

ENVIRONMENTAL IMPACT ASSESSMENT
FOR PROPOSED EXPLORATION ACTIVITIES ON EPL 6123 &
5600 NEAR SESFONTEIN
KUNENE REGION



Prepared By

**ECO-WISE ENVIRONMENTAL
CONSULTING CC**

P.O Box 40168 Windhoek

Cell: +264 813 826460

Email: ecowise@protonmail.com

Prepared For

KAOKO MINING NAMIBIA PTY LTD

P.O. Box 1121

Tsumeb

Cell: +264 67 220504

Fax: +264 67 220509



DOCUMENT AUTHENTICATION

This Environmental Impact Assessment project report has been prepared by Eco-Wise Environmental Consulting cc in accordance with the Environmental Management Act No 7 of 2007 (EMA) and its regulations of 2012, which requires that every mining related project must have an EIA report prepared for submission to the Ministry of Environment and Tourism-Division of Environmental Affairs. I the undersigned, certify that the particulars in this report are correct and righteous to the best of my knowledge.

EIA/EA FIRM OF EXPERTS:

ECO-WISE ENVIRONMENTAL CONSULTING CC

P.O Box 40168 Windhoek

Cell: +264 813 826460

Email: ecowise@protonmail.com

Date of Submission: 27 August 2020

ENVIRONMENTAL AUTHORIZATION INFORMATION

Please note that the environmental clearance certificate should be issued out to the client. All comments and enquiries during the evaluation of this document must be addressed to the Environmental Consultants. Please forward the clearance certificate to the consultant.

TABLE OF CONTENTS

LIST OF IMAGES..... 5

LIST OF TABLES..... 5

LIST OF APPENDICES 6

ACRONYMS..... 6

EXECUTIVE SUMMARY 7

CHAPTER ONE: BACKGROUND 9

1.1 INTRODUCTION 9

1.2 NEED AND DESIRABILITY OF THE PROJECT..... 9

1.2.1 PROMOTE LOCAL EMPOWERMENT 9

1.2.2 ECONOMIC DEVELOPMENT 9

1.2.3 EMPLOYMENT CREATION10

1.2.4 LOCAL DEVELOPMENT10

1.3 SCOPE OF THE PROJECT10

1.4 TERMS OF REFERENCE.....10

1.5 OBJECTIVES11

1.5.1 GENERAL OBJECTIVE11

1.5.2 SPECIFIC OBJECTIVES11

1.6 METHODOLOGY USED FOR THE STUDY11

1.7 LAND OWNERSHIP12

1.8 OVERVIEW OF EIA REPORT12

CHAPTER TWO: PROJECT DESCRIPTION12

2.1 PROJECT LOCATION12

2.3.1 RESEARCH AND RECONNAISSANCE.....13

2.3.2 TRENCHING AND DRILLING.....13

2.3.3 GEOCHEMICAL SAMPLING AND ANALYSIS14

2.3.4 MAPPING14

2.4 PROJECT COST14

CHAPTER THREE: ANALYSIS OF ALTERNATIVES14

3.1 ALTERNATIVE LOCATIONS14

3.2 THE “NO PROJECT” ALTERNATIVE14

3.3 OTHER ALTERNATIVES15

3.4 ALTERNATIVES ASSESSMENT OUTCOMES16

CHAPTER FOUR: RELEVANT LEGISLATION16

CHAPTER FIVE: DESCRIPTION OF THE AFFECTED ENVIRONMENT21

5.1 BIO-PHYSICAL ENVIRONMENT.....21

5.1.1 CLIMATE21

5.1.2 TOPOGRAPHY AND GEOLOGY21

5.1.3 HYDROGEOLOGY22

5.1.4 SOILS22

5.1.5 VEGETATION OF THE STUDY AREA23

5.1.6 FAUNA.....24

5.1.7 ARCHAEOLOGY.....24

5.2 SOCIO-ECONOMIC ENVIRONMENT28

5.2.1 POPULATION	28
CHAPTER SIX: PUBLIC PARTICIPATION	29
CHAPTER SEVEN: ASSESSMENT OF ENVIRONMENTAL IMPACTS	33
7.1 IDENTIFICATION OF POTENTIAL IMPACTS OF THE PROJECT	34
7.2 IMPACT ANALYSIS.....	34
7.3 IMPACT EVALUATION	37
7.3.1 NEGATIVE IMPACTS ASSOCIATED WITH EXPLORATION PHASE:.....	37
7.3.2 NEGATIVE SOCIO-ECONOMIC IMPACTS ASSOCIATED WITH EXPLORATION PHASE:	43
7.3.3 POSITIVE IMPACTS ASSOCIATED WITH THE PROJECT	47
7.4 SUMMARY & ANALYSIS OF IMPACTS	49
CHAPTER EIGHT: ENVIRONMENT MANAGEMENT AND MONITORING PLAN	49
CHAPTER NINE: CONCLUSIONS AND RECOMMENDATIONS.....	49
REFERENCES.....	51

LIST OF IMAGES

Image 1: Vegetation around the study area	23
Image 2: Public Participation Meeting at Sesfontein Conservancy	32
Image 3:Public Participation Meeting at Otwani Rural District Council	32
Image 4: Public Participation Meeting in Otjapitjapi Village	32
Image 5:Public notice at Otwani clinic	34
Image 6: Public notice at Kunene Regional Council.....	33

LIST OF TABLES

Table 1: Coordinates for the EPLs	12
Table 2: Exploration methods.....	15
Table 3: Services alternatives.....	15
Table 4: Relevant legislations related to the project.....	17
Table 5: General Climate Data	21
Table 6: Geology for the EPLs	22
Table 7: Protected plant species.....	23
Table 8: Details of public notification of the EIA study.....	30
Table 9: Ranking Matrix	34
Table 10: Ranking matrix for Environmental Significance	35
Table 11: Matrix to show environmental significance.....	36

LIST OF FIGURES

Figure 1: Map of declared heritage sites in Kunene Region.....	27
--	----

LIST OF APPENDICES

Appendix A -Maps (Site location, Vegetation & Hydrogeology)

Appendix B –Public Participation Process (Adverts, Background Information Document (BID), Register, Meeting Minutes & Questionnaires)

Appendix C - Consent letters, Agreements

Appendix D - Environmental Management Plan (EMP)

Appendix E - CV’s of Consultants

ACRONYMS

ACRONYM	MEANING
BID	Background Information Document
EIA	Environmental Impact Assessment
EAP	Environmental Assessment Practitioner
EMP	Environmental Management Plan
EPL	Exclusive Prospecting License
GDP	Gross Domestic Product
HPP	Harambe Prosperity Plan
I&APs	Interested and Affected Parties
LTD	Limited Company
NDP4	National Development Plan 4
PPP	Public Participation Process
PTY	Proprietary
ToR	Terms of Reference

EXECUTIVE SUMMARY

Proponent

The Proponent, Kaoko Mining Namibia (Pty) Ltd, proposes to conduct exploration activities on the following EPLs 6123 & 5600 near Sesfontein area, Kunene Region. Kaoko Mining Namibia (Pty) Ltd is a registered Namibian company. The shareholders are thirty-three Namibians with other various EPLs and mining claims around Opuwo and Sesfontein area. The shareholders managed to group their licenses together with the objective to study all historical geological data of all their EPL's in order to search for new mineral showings and to determine potential areas for exploration. The areas to be explored, might have different minerals but the proponent is mainly aiming to discover, copper of medium to large minable deposits. The future plans of the proponent is to supply the copper to Tsumeb Smelter.

Environmental Assessment Consultants

The Environmental Impact Assessment (EIA) for the proposed exploration was conducted by Eco-Wise Environmental Consulting cc. The study was carried out according to the requirements of the Environmental Management Act (Act No.7 of 2007) and its regulations of 2012.

Environmental Impact Assessment

This is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. The Environmental Consultants undertook this Environmental Impact Assessment (EIA) study, to predict the impacts of the proposed activity on the environment and to propose mitigation measures. The EIA covered the following aspects; project description, baseline studies, public participation process, environmental, socio-economic impact assessment and environmental management. All identified impacts were addressed and mitigation measures were brought forward where needed.

Objectives of the EIA

Generally, the main objective of the study was, to identify environmental and socio-economic impacts associated with exploration activities and to propose mitigation measures as required.

Specific objectives included:

- To determine the potential environmental impacts derived from the proposed exploration activities.
- To establish baseline environmental conditions so that relevant impacts could be projected and sufficient mitigation measures could be designed.

- To consult with key, interested and affected stakeholders so that their concerns are considered in the formulation of the EIA report and implementation of the Environmental Management Plan
- To propose alternative measures where it is noticed that adverse effects may occur and to set up an Environmental Management Plan that will govern all activities of the project for the better protection of the environment.

Environmental Impact Assessment Methodology

The following methodologies were used during the Environmental Impact Assessment study; desktop studies, observations through site visit, public meetings, advertisement, secondary data collection and distribution of questionnaires and letters. Public meetings were open to all stakeholders (Interested and Affected Parties).

