante” and “New Era” newspapers.

Table 6: Newspaper and site notices

Newspaper	Area of Distribution	Language	Date placed
The Villager	Country Wide	English	01-03-2023 08-03-2023
Windhoek Observer	Country Wide	English	06-03-2023 03-03-2023
Notices	Witvlei open market, village council notice board, farm gate (on site)	English	17-03-2023

6.2.3. Site Notices

Site notices placed at the project site and at Witvlei Village Council office. These provided information about the project and related EA while providing contact details of the project team.

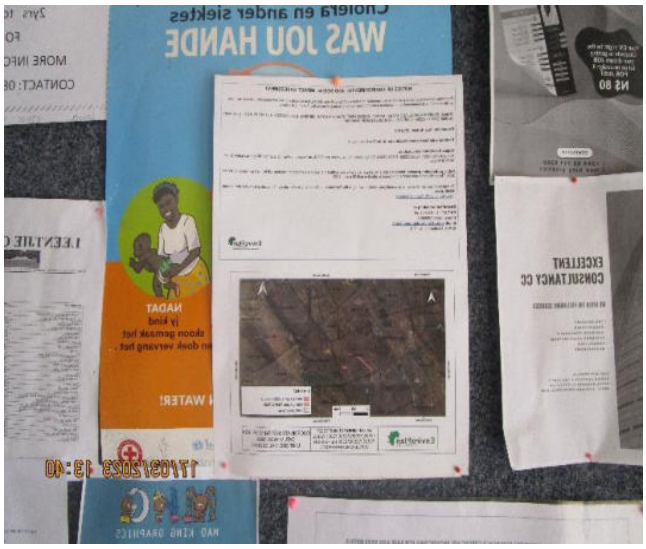

Figure 14: Public Notices on site

Stakeholder Database

A stakeholder database for the project was developed. 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.

6.2.4. Stakeholder Meetings & Key Conversations

A public meeting was scheduled to take place on the project site farm house on the 17th of March 2023 at 10:00 Hrs. The meeting was not well attended. Present was the farm owner, proponent representatives and the consulting team.

Consultation registers, comments and proof of stakeholder's engagement are attached in Appendix (iii) of this ESR. A list of neighbouring farmers was collected as well as contact details which later used to get their views on the proposed project. BIDs were circulated via emails as an additional platform specifically targeting the neighbouring farmers. Pertinent issues relating to the projects were discussed and recorded.

6.2.5. Comments and review period

From the onset of the public consultation process and the initial information sharing through the BID, newspaper and site notices, various stakeholders have registered and provided comments.
The public commenting period from the first Newspaper advert spanned for thirty (30) days and the Scoping Report and Environmental Management Plan was made available to the public and stakeholders for comment and review. Table 6 overleaf summarises the key issues raised during public consultations. All raised concerns were carefully attended and addressed in the Impact Management Plan compiled for the proposed mining activities.

Table 7: Key issues raised during public consultations

THEME	COMMENT
ECONOMIC	Employment of general labour: NHIG must consider employing local people particularly the youth. Improve the life being of the residents. The project should benefit all the community members citing lack of inclusivity when projects kick-off.
AMBIENT ENVIRONMENTAL QUALITY	Dust emissions, suppression and monitoring measures were inquired. Noise pollution
ENVIRONMENTAL	Potential for water pollution from exploration was raised, citing groundwater vulnerability. Concerns regarding the rehabilitation of target exploration areas were also raised. Resources such as air and water should not be polluted during operations because communities, wild animals and livestock rely on these resources. Waste management was emphasized as crucial to the project as the community does not have a functional and approved solid waste disposal site.

EnviroPlan concludes that the public participation was extensive and transparent enough to ensure any comments or issues regarding the proposed development were addressed and to suggest possible mitigation measures.

