mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

FINAL BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT:
Cuprachem (Pty) Ltd
Reg No.: 2006/036916/07
Representative: Leonarde Roux

CELL NO: 027 4950002
E-Mail: l.roux@cuprachem.co.za

POSTAL ADDRESS:
P.O.Box 1140
Springbok, 8241

PHYSICAL ADDRESS:
Spektakel Copper Mine
Buffelsrivier

FILE REFERENCE NUMBER SAMRAD: NC30/5/1/1/3/2(12171PR)

Important Notice

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un- interpreted information and that it unambiguously represents the interpretation of the applicant.

Objective of the basic assessment process

The objective of the basic assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives,

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:

  (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

  (ii) the degree to which these impacts —

    (aa) can be reversed;

    (bb) may cause irreplaceable loss of resources; and

    (cc) can be managed, avoided or mitigated;

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

  (i) identify and motivate a preferred site, activity and technology alternative;

  (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and

  (iii) identify residual risks that need to be managed and monitored.

DEFINITIONS

Alternatives - In relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to –
i. The property on which or location where it is proposed to undertake the activity;
ii. The type of activity to be undertaken;
iii. The design or layout of the activity;
iv. The technology to be used in the activity, and;
v. The operational aspects of the activity.
Baseline - Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.
Basic Assessment Process – This is the environmental assessment applied to activities listed in Government Notice No. R 983 (Listing 1) as amended by GNR 327 (dated 7/04/2017) and No. R985 (Listing 3) as amended by GNR 324 (dated 7/04/2017)**.** These are typically smaller scale activities of which the impacts are generally known and can be easily managed. Generally, these activities are considered less likely to have significant environmental impacts and, therefore, do not require a full-blown and detailed Environmental Impact Assessment (see below).
Biodiversity - The diversity, or variety, of plants, animals and other living things in a particular area or region. It encompasses habitat diversity, species diversity and genetic diversity.
Borehole - Includes a well, excavation, or any other artificially constructed or improved groundwater cavity which can be used for the purpose of intercepting, collecting or storing water from an aquifer; observing or collecting data and information on water in an aquifer; or recharging an aquifer.
Community - Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area.
Construction Phase - The stage of project development comprising site preparation as well as all construction activities associated with the development.
Consultation - A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.
Critical Biodiversity Area - Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.
Cumulative Impacts - Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.
Environment - The surroundings within which humans exist and that are made up of
i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any Part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Authorisation (EA) – The authorisation by a competent authority of a listed activity.
Environmental Assessment Practitioner (EAP) – The person responsible for planning, management and co-ordination of environmental impact assessment, strategic environmental assessments, environmental management plans or any other appropriate environmental instrument introduced through regulations.
Environmental Impact Assessment (EIA) – In relation to an application to which scoping must be applied, means the process of collecting, organizing, analysing, interpreting and communicating information that is relevant to the consideration of that application. This process necessitates the compilation of an Environmental Impact Report, which describes the process of examining the environmental effects of a proposed development, the anticipated impacts and proposed mitigatory measures.
Environmental Impact Report (EIR) - A report assessing the potential significant impacts as identified during the Scoping phase.
Environmental Management Programme (EMPr) - A management programme designed specifically to introduce the mitigation measures proposed in the Reports and contained in the Conditions of Approval in the Environmental Authorisation.
Gross Domestic Product (GDP) by region - represents the value of all goods and services produced within a region, over a period of one year, plus taxes minus subsidies.
Hydrocarbons – Oils used in machinery as lubricants, including diesel and petrol used as fuel.
Impact - A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Interested and Affected Party (I&AP) – Any individual, group, organization or associations which are interested in or affected by an activity as well as any organ of state that may have jurisdiction over any aspect of the activity.
Municipality –
(a) Means a metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998); or
(b) In relation to the implementation of a provision of this Act in an area which falls within both a local municipality and a district municipality, means
    (i) The district municipality, or

(ii) The local municipality, if the district municipality, by agreement with the local municipality, has assigned the implementation of that provision in that area to the local municipality.

NEMA EIA Regulations - The EIA Regulations means the regulations made under section 24(5) of the National Environmental Management Act (Act 107 of 1998) (Government Notice No. R 982, R 983, R984 and R 985 in the Government Gazette of 4 December 2014 refer as amended by GNR 324, 325, 326 and 327 of 7 April 2017.