Positive impact associated with the project include employment creation, local empowerment, land utilization for the benefit of the people and generation of revenue. If this initiative succeeds and ultimately develops into an active mine, this will support thousands of Namibians and fast track development in the southern areas of Kunene Region. Positive impacts which will likely happen in future include transfer of skills, employment creation, community development and boosting Namibia's copper supplies and mineral exports. However, the project might also have negative impacts such as impact on the landscape, soil disturbance, impact on fauna, vegetation disturbance, heritage impact, occupational hazards on employees, generation of waste and spread of HIV/AIDS.

Draft Scoping Report

The draft scoping report was made available to the public for commenting. The draft report included all comments raised during the public meetings. All impacts identified through the site visit, professional expert opinions and comments from the public were incorporated in the report. An Impact Assessment matrix was used to establish the environmental risk of the overall project. In a bid to ensure that the proposed mitigation measures will be implemented, an Environmental Management Plan was developed to guide all activities of the project.

Final Scoping Report and EMP

The final report was sent to the Proponent, Kunene Regional Council, Ministry of Mines and Energy, National Heritage Council and Ministry of Environment Forestry and Tourism: DEA for review.

CHAPTER ONE: BACKGROUND

1.1 Introduction

Kaoko Mining Namibia (Pty) Ltd being the Proponent proposes to conduct exploration activities on the following EPLs' 6123 & 5600 near Sesfontein area in Kunene Region. Different local individuals with EPLs' around Opuwo and Sesfontein area came together and formed a company and then transferred their EPLs into that company which is Kaoko Mining Namibia (Pty) Ltd. See Appendix C, Agreement for transfer of the EPLs from the shareholders to Kaoko Mining Namibia (Pty) Ltd. All the EPLs listed were checked on the Ministry of Mines and Energy portal and were found not to be falling under environmentally sensitive areas or withdrawn areas.

An independent consultant, Eco-Wise Environmental Consulting was contracted to conduct an EIA for the proposed exploration activities. Eco-Wise Environmental Consulting cc conducted a site visit on 25/10/2019. The consultant was mainly guided by the Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (2012) during the process of the EIA. The Environmental Impact Assessment Regulations (2012) states all the activities, which require an Environmental Impact Assessment and among the listed activities is annexure 3, mining and quarrying activities, under which this project is classified. Annexure 3.2 states that other forms of mining or extraction of any natural resources whether regulated by law or not and 3.3 Resource extraction, manipulation, conservation and related activities require an EIA. The competent authority will be, Ministry of Environment, Forestry and Tourism.

1.2 Need and Desirability of the Project

As one of the main contributors to the Gross Domestic Products (GDP) of Namibia, mining fulfils the criterion set out by the Harambe Prosperity Plan's (HPP) need for economic growth and employment creation. The proposed activities are also in line with Namibia's Vision 2030 goals and National Development Plan 4 (NDP4) which also stresses of the need for economic development and employment creation. This justifies the need and desirability of the proposed exploration activities by Kaoko Mining Namibia (Pty) Ltd. Below is an articulation of some of the direct benefits of the proposed project.

1.2.1 Promote local empowerment

Kaoko Mining Namibia (Pty) Ltd comprises of thirty-three local shareholders, hence if the project is successful it will result in financial empowerment for these local shareholders who are also in turn supporting many households.

1.2.2 Economic development

Given that, medium to large minable copper deposits are discovered, this will boost Namibia's copper supplies and mineral exports thereby adding Namibia's struggling economy. In addition,

the proponent will generate revenue for the government through taxes. Revenue generated through taxes will be used for economic development.

1.2.3 Employment creation

Given that this initiative succeeds and ultimately develops into an active mine, thousands of Namibians will benefit. Job opportunities will be created during the life span of the project. The type of jobs will range from skilled, semi-skilled and unskilled. During the exploration phase, mainly professionals with the requisite expertise will be hired to explore the area. Casual labour might however be sourced from locals when the need arises.

1.2.4 Local development

Generally, the area Sesfontein is remote hence this project will have a potential to boost the development of the area. If a mine is established in future, this might likely lead to upgrading of roads (which are all currently gravel roads), establishment of infrastructure, increase of people which will have a consequence of increasing demand hence promoting local sales and products.

1.3 SCOPE OF THE PROJECT

The report is aimed at identifying and evaluating environmental and socio-economic impacts associated with the project. The scope of the study includes carrying out environmental investigations and consultations in line with current provisions on environmental legislation. The Environmental Management Act (No 7 of 2007) and its regulations of 2012 were used as guidelines for the EIA study.

1.4 TERMS OF REFERENCE

The approach to undertake the work was guided by the following ToR, which were provided by the proponent;

- Conduct environmental scoping.
- Determine all the possible environmental and socio-economic impacts of the project.
- Conduct a public participation process to gather the views of Interested and Affected Parties.
- Compile a full EIA report for submission to Ministry of Environment, Forestry and Tourism and Ministry of Mines and Energy.
- Design an Environmental Management Plan with sound and relevant mitigation measures for monitoring purposes.
- Coordinate the whole application process of the Environmental Clearance Certificate until the issuance of the certificate.

1.5 OBJECTIVES

The objectives of the study as derived from the ToR were as follows:

1.5.1 General objective

- To determine the potential environmental and socio-economic impacts derived from the exploration activities.

1.5.2 Specific Objectives

- To establish baseline environmental conditions so that relevant impacts could be projected or benchmarked and sufficient mitigation measures could be designed
- To identify direct or indirect environmental impacts that may result from the proposed activity.
- To consult with key, interested and affected stakeholders so that their concerns are considered in the formulation and implementation of the Environment Management Plan.
- Comply with Namibia's Environmental Impact Assessment Regulations (2012), Environmental Management Act (No. 7 of 2007) and other relevant laws and regulations.
- To set up an Environmental Management Plan that will govern all activities of the project to mitigate or reduce effects on the environment.

1.6 METHODOLOGY USED FOR THE STUDY

- Desktop Study**- This involved review of documents and relevant legislation. Documents containing geological, vegetation, climatic, demographic and hydrological data for the area of interest were reviewed.
- Site Visits** – The EIA team visited the sites on 25/10/2019. The field visit was meant for physical inspections of the sites in order to gather information on the state of environment.
- Public Participation** -The study also sought public opinion/views through distribution of questionnaires and public meetings. The meetings were held on 02/11 2019 at Otwani Rural District Council at 10:00am, Sesfontein Conservancy at 14:00 and Otjapitjapi at 17:00.
- Mapping** - More data was obtained from the maps which were produced by the consultant's GIS personnel. The maps included vegetation, hydrogeology and location as attached in **Appendix A** of this report.
- Reporting** - All data gathered was used to compile an EIA and EMP report which was submitted to Ministry of Environment, Forestry and Tourism and Ministry of Mines and Energy.

1.7 LAND OWNERSHIP

The land is under communal land, **see Appendix C** consent letters from the traditional authorities. The owners of the EPLs were however allocated the EPLs by Ministry of Mines and Energy. **See Appendix C**, for agreement of transferring shares to Kaoko Mining Namibia (Pty) Ltd.

1.8 OVERVIEW OF EIA REPORT

The remaining part of this report has been designated for the following aspects;

- Project Description.
- Legal and Policy Analysis.
- Environmental Baseline.
- Public Consultation.
- Impact Identification and Analysis.
- Environment Management, Monitoring and Evaluation Plan.
- Conclusions and Recommendations.

CHAPTER TWO: PROJECT DESCRIPTION

The following issues will be clarified under project description;

- Project location.
- Project activities.
- Project cost.

2.1 PROJECT LOCATION

Kaoko Mining Namibia (Pty) Ltd proposes to conduct exploration activities on EPLs 6123 & 5600 which are approximately 30km from Sesfontein and approximately 200km from Opuwo town, Kunene Region. **See Appendix A, Location Map**. The coordinates for the location of the EPLs are as follows:

Table 1: Coordinates for the EPLs

EXCLUSIVE PROSPECTING LICENCE (EPL)	AREA (HECTARES)	COMMUNAL CONSERVANCY	COORDINATES				Middle Point
			Corner 1	Corner 2	Corner 3	Corner 4	
6123	43351.1383	Puros \ Otjikondavirongo	18° 48' 47" S 13° 03' 10" E	18° 49' 20" S 13° 22' 17" E	18° 55' 58" S 13° 22' 27" E	18° 55' 44" S 13° 03' 27" E	18° 52' 03" S 13° 12' 48" E
5600	29892.7756	Puros	18° 56' 03" S 13° 05' 26" E	18° 56' 05" S 13° 20' 01" E	19° 02' 10" S 13° 20' 01" E	19° 01' 58" S 13° 05' 14" E	18° 58' 51" S 13° 12' 41" E

2.3 PROJECT ACTIVITIES

Exploration involves investigating or examining the geological condition of an area so as to determine what mineral resources may be found within that certain area. The main aim at this stage is to find high quality ore which will be of a concentration high enough to encourage the client to invest their time and resources in setting up a mine in that area. It is vital to note that, no construction will take place during this phase. In addition, existing roads will be used hence reducing the impact of clearing vegetation. Roads in bad conditions will be upgraded and where EPLs are inaccessible, cut lines will be created for accessibility of vehicles.