7. CHAPTER SEVEN: ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

7.1. Overview

Explorations and mining activities are associated with a wide range of potential environmental impacts, both positive and negative. The primary aim of an environmental assessment is to assess the potential impacts of proposed exploration activities. This is done to ensure that the negative impacts that the project activities may have on the biophysical and social environments are adequately addressed, are brought under control while maximizing the positive impacts. The potential positive and negative impacts that have been identified from the proposed activities are as follows:

7.1.1. Description of identified Impacts (Positive and Negative)

The potential benefits and adverse impacts stemming from the proposed development onto the bio-physical and socio-economic environment during all phases of project are listed below and assessed. NHIG has committed to sustainability and environmental compliance by coming up with a corrective action for all anticipated environmental impacts associated with the project. This is also in line with the Namibian Environmental Management legislation and International best practices. As proponent, NHIG will implement an Impact Management Plan (IMP) to prevent, minimise and alleviate negative impacts. The IMP developed 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. The main conclusion of the overall assessment was that the proposed project would result in environmental and social impacts, however management and monitoring measures will be put in place to minimise these impacts to insignificant levels. Summaries of the key findings of the specialist studies are provided below.

Positive impacts

- Improvement the country's GDP because of mineral extraction, processing and selling;
- Socio-economic advancement: The proposed development will create several employment opportunities for individuals and their families in the surrounding areas.

Negative impacts

- Aesthetics /Visual Degradation (operational and decommissioning phases)
- Biodiversity Loss/Wildlife disturbance (all phases)
- Decrease in ambient air quality (operation and decommissioning phases)
- Over abstraction of water and contamination (operation and decommissioning phases)
- Soil degradation (operational phase)
- Damage to Private Property (all phases)
- Noise nuisance from vehicle activities (all phases)
- Public and environmental Health impacts (operation and decommissioning phases)
- Social nuisance: Influx of people into the area, economic losses due to poaching (All phases)
- Vehicular traffic impacts (all phases)
- Waste generation and management (all phases)

7.2. Assessment of Impacts

This section sets out the overall approach that was adopted to assess the potential environmental and social impacts associated with the project. To fully understand the significance of each of the potential impacts each impact must be evaluated and assessed. The definitions and explanations for each criterion are set in Table 7 and 8 below.

7.2.1. Extent (spatial scale)

Extent is an indication of the physical and spatial scale of the impact. Table 13 shows rating of impact in terms of the extent of spatial scale.

Table 8:Extent or spatial impact rating

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

7.2.2. Duration

Duration refers to the timeframe over which the impact is expected to occur, measured in relation to the lifetime of the project. Table 14 shows the rating of impact in terms of duration.

Table 9:Duration of Impact

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Immediate mitigating measures, immediate progress	Impact is quickly reversible, short term impacts (0-5 years)	Reversible over time; medium term (5-15 years)	Impact is long- term	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

7.2.3. Intensity, magnitude / severity

Intensity refers to the degree or magnitude to which the impact alters the functioning of an element of the environment. The magnitude of alteration can either be positive or negative. These were also taken into consideration during the assessment of severity. Table 11 below shows the rating of impact in terms of intensity, magnitude or severity.

Table 10: Intensity, magnitude and severity of impact

Type of Criteria	**Negative**				
	H- **(10)**	**M/H** **(8)**	**M-** **(6)**	**M/L** **(4)**	**L-** **(2)**
Qualitative	Very high deterioration, high quantity of deaths, injury of illness / total loss of habitat, total alteration of ecological processes, extinction of rare species	Substantial deterioration, death, illness or injury, loss of habitat / diversity or resource, severe alteration or disturbance of important processes	Moderate deterioration, discomfort, partial loss of habitat / biodiversity or resource, moderate alteration	Low deterioration, slight noticeable alteration in habitat and biodiversity. Little loss in species numbers	Minor deterioration, nuisance or irritation, minor change in species / habitat / diversity or resource, no or very little quality deterioration.