No-Go Alternative – The option of not proceeding with the activity, implying a continuation of the current situation / status quo

Public Participation Process (PPP) - A process in which potential Interested and Affected Parties are given an opportunity to comment on, or raise issues relevant to, specific matters.

Registered Interested and Affected Party – All persons who, as a consequence of the Public Participation Process conducted in respect of an application, have submitted written comments or attended meeting with the applicant or environmental assessment practitioner (EAP); all persons who have requested the applicant or the EAP in writing, for their names to be placed on the register and all organs of state which have jurisdiction in respect of the activity to which the application relates.

Scoping process - A procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail

Scoping Report – The report describing the issues identified during the scoping process.

Significant impact – Means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Spatial Development Framework (SDF) - A document required by legislation and essential in providing conservation and development guidelines for an urban area, which is situated in an environmentally sensitive area and for which major expansion is expected in the foreseeable future.

Specialist study - A study into a particular aspect of the environment, undertaken by an expert in that discipline.

Stakeholders - All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.

Sustainable development - Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

Visibility - The area from which the project components would actually be visible and depends upon topography, vegetation cover, built structures and distance.

Visual Character - The elements that make up the landscape including geology, vegetation and land-use of the area.

Visual Quality - The experience of the environment with its particular natural and cultural attributes.

Visual Receptors - Individuals, groups or communities who are subject to the visual influence of a particular project.

ACRONYMS AND ABBREVIATIONS

amsl	Above mean sea level
BA	Basic Assessment
BPEO	Best Practicable Environmental Option
CBA	Critical Biodiversity Area
DM	District Municipality
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
DSR	Draft Scoping Report
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EStA	Early Stone Age
FoT	"Free on Truck ": means there is no processing and that it's a raw product.
FSR	Final Scoping Report
GA	General Authorisation
GDP	Gross Domestic Product
GDPR	Regional Gross Domestic Product
GGP	Gross Geographic Product
GNR	Government Notice Reference
ha	Hectares
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
km	Kilometres
km^2	Square kilometres
LED	Local Economic Development
LM	Local Municipality
LoM	Life of Mine
LN	Listing Notice
L/s	Litres per second
LSA	Late Stone Age
m^3	Metres cubed
MAP	Mean Annual Precipitation
MAPE	Mean Annual Potential Evaporation
MASMS	Mean Annual Soil Moisture Stress (% of days when evaporation demand was more than double the soil moisture supply)
MFD	Mean Frost Days
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSA	Middle Stone Age
MSDS	Material Safety Data Sheet
NEMA	National Environmental Management Act 107 of 1998 as amended
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NEM:WA	National Environmental Management: Waste Act 59 of 1998
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PES	Present Ecological State
RDL	Red Data List
ROM	Run of Mine
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SLP	Social and Labour Plan
StatsSA	Statistics South Africa
WMA	Water Management Area
WML	Waste Management License
WUL A	Water Use License Application

Contents

1. Contact Person & Contact Details 1
   1.1 Details of EAP 1
   1.2 Expertise of the EAP 1
2. Location of the overall Activity 2
   2.1 Locality map (show nearest town, scale not smaller than 1:250000). 2
3. Description of the scope of the proposed overall activity 5
   3.1 Introduction and Background 5
   3.2 The Scope of the Proposed Activities 5
      3.2.1 Phase 1: Investigations & surface surveys (24 months): 5
      3.2.2 Phase 2: Drilling and assay (24 months): 6
      3.2.3 Phase 3 Compilation & reporting (12 months) 8
   3.3 Description of the activities to be undertaken 8
      3.3.1 Invasive prospecting activities 8
      3.3.2 Associated infrastructure 8
      3.3.3 Drilling Program 9
      3.3.4 Rehabilitation 10
   3.4 Listed and specified activities 10
4. Policy and Legislative Context 14
5. Need and desirability of the proposed activities 17
   5.1 Mining and Biodiversity Guidelines (2013) 17
   5.2 Namakwa District Municipality IDP 2017-2022 19
   5.3 Nama Khoi Local Municipality IDP (Draft 2018-2019) 19
   5.4 Northern Cape Provincial Spatial Development Framework (NCPSDF) 20
   5.5 Northern Cape Provincial Growth and Development Strategy (NCPGDS) 20
   5.6 DEA Guideline on Need and Desirability (2017) 21
6. Motivation for the overall preferred site, activities and technology alternative. 23
7. Details of the Public Participation Process Followed 23
   7.1 Introduction 23
   7.2 Summary of issues raised by I&Aps 24
8. Process to reach the proposed preferred alternative 27
   8.1 Process to Reach the Proposed Preferred Alternative 27
   8.2 The Environmental attributes associated with the alternatives (Baseline Environment) 27
      8.2.1 Regional setting 27
      8.2.2 Geology 28
      8.2.3 Soil and land capability 30
      8.2.4 Landscape - Topography 32
      8.2.5 Climate 32
      8.2.6 Biodiversity (Flora and Fauna) 33
      8.2.7 Water Resources 36
      8.2.8 Emissions 38
      8.2.9 Socio-economic 38
      8.2.10 Description of specific environmental features and infrastructure on the site 38
      8.2.11 Environmental and current land use maps 38