The proposed mineral exploration activities will comprise of two stages, i.e. first stage involves non-destructive prospecting and exploration activities. This stage involves gathering of relevant information from geological field maps, ground geophysical reconnaissance and survey, soil sampling when necessary, ground truthing and rigorous analysis of data obtained from these activities. The second stage involves drilling and trenching and it is determined by the initial exploration results as deduced from the first stage. Below is a detailed elaboration of the proposed project activities.

2.3.1 RESEARCH AND RECONNAISSANCE

Firstly, the proponent has to conduct a research through the study of existing literature, examination of aerial photographs and satellite imagery alongside acquisition of geophysical data and geological maps of the prospective region. The desktop study is used to generate a geological model on which all the future exploration activities will be based.

Reconnaissance will be done whereby Mr David an employee of Kaoko Mining Namibia (Pty) Ltd will scout the EPLs to try and identify areas with ore deposits .He will also gather information from locals about possible ore locations as most of them have been involved in some sort of mining as is evident from the numerous mining claims around their area. In a case that Mr David identifies a potential area, he will notify Mr Arno (geologist) who will further verify. During this stage, prospectors will only look at the rocks for useful minerals deposit signs and other clues to where deposits may occur. The reconnaissance narrows down the possible areas where full exploration activities will be undertaken.

2.3.2 TRENCHING AND DRILLING

Where minerals occur close to surface, trenching can be utilised to obtain samples, to help establish structural controls and delineate the potential resource. This is a cost-effective method compared to drilling. The proponent intends to use limited trenching and also drilling. Trenching will be carried out to expose the ore body near to the surface and shovels and picks will only be used. Drilling will be used to have a better understanding of the subsurface geology. In cases where ore deposits extend underneath the surface, drilling will be used. Exploratory openings or boreholes will be drilled at closer intervals along the strike and also depth wise, to accurately

determine the shape, size, disposition of ore and grade of ore body. Drilling will require water, which will be obtained from nearby villages.

2.3.3 GEOCHEMICAL SAMPLING AND ANALYSIS

Samples will be collected during trenching and drilling and sent for chemical analysis/testing to determine the mineral content of the ore so as to give a better picture on whether it is feasible to carry out mining operations or not.

2.3.4 MAPPING

A map will be produced showing areas with potential deposits. Such maps will be of great importance during the mining phase.

2.4 PROJECT COST

The total funding required to set up the project is not yet established but the client has expressed confidence in having funds to carry out the initial stages of the project which cover the exploration phase as well.

CHAPTER THREE: ANALYSIS OF ALTERNATIVES

The following chapter will focus on the alternatives to the project. Alternatives to the project are different options, other possibilities or other course of action, which can be adopted. The alternatives to the proposed project are:

Option 1 – Alternative locations

Option 2 – No project alternative

Option 3 – Continue with the project

3.1 ALTERNATIVE LOCATIONS

Option 1, which is alternative locations, implies that a different location to carry out the development must be acquired somewhere else other than the chosen site. Nevertheless, the fact that there are possibilities of copper deposit basing on past researches justify the use of the proposed sites for further studies.

3.2 THE “NO PROJECT” ALTERNATIVE

Option 2, which is “no project alternative”, implies that the project must not be undertaken on the proposed land rather the land should remain undisturbed. However, the “no project alternative” will be less favorable from the socio-economic perspective due to the following factors:

- **Local Empowerment-** the shareholders of the company are local people hence the project will help to reduce poverty in the area thereby improving their social wellbeing.

- **Growth and development**- the project has the potential to benefit the locals mainly in future. If medium to large copper deposit are discovered during exploration phase, plans to start mining will be done which will result in growth and development of the area in terms of human capital and infrastructure.
- **Employment creation**-more jobs will mainly be created in future during the mining phase. Currently, two people will be employed permanently and locals will be hired in cases when manual labor is required. Drilling crew will also be contracted.

3.3 OTHER ALTERNATIVES

Initially, it was proposed that limited trenching shall be used and drilling when necessary. However, both methods will be used depending on the condition of the ground and the required depth. Table 2 below indicate the proposed methods.

Table 2: Exploration methods

Method	Pros	Cons
Limited Trenching	- Ideal for understanding surface geology.	-Difficult in areas with limited access -Poses more damage to the environment
Drilling	-Easier installation in areas with limited access (under buildings, roads, railway tracks, hills, rivers, ponds, heavily-wooded areas) -Ideal when one requires to understand subsurface geology -Less impact on job site and public -Reduced restoration costs due to minimal impact on land -Maintains a cleaner job site -Environmentally-friendly process	-Drilling is also not an option for shallow trenches less than 2 ft. deep. -more pricey than other alternatives

Table 3: Services alternatives

Services	Proposed source	Alternative source
Water	-Local water sources from the nearby villages will be used.	- Piping water from other sources out of the project area so as to supplement local water supplies. -Drilling boreholes
Power for drilling	-Diesel generators	-Solar
Power for cooking	-Gas stoves	-Fire wood

Workers accommodation	-Campsite on the nearby villages for geologist, assistant and drilling crew. -Other employees for manual labor will be sourced from the nearest village.	-Accommodation can be sourced from the nearest town which is Sesfontein.
Road (site accessibility)	-EPLs to be accessed from C43 road (Opuwo Sesfontein road)	
Waste Management		
Sewage	-Portable toilet to be used and these are advantageous because they are easy to transport and environmentally friendly (if properly disposed)	-Ventilated improved pit (VIP) latrine.

3.4 ALTERNATIVES ASSESSMENT OUTCOMES

Continuation with the project which is Option 3 will be the preferred option. Water to be used will be sourced from nearby villages. In cases that the water sources from the villages have low yields, water will be transported by trucks from other villages around the area. Apart from that, power for drilling will come from a diesel-powered generator. The route which comes from C43 will be used and no alternative route for access will be available. Portable toilets shall be used at the village and site where the contractor crew, geologist and assistant will be staying and working respectively. Portable toilets are easily transportable and environmentally friendly (if properly disposed).

CHAPTER FOUR: RELEVANT LEGISLATION

This chapter reviews various applicable legislations, which govern the project. The objective is to ensure that the proposed project complies with Namibia’s relevant laws, policies and regulations. Table 4 below indicates laws and policies, which relates to the project.

Table 4: Relevant legislations related to the project

Aspect	Legislation	Relevant Provisions	Relevance to the Project
The Constitution	Namibian Constitution First Amendment Act 34 of 1998	<ul style="list-style-type: none"> - According to article 91(c) it provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia” - Article 95 (l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources. 	<ul style="list-style-type: none"> - Exploration activities to be conducted might negatively affect the environment if the proponent does not conduct the activities in a sustainable manner. It will therefore remain the responsibility of the proponent to implement all the stated measures and to abide to the legislation related to the project so as to safeguard the environment.
Environmental	Environmental Management Act 7 of 2007	<ul style="list-style-type: none"> - States that, projects with significant environmental impacts are subject to an environmental assessment process (Section 27). - Requires for adequate public participation during the environmental assessment process for interested and affected parties to voice their opinions on a project (Section 2). 	<ul style="list-style-type: none"> - The stated project is listed under activities which require an EIA. - As stated in the act, adverts should be published in two local newspapers twice. - The public and relevant authorities should be consulted during the process of public participation as per the requirement of the act - The EMP which will guide on the management of the environment should be drafted as per the requirement of the act
	EIA Regulations (2012)	<ul style="list-style-type: none"> - Lists all activities, which cannot be undertaken without an EIA. 	<ul style="list-style-type: none"> - This project is listed under mining and quarrying activities.

			- Activity 3.3 states that resource extraction, manipulation, conservation and related activities require an EIA.
	Convention on Biological Diversity (1992)	- Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	- The area under study is under conservancies hence the need for the proponent to carry out the project in a sustainable manner such that the biodiversity of the area is not disturbed.
	Nature Conservation Ordinance No. 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants	- The area of study has protected plants around hence the need of the proponent to protect the plants. Indigenous and protected plants should be incorporated within the development of the project.
	Minerals (Prospecting and Mining) Act, 1992 (Act 33 of 1992)	To provide for the reconnaissance, prospecting and mining for, and disposal of, and the exercise of control over, minerals in Namibia; and to provide for matters incidental thereto. "mineral" means any substance, whether in solid, liquid or gaseous form, occurring naturally in, on or under any land and having been formed by, or subjected to, a geological process, excluding-(c) subject to the provision of subsection (2) , soil, sand, clay, gravel or	- The intended activity involves exploration of minerals mainly copper ore.

		stone (other than rock material specified in Part 2 of schedule 1) .	
Soil	Soil Conservation Act 6 of 1969	This act covers the prevention and combating of soil erosion; the conservation, improvement and manner of use of the soil and vegetation; and the protection of water sources	- Limited trenching will leave earthed soils hence it should not be left unrehabilitated.
Water	Water Act 54 of 1956	- Prohibits the pollution of underground and surface water bodies.	- If drilling activities go below the level of the water table, they might be possibilities of pollution. Hence the pollution of water resources should be avoided during the exploration process.
Health and Safety	Labour Act (No 11 of 2007)	- This act emphasizes and regulates basic terms and conditions of employment, it guarantees prospective health, safety and welfare of employees and protects employees from unfair labour practices.	- Work related hazards which include noise, dust, stress might be encountered by employees during the exploration phase. - The proponent will therefore be obliged to create a safe working environment for the employees.
	Public Health and Environmental Act, 2015	- The act mainly emphasis on proper management of the environment, to prevent negative health impacts. - The act promotes proper waste management.	- Proper waste management should be promoted to prevent nuisance, which can consequently affect public health. - Recycling, reuse and reduce must be practised at all times thus if any waste is generated.