7.2.4. Probability of occurrence

Probability describes the likelihood of the impacts actually occurring. This determination is based on previous experience with similar projects and/or professional judgment. See Table 8-4 for impact rating in terms of probability of occurrence.

Table 11: Probability of occurrence impact rating

Low (1)	Low/Medium (2)	Medium (3)	Medium/High (4)	High (5)
Improbable; low likelihood; seldom. No known risk or vulnerability to natural or induced hazards.	Likely to occur from time to time. Low risk or vulnerability to natural or induced hazards	Possible, distinct possibility, frequent. Low to medium risk or vulnerability to natural or induced hazards.	Probable if mitigating measures are not implemented. Medium risk of vulnerability to natural or induced hazards.	Definite (regardless of preventative measures), highly likely, continuous. High risk or vulnerability to natural or induced hazards.

7.2.5. Significance

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

Once the above factors (Table 14, Table 15, Table 16 and Table 17) have been ranked for each potential impact, the impact significance of each is assessed using the following formula:

SP = (magnitude + duration + scale) x probability

The maximum value per potential impact is 100 significance points (SP). Potential impacts were rated as high, moderate or low significance, based on the following significance rating scale (Table 18).

Table 12: Significance rating scale

SIGNIFICANCE	***ENVIRONMENTAL SIGNIFICANCE POINTS***	***COLOUR CODE***
High (positive)	>60	H
Medium (positive)	30 to 60	M
Low (positive)	<30	L
Neutral	0	N
Low (negative)	>-30	L
Medium (negative)	-30 to -60	M
High (negative)	>-60	H

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

The impact assessment for the proposed activities is given below.

7.3. Exploration Phase Impact Assessment

The Exploration phase is mostly concerned with the preparation of the site for access roads, drilling sites and camping sites. The potential impacts during this phase include loss of biodiversity, dust and noise during site clearing and preparation.

7.4. Impact Assessment of Biodiversity Loss

A number of indigenous trees are located along the mountain and riverine areas. Some vegetation may need to be removed for exploration and accessibility. This may also lead to habitat destruction for some fauna. As such, care should be taken during the removal of vegetation for site preparation to ensure minimal disturbance in the area. The envisaged impact at the project site is thus not of such magnitude and/ or significance that it will have irreversible impacts on the biodiversity and endemism of the area and Namibia at large. The pre- mitigation impact is assessed to be “medium” in significance and after mitigation the impact is assessed to have a “low” significance. The assessment of this impact is presented in Table 14.

Table 13:Assessment of the impacts on biodiversity loss

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 3	L/M - 5	M - 6	M – 3	M - 42
Post-mitigation	L - 1	L- 1	L- 2	L - 1	L-4

7.4.1. Mitigations and recommendations to biodiversity loss

- Large indigenous trees on site need to be identified, marked, surveyed and are not to be removed or damaged.
- Trees with a trunk size of 150 mm and bigger should be surveyed, marked with paint (readily visible) and protected.

- Protected tree species as per the Forest Act No 12 of 2001 and Forest Regulations of 2015 may not be removed without a permit from the Ministry of Agriculture, Water and Forestry.
- Workers should be trained on the importance of conserving trees during construction activities and should be sensitised to be vigilant against any practice that will have a harmful effect on vegetation.

7.5. Impact Assessment of Dust Generation

Site clearing and drilling activities may lead to the generation of dust which could impact the local communities and businesses negatively, if not properly handled. This may pose a negative health impact on the surrounding communities. Without any mitigation measures implemented, the impact can be rated as of a "medium" significance. After the implementation of the mitigations, the impact will be significantly reduced to "low" rating. The assessment of this impact is presented in Table 15.