8.3 Impacts and risks identified 39
8.4 Methodology used in determining potential environmental impacts 41
Ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks. 41
8.4.1 Evaluating the probability 41
8.4.2 Evaluating the severity 41
8.4.3 Evaluating the frequency 41
8.4.4 Evaluating the duration 41
8.5 Positive and negative impacts of proposed activity and alternatives 42
8.6 The possible mitigation measures that could be applied and the level of risk. 43
8.6.1 Site Access 43
8.6.2 Site Establishment 44
8.6.3 Operational Phase 47
8.6.4 Decommissioning phase: 50
8.6.5 Assessment of potential cumulative impacts 50
8.7 Motivation where no alternative sites were considered. 50
8.8 Statement motivating the alternative development location within the overall site. 50
9. ENVIRONMENTAL IMPACT ASSESSMENT 51
9.1 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site 51
9.2 Assessment of each identified potentially significant impact and risk 52
9.3 Summary of specialist reports. 62
10. Environmental impact statement 63
10.1 Summary of the key findings of the environmental impact assessment 63
10.2 Final Site Map 63
10.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives 63
10.3.1 Positive Impacts 63
10.3.2 Negative Impacts 63
10.4 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr 64
10.5 Aspects for inclusion as conditions of Authorisation 65
10.6 Description of any assumptions, uncertainties and gaps in knowledge. 65
10.7 Reasoned opinion as to whether the proposed activity should or should not be authorized 65
10.7.1 Reasons why the activity should be authorized or not. 65
10.7.2 Conditions that must be included in the authorisation 66
10.7.3 Period for which the Environmental Authorisation is required. 66
10.7.4 Undertaking 66
11. Financial Provision 66
11.1 Legal Framework 66
11.2 Calculation 66
11.3 Explain how the aforesaid amount was derived. 67
11.4 Confirm that this amount can be provided for from operating expenditure. 67
12. Specific Information required by the competent Authority 67
12.1 Compliance with sections 24(4)(a) and (b) of NEMA 67

12.2 Other matters required in terms of sections 24(4)(a) and (b) of the Act. 68
13. Environmental Management Program 68
13.1 Details of the EAP, ... 68
13.2 Description of the Aspects of the Activity 68
13.3 Composite Map 68
13.4 Description of Impact management objectives including management statements 68
13.5 Determination of closure objectives. 68
13.6 Volumes and rate of water use required for the operation. 68
13.7 Has a water use license has been applied for? 69
13.8 Impacts to be mitigated in their respective phases 70
13.9 Impact Management Outcomes 74
13.10 Impact Management Actions 76
14. Financial Provision 78
14.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation. 78
14.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties 79
14.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure. 79
14.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives. 79
14.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline 79
14.6 Confirm that the financial provision will be provided as determined. 79
14.7 Mechanisms for monitoring compliance with and performance assessment against the environmental management program and reporting thereon, including 80
14.8 Indicate the frequency of the submission of the performance assessment/ environmental audit report. 82
15. Environmental Awareness Plan 82
15.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work. 82
15.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment. 82
15.3 Specific information required by the Competent Authority 83
16. Undertaking 83