	Heritage Act	<ul style="list-style-type: none"> - The Heritage Act of 2004 makes provision for the developer to identify and assess any archaeological and historical sites of significance. The existence of any such sites should be reported to the Monuments Council as soon as possible. The Council may serve notice that prohibits any activities as prescribed within a specified distance of an identified heritage/archaeology site. 	<ul style="list-style-type: none"> - Within the EPLs there are no any declared heritage sites nevertheless the area might have unknown archaeological remains. - In an event that the proponent comes across any archaeological or historical sites of significance, they should report immediately to Heritage Council
--	--------------	--	---

N.B: The proponent shall be required to comply with the legislations. Where there is need to engage private consultants to facilitate compliance, the proponent is encouraged to consult qualified and certified personnel. The Environmental consultant is supposed to conduct legal compliance audits and produce bi-annual reports, which will be required during renewal of environmental clearance certificate. The Proponent is also required to renew the permit from Heritage Council **see Appendix C**, Consent from Heritage Council

CHAPTER FIVE: DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter describes the environmental setting of the project, which includes the biophysical environment and the socio-economic environment. The baseline information will assist in the monitoring of the environmental impacts during the exploration phase.

5.1 BIO-PHYSICAL ENVIRONMENT

5.1.1 Climate

The area under study is located on the north-west part of Namibia and generally, the area receives little rainfall. The environment of the study area is shaped by the desert climate such that average annual rainfall is low and highly variable, with much higher than average rain in some years and basically none in others. The cold Benguela Current of the Atlantic generates frequent fog, which is pushed inland and beyond on 20 or more days each year, providing important moisture for plants and animals, and soothing the dry land. Table 5 below briefly describe the general climatic conditions experienced within the area of study, as deduced from the Atlas of Namibia, by Mendelsohn et al 2003.

Table 5: General Climate Data

Average Annual rainfall:	Average rainfall in the area is between 300-350mm per year
Variation in rainfall:	Variation in annual rainfall is averaged to be 40-50 % per year
Average evaporation:	Average evaporation in the area is between 2240-2380mm per year.
Precipitation:	January-March receives high rainfall, with January being the wettest. June and July being the driest month
Water Deficit:	Average water deficit in the area is between 1700-1900mm per year.
Temperatures	Annual temperatures are 20-22 °C per year Average maximum temperature 34°C-36°C Hottest month February Average minimum temperatures 6°C-8°C Coldest month July
Wind direction	Wind directions in the area are predominantly from the south.
Humidity	Most humid month is March with 80%-90% and September being the least with 10%-20%

(Source: Atlas of Namibia, 2003)

5.1.2 Topography and Geology

The topography around the study area is mainly mountainous. The elevation of the region is 868m above sea level. Geology of Kunene Region is classified mainly under the Otavi Group (Ls). Mendelsohn (2000) pointed that Kunene Region has the oldest rocks and the Damara

supergroup and gariiep complex. Mendelsohn (2000) further point that besides diamond, all valuable minerals are found in the western side of the country. See table 6 which shows geology of the EPLs and possible types of mineral deposits. Also refer to **Appendix A**, Hydrogeology Map.

Table 6: Geology for the EPLs

EXCLUSIVE PROSPECTING LICENCE (EPL)	GEOLOGY	COMMODITIES
6123	Lithology: marble, schist, ortho amphibolite, quartzite (Nkb) Formation: karibib	Base and Rare Metals
5600	Lithology: marble, schist ortho-amphibolite, quartzite (Nkb) mica schist, quartzite, graphitic schist (Nk) para-/ortho-gneiss, metasedimentary rocks (Ve), mudstone, siltstone, sandstone, grit, conglomerate (C-Tr-L) Formation: karibib, kuiseb, kheisian, carboniferous to triassic	Base and Rare Metals, Industrial Minerals, Precious Metals

5.1.3 Hydrogeology

The nearest river is the Hoarusib River which is approximately 20km from the nearest EPL 5600. The river has carved its path deep into the mountains, creating spectacular cliffs as well as the 'Clay Castles' along its lower reaches. The dry Khumib River crosses the Puros conservancy and has created similarly beautiful scenery. The Hoarusib and Khumib rivers are bought ephemeral. The villagers obtain their water from a borehole and livestock from created water points. See **Appendix A:** Hydrogeology Map

5.1.4 Soils

The type of soil around the study area is lithic leptosols which are very thin and shallow. Leptosols typically form in actively eroding landscapes, especially in the hilly or undulating areas that cover much of southern and north-western Namibia (Mendelsohn 2000). Leptosols are coarse-textured soils which are characterized by their limited depth caused by the presence of a continuous hard rock, highly calcareous or cemented layer within 80cm of the surface. The leptosols are, therefore the shallowest soils to be found in Namibia and they often contain much gravel. Their water holding capacity is low and vegetation in areas in which they occur is often subject to drought (Mendelsohn 2000). Rates of water run-off and water erosion can be high when heavy rains fall.

5.1.5 Vegetation of the study area

The vegetation type of the study area is the north-western escarpment and inselbergs, see **Appendix A**, Vegetation Map. While much of the conservancy supports only a sparse vegetation cover, denser vegetation is found along the ephemeral river (Hoarusib River) with camel thorn tress, tamarisk and salvadora thickets, makalani palms and mopane trees. Mopane is the dominant tree throughout much of the study area. For protected plant species obtained around the EPLs, see table 7 below.

Table 7: Protected plant species

Species Name	Tree Name	EPLs	Occurrence
Acacia Erioloba	Camel thorn/ kameeldoring	6123, 5600	Common to abundant
Berchemia Discolour	Bird Plum	6123, 5600	Uncommon to rare occurrence
Boscia Albitrunca	Shepherd's tree/ Witgat	6123, 5600	Common to abundant
			Occasional occurrence
			Uncommon to rare occurrence
Colophospermum mopane	Mopane	5600, 6123	Common to abundant
			Uncommon to rare occurrence



Image 1: Vegetation around the study area

5.1.6 Fauna

The following animals are common around the study area; giraffe, black rhino, kudu, gemsbok, springbok, hartmann's mountain zebra, duiker, steenbok and klipspringer which are stalked by an assortment of predators that also includes leopard, cheetah and brown hyaena. In addition, the country's near-endemic birds are found in the Puros conservancy, including Benguela long-billed lark, Gray's lark, Carp's tit, rosy-faced lovebird, Rüppell's parrot, Rüppell's korhaan, Monteiro's hornbill, Damara hornbill, violet wood-hoopoe, white-tailed shrike, Herero chat and rockrunner. Domestic animals mainly domesticated are goats, sheep and cattle.

5.1.7 Archaeology

The project area falls within Kaokoland in Kunene Region, northeast of Namibia. This section will therefore describe how the proponent will handle any unknown heritage sites that might fall within the proponent's EPLs. It is also worthwhile to note that currently there are no registered or declared heritage sites that fall within Kaoko Mining Namibia (Pty) Ltd.'s EPLs, see attached map below. In addition, previous archaeological work done around Kaokoland will also be discussed in brief.

According to the Heritage Act (27 of 2004), "heritage" is restricted to places and objects, including those of archaeological, cultural, historical, scientific and social significance. The act also defines "archaeological" as any remains of human habitation or occupation that are more than 50 years old found on or beneath the surface on land or in the sea, and especially notes rock art, being any form of painting, engraving or other representation on affixed rock surface or loose rock or stone which is 50 or more years old. It is essential to understand that the legal protection can extend beyond the archaeological object or site, to include the natural or existing condition or topography of land, as well as the trees, vegetation or topsoil. Kaoko Mining Namibia (Pty) Ltd shall therefore be responsible in persevering any archeological or heritage sites within their project area, in a case that they come across any. The Proponent shall bear in mind that, all archaeological objects are the property of the State and the ownership extends to all archaeological remains, known or unknown. It shall also be the responsibility of the Proponent to inform the exploration personnel and contractors about the legal status of archaeological remains and the obligation to report the discovery of any new archaeological remains to the National Heritage Council.