Table 14: Assessment of the impacts of dust generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 3	L/M - 5	M - 6	M – 3	M - 27
Post-mitigation	L - 1	L- 1	L- 2	L - 1	L-4

7.5.1. Mitigations and recommendations to dust generation

- Dust abatement techniques should be implemented e.g. spraying of water on site to reduce dust levels to an acceptable standard.
- The local community and surrounding businesses should be continuously consulted to ensure that the dust levels are acceptable.
- Community members and businesses should be informed prior to any clearing of vegetation commencing so that they are aware of the planned work.
- During high wind conditions, the contractor must make the decision to cease works until the wind has settled.
- Stockpiles should be covered with plastic to reduce windblown dust.
- Workers should be provided with dust masks.

7.5.2. Mitigations and recommendations to noise generation

Site preparation activities should be limited to daytime hours (between 08h00 and 17h00) unless otherwise arranged with community members and businesses in the area.

7.6. Impact Assessment on Environmental Degradation

During exploration different types of waste may be generated on-site. This may include general waste as well as hazardous chemicals and hydrocarbons which may cause degradation of the subject environment if not correctly managed and contained. Furthermore, the presence of the workforce and machinery may enhance environmental destruction within the subject site. Without any mitigation measures implemented, the impact can be rated as of a "medium" significance. After the implementation of the mitigations, the impact will be significantly reduced to "low" rating. The assessment of this impact is presented in Table 16.

Table 15: Assessment of impacts on environmental degradation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 1	L/M - 3	M - 4	M – 4	M - 32
Post-mitigation	L - 1	L- 1	L- 2	L - 1	L-4

7.6.1. Mitigations and recommendations to environmental degradation

- All types of waste should be effectively managed on site.
- Hazardous substances and hazardous waste materials should be carefully and correctly handled and stored on site according to guidelines in the EMP.
- Contractors should be trained on the importance of protecting the environment.
- Contractors should be trained on EMP compliance and sensitized to ensure that they respect and protect the environment during the work.

7.7. Impact Assessment of Waste Generation

Exploration activities usually generate waste which may lead to environmental pollution, if not properly handled. This may result in blocked waterways should waste be blown into water pipelines; animals may choke on waste when ingested and additionally it may pose a negative visual impact on the surrounding environment. Without any mitigation measures implemented, the impact can be rated as of a "medium" significance. After the implementation of the mitigations, the impact will be significantly reduced to a "low" rating. The assessment of this impact is presented in Table 17.

Table 16: Assessment of Impacts on Waste generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 1	L/M - 3	M - 4	M – 4	M – 32
Post-mitigation	L - 1	L- 1	L- 2	L - 1	L-4

7.7.1. Mitigations and recommendation to waste generation

- The construction site should be kept tidy at all times.
- All domestic and general construction waste produced on a daily basis should be cleaned and contained.
- No waste may be buried or burned on site or anywhere else.
- Waste containers (bins) should be emptied during and after the construction and the waste removed from site to the municipal waste disposal site on a covered vehicle (to prevent waste blowing off the vehicle into the environment).
- Separate waste containers (bins) for hazardous and domestic / general waste must be provided on site.
- Construction labourers should be sensitised to dispose of waste in a responsible manner and not to litter.
- No waste may remain on site after the completion of the project.
- The recycling of waste should be considered and implemented as far as possible.

7.8. Impact Assessment of Soil, Surface and Groundwater

Improper handling, storage and disposal of hydrocarbon products and hazardous materials at the site may lead to soil, surface and groundwater contamination, in case of spills and leakages. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 18.

Table 17: Assessment of the impacts on soil, surface and groundwater

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M - 3	L/M - 4	M - 6	M – 4	M – 52
Post-mitigation	L - 1	L- 1	L- 2	L - 1	L-4

7.8.1. Mitigations and recommendation to soil, surface and groundwater

- Careful storage and handling of hydrocarbons on site is essential.
- Workers responsible for the storage and handling of hydrocarbons should be suitably trained to do so and trained on spill prevention (e.g. the use of drip trays) and the handling of potential spills should they occur, to be able to ensure implementation on site.
- Potential contaminants such as hydrocarbons and wastewater should be contained on site and disposed of in accordance with municipal wastewater discharge standards so that they do not contaminate surrounding soils, surface water and eventually groundwater.
- An emergency plan should be available for major / minor spills at the site during operation activities (with consideration of air, groundwater, soil and surface water) and during the transportation of the product(s) to the site.