1. Contact Person & Contact Details

1.1 Details of EAP

Name of The Practitioner: N.J. van Zyl
Tel No.: 082 8898696; Fax No.: 086 6562942
e-mail address: klaaskraalbos@gmail.com

1.2 Expertise of the EAP

The qualifications of the EAP

Current qualifications in this field were obtained through formal studies at the Cape Town Technicon, Nelson Mandela Metropolitan University and the University of the Orange Free State, which is the following:

- National Diploma Nature Conservation (1986)
- National Higher Diploma (B-Tech) Nature Conservation (1992)
- Master's Degree Environmental Management (MOB 750) (2001)

Further qualifications in this field were also obtained through short courses at the University of the Orange Free State, which is the following:
Environmental Impact Assessment (2001)
Wildlife Management through Veld Management (2001)
Resource evaluation and game ranch management (2003)
Arc GIS (2009)

Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

With the implementation of the Mineral and Petroleum Resources Development Act 28 of 2002 Mr. van Zyl has started assisting small scale miners with all facets of applications for mining permits in terms of section 27 and prospecting rights in terms of section 16 of the MPRDA. Mr van Zyl has an excellent knowledge of the relevant acts applicable to the mining sector including the following:

- Mineral and Petroleum Resources Development Act 28 of 2002
- Mineral and Petroleum Resources Development Amendment Act 49 of 2008
- Mineral and Petroleum Resources Regulations 2004
- National Environmental Management Act 107 of 1998 as amended
- National Environment Laws Amendment Act 25 of 2014 as amended
- NEMA: Environmental Impact Assessment Regulations, 2014
- NEMA: Financial Provisioning Regulations, 2015
- NEMA: Waste Act 59 of 2008 as amended
- NEMA: Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits, 2015
- National Water Act 36 of 1998 as amended (with special attention to section 21 water uses)

Since 2002 Mr. van Zyl completed more than 150 applications for mining permits and more than 100 applications for prospecting rights. The mineral regulations and environmental management for most of these projects were managed throughout the life of the project including:

- Applications – manual and Samrad
- Prospecting work programs including financial and technical competence
- Public participation process
- EIA and EMP's now BAR and EMP's
- Annual Rehabilitation Plans

- Final Rehabilitation, Decommissioning and Mine Closure Plans including Risk Assessment Reports
- Execution and registration of rights including sec 42 diagrams for MPTRO
- Performance audits including reviews of Annual Closure Plans and Rehabilitation, Decommissioning and Mine Closure Plans together with financial quantum reviews.
- Application for closure certificate

Although Mr. van Zyl specializes in small scale mining operations and prospecting operations that requires investigation, assessment and communication according to the procedure as prescribed in regulations 19 and 20 of the EIA Regulations he also assist 5 mining rights with environmental management. Other sections of the MPRDA that Mr. van Zyl has experience in is:

- Section 102 applications and Section 20 applications
- Section 53 Applications and Section 11 Applications

2. Location of the overall Activity

Table 1

Farm Name:	Property 1: Portion of the farm Graces Puts No. 201 in extent approximately 6300.0242Ha. Registered in the name of The Plaaslike Oorgangsraad Komaggas by virtue of title deed T29430/1997. SG Code C05300000000020100000 Property 2: The Farm Spektakel No. 202 in extent approximately 1195.3830Ha. Registered in the name of The Republic of South Africa by virtue of title deed T88538/1998 SG Code C05300000000020200000
Application area (Ha)	1 767 Ha
Magisterial district:	Namakwaland
Distance and direction from nearest town	35 Km West of Springbok
21-digit Surveyor General Code	Graces Puts No. 201 - C05300000000020100000 Spektakel No. 202 - C05300000000020200000

2.1 Locality map (show nearest town, scale not smaller than 1:250000).

Refer to the locality plan attached at **Diagram 1.** **Diagram 2** shows the properties and co-ordinates.