Apart from that, during the exploration phase, the exploration personnel should be observant given that they might come across archaeological evidence.

The following should be observed as they might be clues to archaeological evidence; stone artefacts and stone features sites (settlements and graves).

In addition, the exploration team should be aware that archaeological sites commonly occur in these locations; rock outcrops and inselbergs, saddles, drainage lines, pans and dune fields and gravel plains.

a) Brief History of Archaeological work around Kaokoland

Archaeological work has been conducted around the Kaokoland area and significant archaeological evidence has been obtained. The most significant results in the Kaokoland were provided by excavations in a rock shelter, named Oruwanje 95/1 (Frank, in prep). Ovizorombuku 96/1 being another rock shelter was also excavated in 1998 (Vogelsang 1998). The stone artifact accumulation from the basal layers of this site were attributed to date back to an Early Holocene to Late Pleistocene Age (around 10,000 B.P). The second trench at the site Ovizorombuku 96/1 after excavation produced a sheep bone, coming from one of the final spits. A charcoal sample from this spit was dated about 2500 B.P.

Another site discovered was Omungunda 99/1 which is situated near Opuwo town. With an extension of approximately 23 x 4 m, Omungunda 99/1 is the largest rock-shelter in the region and it was the first site with rock paintings in the Kaokoland (Vogelsang 1998). In addition, around 1999 other sites Hartmann's (N99/3) and Marienfluss valleys (N99/5) located on top of hills, were discovered and they had stone circles, potsherds, glass-beads and an iron arrowhead. According to Vogelsang (1998), a first radiocarbon date from a fireplace inside one of the hut-circles had an age of 230 years hence corresponding with the suspected date of the immigration of the cattle keeping Himba people from Angola. Apart from that, several clusters of stone circles were also discovered at a granite hill close to the border of the Skeleton-Coast Park.

b) Declared Heritage Sites in the vicinity of the proposed development

According to the data sourced from the website of National Heritage Council, there are six declared heritage sites in Kunene Region where Kaoko Mining Namibia (Pty) Ltd EPLs are located. See attached map below. Of the known heritage sites, none overlays EPL 5600 and 6123.

c) Unknown Heritage Sites

It is essential to note that, within the EPLs, there might be unknown heritage sites. The Proponent will consult with the headman of the area before conducting any work as their knowledge will be of great importance in identifying some sites of significance such as their holy grounds and graves. In addition, given that the Proponent comes across unknown heritage sites within the EPLs, the proponent will follow the following procedures:

Action by person identifying archaeological or heritage material

- If operating machinery or equipment, stop work
- Identify the site with flag tape
- Determine GPS position if possible
- Report findings to foreman

Action by Foreman

- Report findings, site locations and actions taken to superintendent
- Cease any work in immediate vicinity

Action by superintendent

- Visit site and determine whether work can proceed without damage to findings
- Determine and mark exclusion boundary
- Record coordinates for the site for confirmation by archaeologist

Action by Archaeologist

- Inspect site and confirm recorded coordinates
- Advise National Heritage Council (NHC) and request written permission to remove findings from work area
- Recover, package and label findings for transfer to National Museum

In the event of discovering human remains:

Action as above

- Field inspection by Archaeologist to confirm that remains are human
- Advise and liaise with NHC and Police
- Recover remains and remove to National Museum or National forensic Laboratory, as directed

d) Management of “no-go areas”

Currently there are no declared or registered heritage sites that overlap or coincide with our proposed project area, hence this section at the moment does not apply to this project.

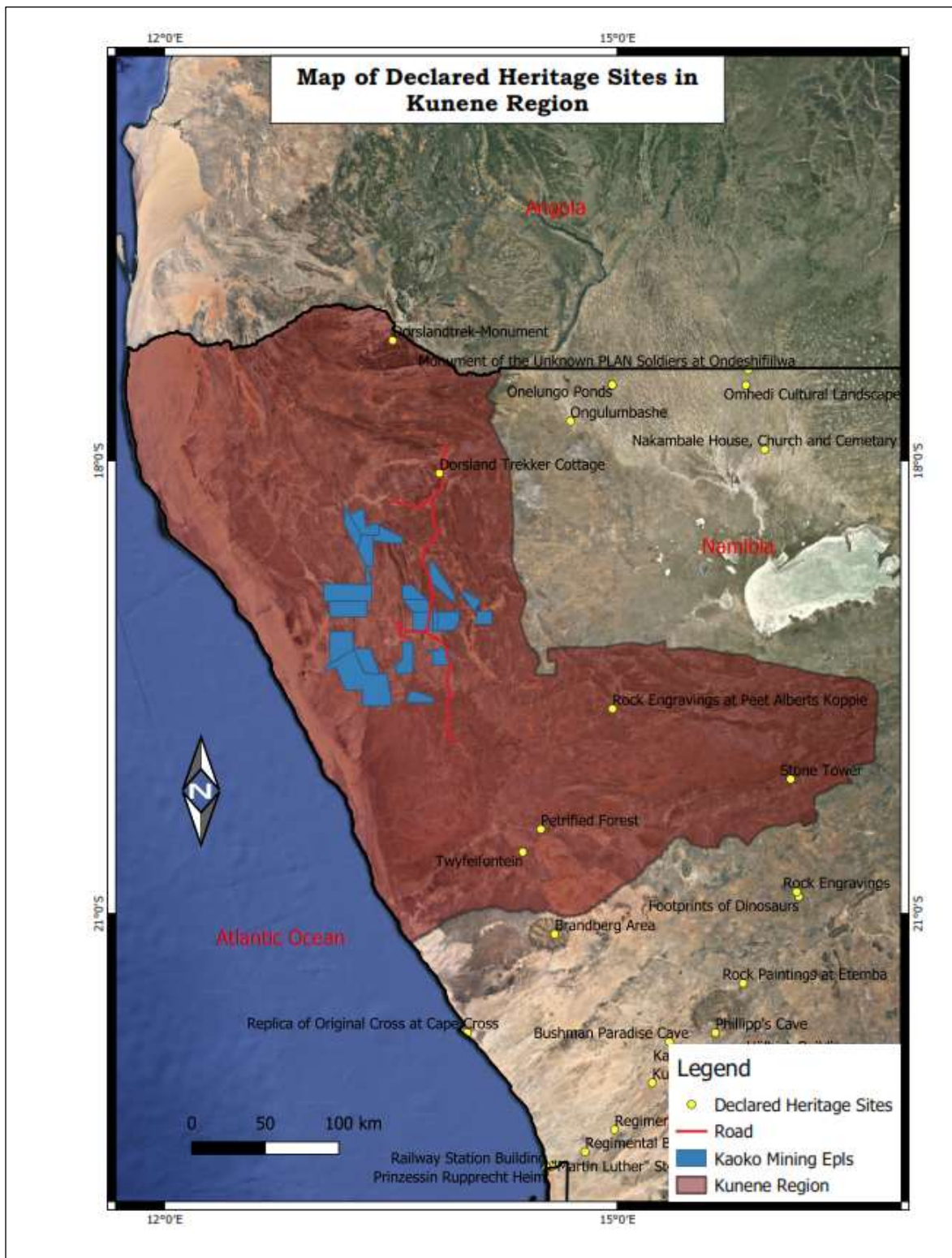


Figure 1: Map of declared heritage sites in Kunene Region

5.2 SOCIO-ECONOMIC ENVIRONMENT

Kunene Region is located on the northwest of Namibia and the Skeleton Coast Park forms its entire west coast on the Atlantic Ocean. The following six political constituencies comprises Kunene Region, Opuwo, Sesfontein, Epupa, Khorixas, Kamanjab and Outjo. Outjo is classified under municipality, Khorixas and Opuwo as towns, Kamanjab as a village. Sesfontein, Fransfontein and Okangwati have been proclaimed and targeted for urban development.

5.2.1 Population

In the census that was conducted in 2011, the population for Kunene Region was 86 856 of which 43 253 are female and 43 603 are males (NPC 2011). According to NPC (2011), there was an increase in population from 2001 (68 735) to 2011 (86 856). In 2011, Kunene Region had a relatively young population, with about 42 percent of the whole population being less than 15 years of age hence it is vital to bring projects which create employment and empower the youths.

By region, Kunene Region among the other regions has the lowest percentage of people living with HIV. By region it has 9.7% people living with HIV/AIDS (MHSS 2015).

According to (EMIS, 2012) there are 41 Primary schools, 12 Combined school and 6 Secondary schools, in total there are 120 schools which is too low as compared to other regions. Of the 120 schools, 114 are state owned and 6 privately owned. 73 out of 838 teachers in Kunene Region are without training. Of the population aged 6 years and above in Kunene Region, 35.9 % never attended school, 50% left school and 9% are currently at school (NPC 2011). The major problem in the region is shortage of schools such that learners travel long distances to school which might be a factor to high dropouts in the region. In addition, another challenge is lack of proper teaching facilities and physical buildings to accommodate learners and teachers. Given the scenario above, if the project is to be implemented, the proponent should try to help the community as a social responsibility of the company.