7.8.2. Mitigations and recommendations to dust generation

- Dust abatement techniques should be implemented e.g. spraying of water on site to reduce dust levels to an acceptable standard.
- The local community and surrounding businesses should be continuously consulted to ensure that the dust levels are acceptable.
- Community members and businesses should be informed prior to construction commencing so that they are aware of the planned construction.
- During high wind conditions the contractor must make the decision to cease works until the wind has settled.
- Stockpiles and sand being transported should be covered with plastic to reduce windblown dust.
- Workers should be provided with dust masks.

7.9. Impact Assessment of Noise Generation

Exploration activities and the presence of construction vehicles may lead to the generation of noise which could impact the local communities and animals negatively, if not properly handled. This may pose a disturbance on the surrounding communities. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to “low” rating. The assessment of this impact is presented in Table 19.

Table 18: Assessment of the impacts of noise generation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M – 2	L/M - 2	M - 6	M – 3	M - 27
Post-mitigation	L – 1	L- 1	L- 2	L - 1	L-4

7.9.1. Mitigations and recommendation to noise generation

- Construction activities should be limited to daytime hours (between 08h00 and 17h00) unless otherwise arranged with community members and businesses in the area.
- No amplified music should be allowed on site.
- Technology such as silencers should be installed on construction machinery.
- The use of horns as a general communication tool should not be allowed, they should only be used when necessary, as a safety measure.

7.10. Impact Assessment of Archaeological and Heritage Resources

The proposed construction activities are not taking place in an area that has significant archaeological or heritage resources. However, should these be encountered during the upgrade activities, mitigation measures need to be in place to ensure that these resources are not harmed.

Memorial sites were identified along the road which are to be preserved during the proposed upgrade. Without any mitigation measures implemented, the impact can be rated as of a "medium" significance. After the implementation of the mitigations, the impact will be significantly reduced to "low" rating. The assessment of this impact is presented in Table 20.

Table 19: Assessment of the impacts on archaeological and heritage resources

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M – 1	L/M - 4	M - 6	M – 1	M - 11
Post-mitigation	L – 1	L- 1	L- 2	L - 1	L-4

7.10.1. Mitigations and recommendation to archaeological and heritage resources

- All works are to be immediately ceased in an affected area should an archaeological or heritage resource be discovered.
- The National Heritage Council of Namibia (NHCN) should advise with regards to the removal, packaging and transfer of the potential resource.

7.11. Impact Assessment of Temporary Employment Creation

The proposed activity may provide employment opportunities for the local people. Additional benefits may arise depending on the agreements reached between the community and the Proponent. The impact can be rated as of a "low-positive" significance. The assessment of this impact is presented in Table 21.

Table 20: Assessment of impacts on temporary employment creation

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M + 2	L/M + 2	M + 2	M +3	L+ 18
Post-mitigation	L + 4	L+ 3	L+ 2	L + 3	L + 27

7.11.1. Recommendations for temporary employment creation

- Should any job opportunities result, they should be made available to the local people in the area as far as reasonably possible.
- Should materials or resources be sourced from communities, they should be sufficiently compensated in a manner agreed between the community and the proponent/contractor.

7.12. Impact Assessment of Health, Safety and Welfare

Mineral exploration and construction may cause health and safety risks to people operating on the site. Without any mitigation measures implemented, the impact can be rated as of a "medium" significance. After the implementation of the mitigations, the impact will be significantly reduced to "low" rating. The assessment of this impact is presented in Table 22.

Table 21: Assessment of impacts on health, safety and welfare

	Extent	Duration	Intensity	Probability	Significance
Pre-mitigation	L/M – 2	L/M - 2	M - 6	M – 3	M - 27
Post-mitigation	L – 1	L- 1	L- 2	L - 1	L-4

7.12.1. Mitigations and recommendations to health and safety

- Employees should be provided with awareness training about the risks associated with the proposed upgrade work such as hydrocarbon handling and storage, the handling of heavy machinery etc.
- During the works conducted, workers should be properly equipped with personal protective equipment (PPE) such as coveralls, gloves, safety boots, safety glasses etc.
- The contractors should comply with the provisions with regards to health and safety as outlined in the Labour Act (No. 6 of 1992).
- The contractor should ensure that road safety is prioritised during the road upgrade phase. Detours and temporary access should have adequate signage and safety considerations.

8. CHAPTER EIGHT: RECOMMENDATIONS AND CONCLUSION

8.1. Conclusion

The key potential biophysical impacts related to the mineral exploration and decommissioning phases of the proposed project were identified and assessed. Suitable mitigation measures (where required and possible) were recommended, and the impacts can be summarised as follows:

8.1.1. Impacts on biodiversity:

There are some large indigenous trees that may be affected, as such, no vegetation removal is recommended, unless a permit is issued by DEAF to ensure minimal disturbance in the area. The likelihood of this impact is low. However, the impact can be adequately addressed by the recommendations and management actions given in the EMP.

8.1.2. Impacts on environmental degradation:

Mineral exploration may result in hydrocarbons which may cause degradation of the subject environment. Furthermore, the presence of the workforce and machinery may aid in environmental destruction within the subject site. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The impact can be adequately addressed by the recommendation’s management actions given in the EMP.

8.1.3. Impacts on waste generation:

Construction and exploration activities usually generate waste, which leads to environmental pollution, if not properly handled. This may result in blocked waterways should waste be blown into water pipelines, animals may choke on waste when ingested and it may pose a negative visual impact on the surrounding environment. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

8.1.4. Impacts on soil, surface and groundwater contamination:

Improper handling, storage and disposal of hydrocarbon products and hazardous materials at the site may lead to spills and leakages which could cause soil, surface and groundwater contamination. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

8.1.5. Impacts on dust generation:

Site clearing, construction activities and the presence of construction vehicles may lead to the generation of dust which could impact the local communities negatively, if not properly handled. Without any mitigation measures implemented, the impact can be rated as of a “medium”

significance. After the implementation of the mitigation measures, the impact will be significantly reduced to low rating. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

8.1.6. Impact on noise generation :

Site clearing, construction, exploration and existence of heavy vehicles may lead to the generation of noise which could impact the local communities negatively, if not properly handled. This may pose a disturbance on the surrounding communities. Without any mitigation measures implemented, the impact can be rated as of a “medium” significance. After the implementation of the mitigations, the impact will be significantly reduced to low rating. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

8.1.7. Impact on archaeological and heritage resources (during construction phase):

The proposed activity is not taking place in an area that has significant archaeological or heritage resources. However, should these be encountered during the construction activities, mitigation measures need to be in place to ensure that these resources are not harmed. The impact can be adequately addressed by the recommendations and management actions given in the EMP.

8.2. Recommendation

Based on the information provided in this report, EnviroPlan is confident the identified risks associated with the proposed project can be reduced to acceptable levels, should the measures recommended in the EMP be implemented and monitored. It is therefore recommended that the project receive Environmental Clearance, provided that the EMP be implemented.

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10. APPENDICES

Appendix A: Environmental and Social Management Plan

Appendix B: Public Consultation Documents

1. Newspaper adverts

2. Attendance Register

3. I&APs Communiques

4. Meeting Minutes

Appendix C:
Maps and Layouts

1. Locality Map

Appendix D:
Lead EAP Resume

1. Tendai E. Kasinganeti