According to NPC (2011), 64 % of the economically active population aged 15 years and above are employed and 36% unemployed in Kunene Region. Many people in the region rely on wages and salaries. According to NPC (2011), 32% of the population in the region relies on farming, 41% on wages and salaries, 5% on cash remittance, 8% on business and 12% on pension.

Sesfontein is one of the areas which is frequently visited by tourists and it owes its name to six springs that surface at the base of the hills, creating an oasis in the barren wastes of the Kunene Region. Prominent areas include the Fort Sesfontein lodge which was once a military outpost back in 1901. There is also the Sesfontein conservancy which was registered in 2003 and covers 2465km². In addition, tourists are also accommodated at Puros lodge which is located in Puros settlement approximately 12km from the study area. Wildlife includes elephant, leopard, lion, black rhino, cheetah and mountain zebra. Income is derived from conservation hunting and tourism.

CHAPTER SIX: PUBLIC PARTICIPATION

The public consultation process forms an important component of the environmental assessment process. Public consultation is a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters. Methods used to reach out to the public during the public consultation process included newspaper adverts and public meetings. The public consultation process has been guided by the requirements of Environmental Management Act (EMA) No. 7 of 2007 and the EIA Regulations of 2012. The following principles governed the public consultation:

Inclusivity - The public participation was open for everyone; invitation to make comments and attend the meetings was announced in the local newspapers, The Namibian and New Era. To ensure that all stakeholders were involved, the consultant compiled a list. Both locals, traditional authorities and Kunene Regional Council were conducted; **see Appendix B, letters sent to stakeholders**. The list included the following:

- Kunene Regional Council
- Traditional Authorities
- Locals

Transparency - The consultant took time to explain the background of the project and both positive and negative impacts associated with the project. All people who registered as Interested and Affected Parties were also given a BID and full document of the EIA was available upon request.

Relevancy- The consultant remained focused on subjects related to the project. Interested and Affected Parties were suppose to make comments relating to socio-economic and environmental impacts associated with the project. Political and other non-related comments were considered not relevant.

The objectives of the public participation were:

- ✓ To inform I&AP about the proposed activity and to give them the opportunity to express their views, concerns or opinions.
- ✓ To reduce conflict through early identification of contentious issues
- ✓ To gather potential negative and positive environmental impacts associated with the proposed project from the stakeholders' perspectives.
- ✓ To engage stakeholders for the effective mitigation of negative impacts and enhancement of positive impacts arising from the proposed project respectively.

6.1 NOTIFICATION OF INTERESTED AND AFFECTED PARTIES

The consultation was facilitated through the following means:

- ✓ A Background Information Document (BID) containing brief project description
- ✓ Newspaper advertisement - as shown in Table 8 below and Appendix B of this document.

- ✓ Public meeting – it was announced in The Namibian and New Era. The meetings were held on 2 November 2019 at Otwani Rural District Council (Otwani), Sesfontein Conservancy (Sesfontein) and Otjapitjapi Village. For more information on issues raised during the meetings, **see Appendix B, Meeting Minutes.**
- ✓ Public notices- they were placed at Kunene Regional Council, Otwani Clinic and around the villages.
- ✓ Questionnaires- they were also distributed amongst the participants so as to gather more information on their views towards the project. Distribution of questionnaires was also done to allow stakeholders to air their views privately, **See Appendix B, questionnaires.**

Table 8: Details of public notification of the EIA study

Advertisement	Area of Distribution	Language	Date Placed
The Namibian	Country Wide	English	28 October 2019
The Namibian	Country Wide	English	4 November 2019
New Era	Country Wide	English	28 October 2019
New Era	Country Wide	English	4 November 2019
Site notices	Kunene Regional Council, Otwani Clinic	English	1 November 2019

6.2 SUMMARY AND DISCUSSION OF STAKEHOLDERS CONSULTATION.

The following issues were mainly raised during the public consultation:

- ✓ Employment
- ✓ Communication and good relation between the proponent and the community
- ✓ Development
- ✓ Encroachment of boundaries
- ✓ Membership to the company/ how to join the company

(See Appendix B – meeting minutes and signed questionnaire sheets)

6.2.1 Response to stakeholder concerns

During the public participation process, all people viewed the project as beneficial to the community. For more issues raised during the public participation process, **see Appendix B, Meeting Minutes for both the three meetings.** In summary, the following major issues were brought forward:

a) Employment

Many participants recommended that locals be employed by the proponent. However, it is essential to note that during the exploration phase two people (geologist and assistant) will be employed permanently by Kaoko Mining Namibia (Pty) Ltd. During this phase, personnel with experience mainly in geology will be required hence the need to employ experienced staff. Locals

will only be employed when there is need for manual labor. In addition, drilling crew shall should be employed.

b) Relations with the community and communication

Mr. Elago Hamnjela (Administrative officer at Kunene Regional Council) also pointed out that, the company should remain friendly to the community and communication should always be maintained. Concerning this issue, the proponent promised to keep good relations with the community. The proponent also highlighted that if they get permission to start exploration activities, they will always notify the headman before working in their area. The proponent also noted that communication with the headman will always be vital given that they will always want to know if there are any holy grounds in the area before any works.

c) Joining the company

Participants in Otjapitjapi village were mainly concerned about joining the company and registering their EPLs and mining claims. In response, the proponent indicated that for now its too late as the EIA is already underway.

d) Community development

Traditional authorities were mainly concerned about community development. Chief Kaenda Herunga of Otjikukutu emphasized that, the proponent should develop schools, roads, waterpoints and kindergartens. Given that the proponent decides to conduct mining activities in future, social responsibilities should be fulfilled.

e) Encroachment of boundaries

Another issue which was raised during the public meeting was encroaching boundaries. It is essential to note that the proponent shall not be allowed to encroach on other EPLs which are not part of their sites. The proponent shall use maps and GPS to see the boundaries of their EPLs.

f) Project description

Mr. Wassenaar emailed requesting the kml file and it was sent to him. He further required clarification on the exploration activities to be done. See Appendix B, response. It is essential to note that, it was decided that both methods which are limited trenching and drilling will be used. Trenching will only be used to understand the surface geology and drilling will be used to understand the subsurface geology. Limited trenching will only be done after the geologist confirms that there is potential ore deposits basing on reconnaissance of the rocks. This implies that no unnecessary trenching shall be done.

6.2.2 Stakeholders' Recommendations

Conducted traditional authorities recommended the project to go ahead but the Proponent was tasked to employ locals and bring development to the community.



Image 2: Public Participation Meeting at Sesfontein Conservancy



Image 3: Public Participation Meeting at Otwani Rural District Council



Image 4: Public Participation Meeting in Otjapitjapi Village



Image 5: Public notice at Otwani clinic



Image 6: Public notice at Kunene Regional Council

CHAPTER SEVEN: ASSESSMENT OF ENVIRONMENTAL IMPACTS

This section serves to identify all the potential impacts both negative and positive. In identifying these potential impacts, mitigation measures have been proposed so that the proponent may carry out the process in an environmentally sound manner. The methodology, which was used to assess impacts and alternatives, include the following:

- Public participation
- Site visit
- Professional experience

7.1 IDENTIFICATION OF POTENTIAL IMPACTS OF THE PROJECT

Positive Impacts

- Local empowerment
- Employment creation.
- Land utilization for the benefit of people

Negative impacts

- **Air Environment**
- Dust
- Noise
- **Land Environment**
- Impact on landscape
- Vegetation loss
- Generation of waste
- Impact on fauna
- Impact on soil
- **Water Environment**
- Impact on surface and groundwater sources
- **Socio -Economics**
- HIV/AIDS
- Occupational Health and Safety risks.
- Heritage impact
- Population influx
- **Indirect Impacts**
- Cumulative impacts

7.2 IMPACT ANALYSIS

In this section, the impacts of the proposed project on human and biophysical environment are evaluated and analyzed. Following the identification of the various potential environmental impacts, the impact analysis framework looked at the impacts under the following categories;

Table 9: Ranking Matrix

	Temporal scale		Score	
EFFECT	Short term	Less than 5 years	1	
	Medium term	Between 5 and 20 years	2	
	Long term	Between 20 and 40 years (a generation) and from a human perspective almost permanent.	3	
	Permanent	Over 40 years and resulting in a permanent and lasting change that will always be there.	4	
	Spatial Scale			
	Study area	The proposed site /within immediate area of the activity	1	
	Beyond project boundary	Surrounding area outside the project boundary	2	
	Regional	District and Provincial level	3	
	National	Country	4	
	International	Internationally	5	
		Severity	Benefit	

	Slight/Slightly Beneficial	Slight impacts on the affected system(s) or party(ies)	Slightly beneficial to the affected systems(s) or party(ies)	1
	Moderate/Moderately Beneficial	Moderate impacts on the affected system(s) or party(ies)	An impact of real benefit to the affected system(s) or party (ies)	2
	Severe/Beneficial	Severe impacts on the affected system(s) or party(ies)	A substantial benefit to the affected system(s) or party(ies)	4
	Very Severe/Very Beneficial	Very severe change to the affected system(s) or party(ies)	A very substantial benefit to the affected system(s) or party(ies)	8
	Likelihood			
LIKELIHOOD	Unlikely	The likelihood of these impacts occurring is slight		1
	May occur	The likelihood of these impacts occurring is possible		2
	Probable	The likelihood of these impacts occurring is probable		3
	Definite	The likelihood is that this impact will definitely occur		4

Table 10: Ranking matrix for Environmental Significance

Environmental Significance		Positive	Negative
LOW	An acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent development.	4-7	4-7
MODERATE	An important impact, which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which, in conjunction with other impacts may prevent its implementation.	8-11	8-11
HIGH	A serious impact, which, if not mitigated, may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually long-term change to the natural and/or social environment and result in severe negative or beneficial effects.	12-15	12-15

VERY HIGH	A very serious impact, which may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often, these impacts are unmitigable and usually result in very severe effects or very beneficial effects.	16-20	16-20
------------------	---	-------	-------

Table 11: Matrix to show environmental significance

	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
3	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
4	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

7.3 IMPACT EVALUATION

7.3.1 Negative impacts associated with exploration phase:

1. Impact on landscape

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Impact on landscape Unmitigated	Short term	1	Study area	1	Moderate impact	2	Definite	4	8
Mitigated	Short term	1	Study area	1	Slight impact	1	May occur	2	5

The original state of the land will be altered by exploration activities like trenching and drilling. The impact is expected to only affect the study area and if mitigation measures are not implemented the severity will be high and the likelihood will be definite. Less harm is generally expected during the exploration phase given that trenching shall be limited and done at a small scale with the use of shovels and picks. No machinery shall be used during trenching. With mitigation measures the impact is expected to reduce to low environmental significance.

Mitigations and recommendation

- Limited trenching should be done to understand the surface geology but when need arise to understand the subsurface geology, drilling should be used.
- Removed rocks and soil should be replaced back and levelling of the area done so as to try to restore the area to its natural state.

2. Dust

Identified Impact	Effect						Risk Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact	Score			
Dust Unmitigated	Short term	1	Study area	1	Slight impact	1	Definite	4	7
Mitigated	Short term	1	Study area	1	Slight impact	1	May occur	2	5

Access roads to the sites are gravel roads hence movement of vehicles will generate dust. Dust is likely to be produced also during limited trenching and drilling. The severity of the impact is expected to be slight such that it will not affect by-passers or animals. Employees working in the area are the ones who might be at risk hence they are expected to cover themselves with dust masks to avoid contracting diseases like pneumoconiosis. The impact is however expected to be of low environmental significance.

Mitigations and recommendation

- Soil watering when soil works are being executed and where dust is emitted
- People at site should be provided with respirators
- Regular monitoring and review to ensure safe operation

3. Noise impact

Identified Impact	Effect						Risk Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact	Score			
Noise Unmitigated	Short term	1	Study area	1	Slight impact	1	May occur	2	5
Mitigated	Short term	1	Study area	1	Slight impact	1	Unlikely	1	4

During exploration, noise above the ambient levels of the area might be generated locally from exploration activities such as drilling and frequenting vehicles. Noise generated is not expected to affect outside the boundaries of the EPLs. Noise generated might affect

employees working at the site hence posing a risk of ear damage. The normal levels of 55 decibels recommended by World Health Organization (WHO) might be surpassed during the exploration phase. Drilling machines can produce noise of 95- 100 decibels. However, the impact of noise will remain of low environmental significance if mitigation measures are implemented.

Mitigations and recommendation

- A drilling interval should be established, used and adhered to and working hours should be limited to minimum of 8 hours per day
- Noise should be addressed and mitigated at an early stage.
- Proper and timely maintenance of machineries and vehicles
- Employees should be equipped with ear protection equipment.

4. Vegetation loss

Identified Impact	Effect					Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact			
Vegetation Loss Unmitigated	Medium term	2	Study area	1	Moderate impact	2	May occur	7
Mitigated	Medium term	2	Study area	1	Slight impact	1	May occur	6

The proponent will use existing roads and in cases that the roads need improvement, they will be upgraded. No new roads will be established but cutlines might only be created for accessibility of vehicles thus when there is need. Vegetation might also be lost during limited trenching and drilling although the severity is expected to be slight. The density of the vegetation around the area is sparse, poor rains which have caused drought for many years has also affected the density and growth of vegetation in the area. However, protected plant species shall not be allowed to be cleared even in cases where cutlines need to be created.

Mitigations and recommendation

- Protected plant species should not be removed but preserved and the activities should fit into the environment without affecting the protected trees.
- Massive clearing shall not be allowed

5. Impact on soil

Identified Impact	Effect						Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact	Score			
Soil Unmitigated	Short term	1	Study area	1	Moderate impacts	2	Definite	4	8
Mitigated	Short term	1	Study area	1	Slight impacts	1	Definite	4	7

Soil will be disturbed during drilling and limited trenching. Soil might also be partly affected by oil or fuel leakages from vehicular and drilling machines. The impact is expected to affect only the study area and it will be definite that soil will be disturbed.

Mitigations and recommendation

- After completion of exploration activities such as trenching, removed soil layers must be replaced and levelling must be done so that the original condition is restored.
- Proper care should be taken so that there is no spill that would cause soil contamination
- If any hazardous waste is produced it should be properly handled and sent for disposal to appropriate disposal areas
- Fuels shall not be kept/stored at the site

6. Impact on surface and groundwater sources

Identified Impact	Effect						Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact	Score			
Surface & groundwater Unmitigated	Short term	1	Study area	1	Slight impact	1	May occur	2	5
Mitigated	Short term	1	Study area	1	Slight impact	1	Unlikely	1	4

There will be no storage of oils and fuel on site, however there is risk of spillage of hydrocarbons from vehicles and drilling machine which may result in environmental contamination. The nearest river is the Hoanib River which is approximately 20km from the site. Hoanib River is an ephemeral river which can flow during good rain seasons. The likelihood of surface and groundwater contamination happening will be unlikely if mitigation measures proposed in the EMP are implemented.

Mitigations and recommendation

- Storage of oils and fuel on site shall not be allowed.
- Implement a maintenance programme to ensure all vehicles, machinery and equipment remain in proper working condition and maintenance should be conducted in designated areas only, preferably off-site.
- Waste oils and fuels from drip trays on stationery vehicles and machinery should be disposed of as hazardous waste at a licensed facility by a specialist hazardous waste handler.

7. Impact on fauna

Identified Impact	Effect					Risk or Likelihood	Score	Overall Significance	
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Impact on fauna Unmitigated	Short term	1	Study area	1	Moderate impact	2	Definite	4	8
Mitigated	Short term	1	Study area	1	Slight impact	1	May occur	2	5

The area of Sesfontein is rich in wild animals hence the need to conduct the exploration activities in a way that do not disturb the animals. Exploration activities walking around, trenching and drilling might result in loss for animal habitancy. Noise generated from these activities might scare away animals. In addition, wild animals might also be at risk if exploration personnel practice poaching activities for meat.

Mitigations and recommendation

- Working hours should be limited to during the day, thus enabling the wildlife to roam freely at night.
- No massive clearance shall be allowed

8. Generation of Waste

Identified Impact	Effect					Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact			
Generation of waste Unmitigated	Short term	1	Study area	1	Slight impact	1	4	7
Mitigated	Short term	1	Study area	1	Slight impact	1	1	4

Waste might be generated from unearthed rocks and soil, oils, fuel, food leftovers, papers and plastics. It is definite that waste will be generated from unearthed rocks and soil but if mitigation measures are implemented such as making sure that after completion of exploration activities such as trenching, removed soil layers are replaced and levelling are done so that the original condition is restored, the impact will be of low environmental significance.

Mitigations and recommendation

- Contaminated wastes in the form of soil, litter and other material must be disposed off at an appropriate disposal site.
- Strictly, no burning of waste on the site or at the disposal site is allowed as it possess environmental and public health impacts
- After completion of exploration activities such as trenching, removed soil layers and rocks must be replaced and levelling must be done so that the original condition is restored.

7.3.2 Negative socio-economic impacts associated with exploration phase:

1. Occupational Health and Safety Risks

Identified Impact	Effect					Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact			
O.H.S Unmitigated	Short term	1	Study area	1	Moderate impacts	2	May occur	6
Mitigated	Short term	1	Study area	1	Slight impact	1	Unlikely	4

Noise, dust and occupational stress are hazards, which are likely to be encountered during the exploration phase. Dust emitted during trenching and drilling can cause pneumoconiosis to employees thus if they are exposed to it for prolonged periods. Moreover, work pressure on employees can cause stress hence resulting into accidents.

Mitigations and recommendation

- Conduct Hazard identification and risk assessments
- Comply with all Health and Safety standards specified in the Labor Act.
- Provide all staff on site with protective equipment (helmets, gloves, respirators, work suits, earplugs, goggles and safety shoes where applicable).
- Use of dust suppression measures
- Reduce noise exposure by isolating noisy equipment and rotate tasks
- Provision of the following, First Aid at the site, safety posters at conspicuous places and immediate accident/incident investigation reporting.

2. Population Influx

Identified Impact	Effect					Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Population Influx Unmitigated	Short term	1	Beyond project boundary	2	Slight impact	1	Unlikely	1	5
Mitigated	Short term	1	Beyond project boundary	2	Slight impact	1	Unlikely	1	5

During the exploration phase, there will be people coming to work at the sites. However, the proponent is expecting to hire a few people given that this stage of the project is not labor intensive as compared to mining. The proponent will hire two permanent employees (geologist and assistant to the geologist), contractors for drilling and locals for manual labor when the need arises. Therefore, the impact of population influx is expected to remain of low environmental significance.

Mitigations and recommendation

- Local employment should be a priority so as to reduce the number of outsiders entering Opuwo area.

3. Heritage impact

Identified Impact	Effect					Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Heritage impact Unmitigated	Short term	1	Study area	1	Moderate impact	2	May occur	2	6
Mitigated	Short term	1	Study area	1	Slight impact	1	Unlikely	1	4

There are a number of archaeological works and declared heritage sites within the vicinity of the proposed development area but since none of these are on the EPLs, the impact on the existing archaeological and heritage sites is limited. Potential impacts on unknown archaeological and heritage sites might arise during the removal of topsoil thus during limited trenching and drilling. However, the overall significance of this impact is expected to be low given that trenching shall be limited and only used to understand

the surface geology whilst drilling will be used to understand the subsurface geology. Moreover, the exploration personnel will first walk around and identify areas of interest and on those targeted areas, trenching and drilling shall be applied hence reducing the area of land to be disturbed.

Possible areas where archaeological artifacts might be found include areas along the Hoanib River which is to the south of the project area and also along the Hoarusib River to the north of the project area. Historically, people settled near water sources for easy accessibility for domestic use.

It is essential to note that, no construction shall be done during the exploration phase hence minimizing the impact on unknown archaeological heritage. The Proponent will also use already existing tracks and in an event that the tracks need rehabilitation, they will only be upgraded. The Proponent will also consult with the headman of the area before any work is done so that if there are any areas which are holy or with graves, the Proponent would be aware. In addition, if the proponent come across archaeological features or objects that possess cultural values (e.g. Pottery, bones, shells, ancient clothing or weapons, ancient cutlery, graves etc.), the area should be barricaded off and the relevant authorities should be contacted immediately.

Mitigations and recommendation

- The Proponent should consult the headman of the area before conducting any work.
- All works are to be immediately ceased 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.

4. Risk and spread of HIV/AIDS

Identified Impact	Effect					Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
HIV/AIDS Unmitigated	Short term	1	Regional	3	Severe impact	4	May occur	2	10
Mitigated	Short term	1	Beyond project boundary	2	Slight impact	1	Unlikely	1	5

The fact that people will be coming from different locations and meeting at one place can result in anti-social behaviours like prostitution hence the spread of HIV/AIDS. If mitigation measures are implemented, it will be unlikely that the virus will spread and the impact will be of low significance.

Mitigations and recommendation

- Employer should allocate time for employees to visit their families.
- Free distribution of condoms

5. Cumulative Impacts

Identified Impact	Effect					Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Cumulative impacts Unmitigated	Short term	1	Study area	1	Slight impact	1	Probably	3	6
Mitigated	Short term	1	Study area	1	Slight impact	1	May occur	2	5

Alternation of existing landscape caused by limited trenching and drilling might impact on unknown archaeological heritage and also result in loss of habitancy for some animals which can further affect the food web. The greatest potential impact of the proposed development on the unknown archaeological heritage of the surrounding landscape will be during the removal of topsoil during limited trenching and drilling on identified areas of interest with possible mineral deposits. The proposed works will have a negative archaeological impact on undisturbed areas of ground where topsoil will be removed.

Mitigations and recommendation

- Limited trenching should be done to understand the surface geology but when need arise to understand the subsurface geology, drilling should be used.

- The Proponent will need to monitor, by seeking consultation from an archaeological consultant during topsoil removal over relatively large areas so as to ensure the full recognition and recording of any buried finds or features.
- Removed rocks and soil should be replaced back and levelling of the area done so as to try to restore the area to its natural state

7.3.3 Positive impacts associated with the project

1. Employment creation

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Employment creation Unmitigated	Short term	1	National	4	Very beneficial	8	Definite	4	17
Mitigated	Short term	1	National	4	Very beneficial	8	Definite	4	17

It is definite that jobs will be created during the exploration phase. The type of jobs will range from skilled, semi-skilled and unskilled and locals will definitely be recruited when manual labour is required.

2. Local Empowerment

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Local Empowerment Unmitigated	Permanent	4	Regional	3	Very beneficial	8	Definite	4	19
Mitigated	Permanent	4	Regional	3	Very beneficial	8	Definite	4	19

The shareholders of Kaoko Mining Namibia (Pty) Ltd are all Namibian citizens who managed to group their licenses together in a bid to explore for the possible discovery of a medium to large minable copper deposit. If the deposits are discovered in future, the shareholders and those who depend on them will benefit as long as the mine is operating.

3. Land utilization for the benefit of people

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Land utilization for the benefit of people Unmitigated	Permanent	4	Regional	3	Very beneficial	8	Definite	4	19
Mitigated	Permanent	4	Regional	3	Very beneficial	8	Definite	4	19

Locals were granted the EPLs but most of the shareholders did not have funds to start exploration activities. Therefore, the formation of the company helped most of the shareholders. Given that exploration activities are done and minable deposits are obtained, this can result in utilisation of the land hence benefiting the people.

4. Generation of Revenue

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
Revenue Unmitigated	Permanent	4	National	4	Very beneficial	8	Definite	4	20
Mitigated	Permanent	4	National	4	Very beneficial	8	Definite	4	20

Kaoko Mining Namibia (Pty) Ltd will pay tax hence generating revenue. More taxes will also be generated through contracted and subcontracted companies.

7.3.4 Post-Exploration Phase

The stage of exploration is expected to have minimum damage to the environment as compared to mining. However, pits created during limited trenching need to be rehabilitated. The following shall be done as a way to restore the environment:

- All pits shall be backfilled or contoured to a stable angle of repose.
- Stockpile disturbed bedrock on site in a safe and stable manner.

7.4 SUMMARY & ANALYSIS OF IMPACTS

During the exploration phase, the following impacts will fall under moderate environmental impacts if no mitigation measures are put in place; impact on landscape, fauna, soil and HIV/AIDS. However, if the project is well managed and the proposed mitigation measures in the EMP are implemented accordingly, all the identified impacts will present minimum or no harm to the environment and to local people.

CHAPTER EIGHT: ENVIRONMENT MANAGEMENT AND MONITORING PLAN

Environmental Management Plan (EMP) is a vital output for an Environmental Impact Assessment as it provides a checklist for project monitoring and evaluation. EMP for the proposed project is aimed at providing a logical framework within which identified negative environmental impacts can be mitigated and monitored. **See Appendix D**, for the EMP.

CHAPTER NINE: CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSION

From the foregoing analysis, the social and economic rating for this project is highly positive. The project does not pose any serious and negative environmental impacts. Adequate mitigation measures have been proposed to address any of the negative impacts arising from the project. Should the Proponent implement all the suggested mitigation measures, the consultant recommends the issuance of the Environmental Clearance Certificate.

9.2 RECOMMENDATIONS

The following recommendations have been brought forward:

- Unnecessary clearing of vegetation shall not be allowed unless when the need arise to create cutlines for accessibility of vehicles.
- After exploration activities, the Proponent should rehabilitate the area by backfilling the pits or contour to a stable angle of repose
- Environmental audits by an independent environmental consultancy must be carried out during the exploration phase to monitor environmental compliance. The monitoring and

audit reports should accompany the application for renewal of the environmental clearance certificate after 3 years.

REFERENCES

Constitution of the Republic of Namibia (1990)

Environmental Management Act (2007)

Environmental Management Regulations (2012)

Education Statistics. (2012). Education Management Information System. Namibia: Ministry of Education.

Ministry of Health and Social Services. (2015). The Namibia Aids Response Progress Report 2015, Namibia: MHSS.

Mendelsohn. J., Jarvis. A., Roberts. C., Robertson. T. (2003). Atlas of Namibia. Cape town South Africa: David Philip publishers,

Miller, R. McG. (2008). The Geology of Namibia, Volume 2, Neoproterozoic to lower Paleozoic, Windhoek: Ministry of Mines and Energy, Geological Survey

Mendelsohn J., Jarvis A., Roberts C. and Roberts T. (2002). Atlas of Namibia: A portrait of the land and its people. Singapore: Tien Wah Press.

Steinneman, (2000) Environmental Impact Assessment, a Guide for Reviewer

Vogelsang. R, (1998) Archaeological survey in the Kaokoveld Namibia. h j w w Aklrnl 50: 22-24