Diagram 1: Locality map

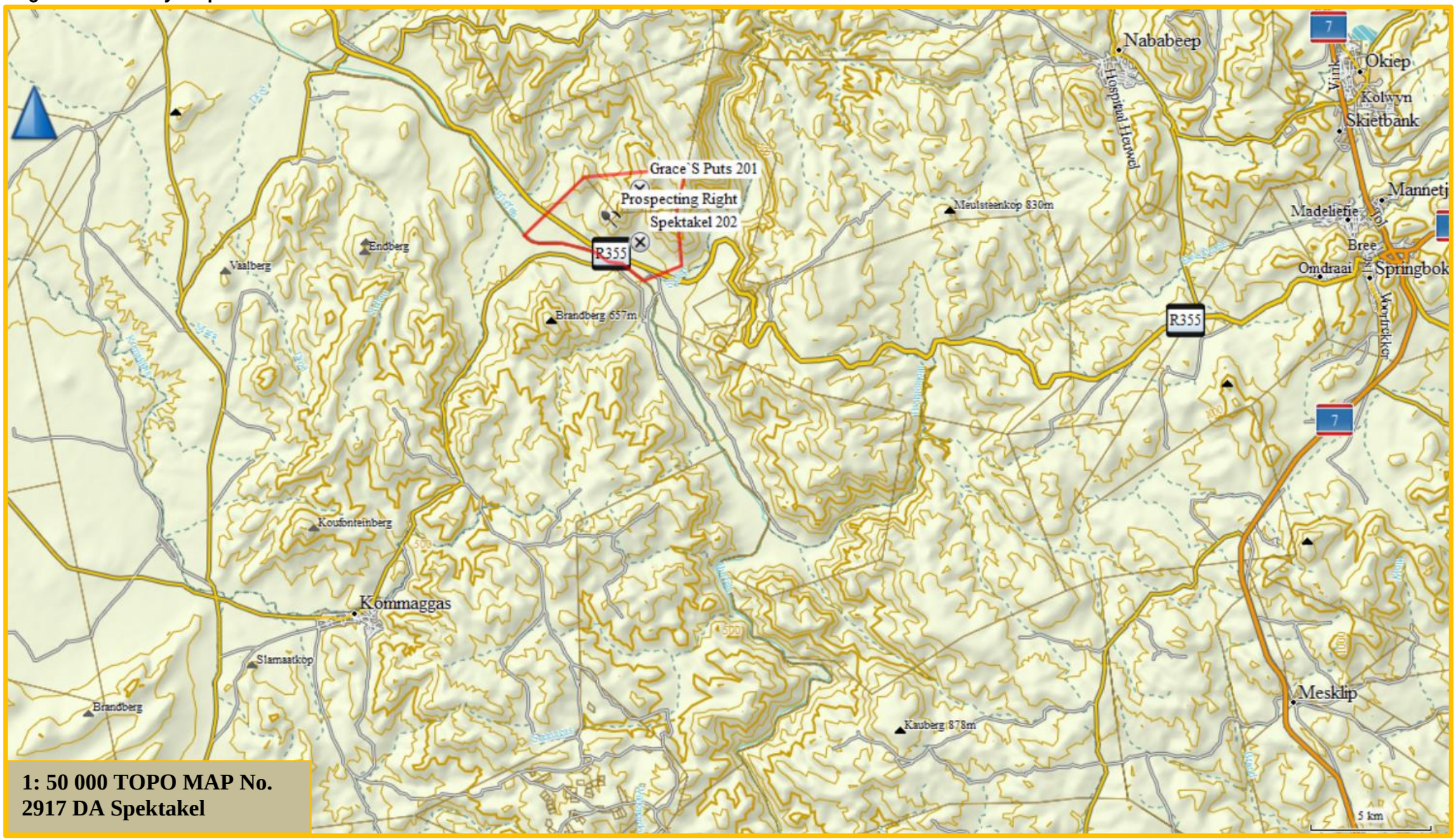
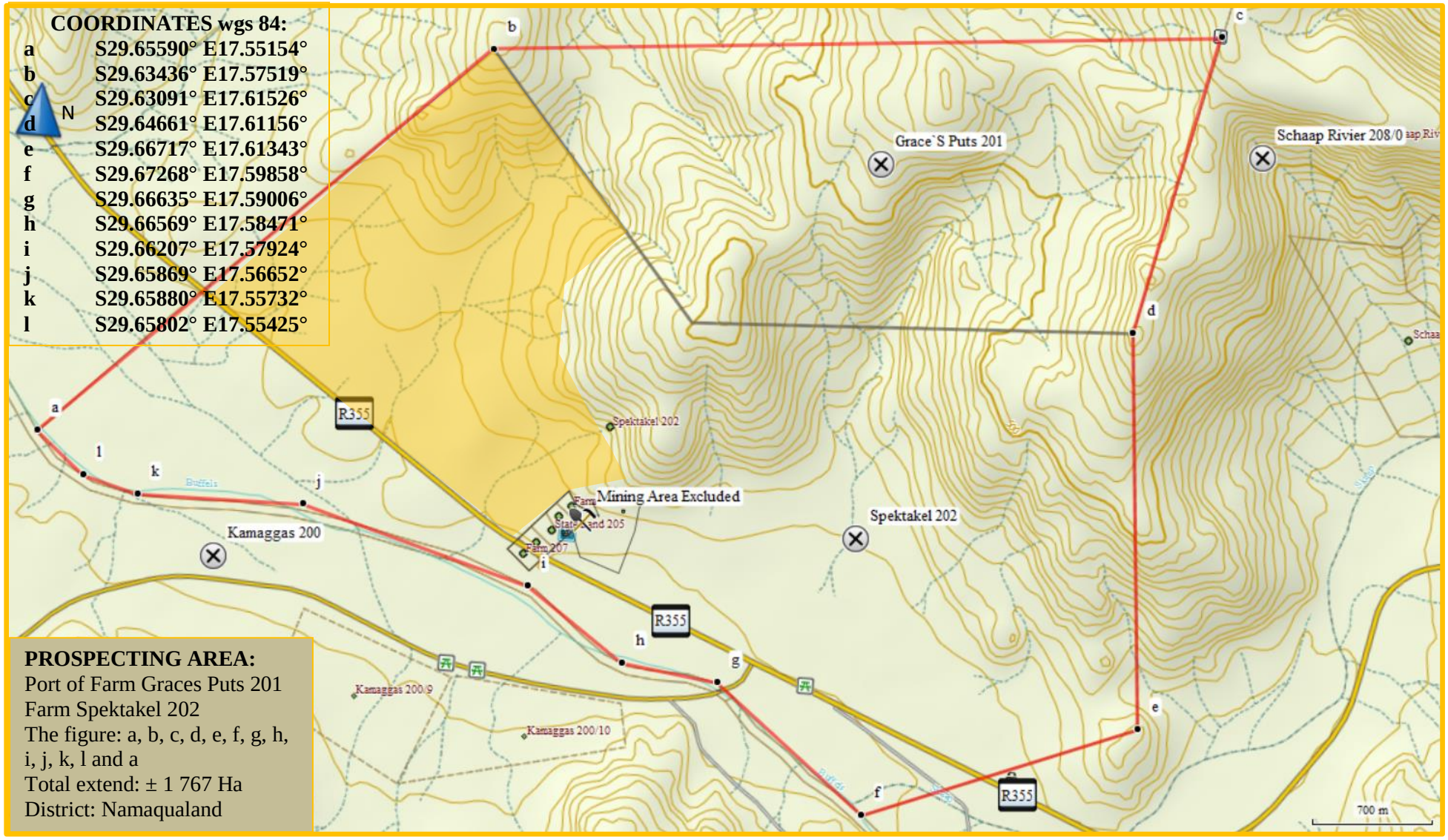


Diagram 2: Site Plan showing area of interest to be explored by means of non-invasive Geophysical Surveys to identify potential Base Metal ore bodies that will be evaluated by means of Percussion Drilling



3. Description of the scope of the proposed overall activity

3.1 Introduction and Background

The applicant, Cuprachem (Pty) Ltd., wishes to undertake prospecting without bulk sampling activities for Copper ore. Prospecting for base metals is a dynamic and result-driven operation which proceeds in phases, the outcome of which cannot be predicted or predetermined. The program could be stopped at any stage during the prospecting operation if the results are negative or noneconomical. Prospecting activities to be undertaken include non-invasive (i.e. desktop studies and ground geophysical surveys) and invasive (i.e. drilling) techniques.

The aim of the prospecting activities is to expand on the known Copper Ore Body at the Spektakel Copper Mine. The area applied for falls within the Namakwa Copper Belt and thus has the generic potential to host Copper deposits. Numerous historic Copper mines are found in quite close proximity to the area applied for.

Prospecting activities are therefore needed to:

- Confirm and obtain additional information concerning potential targets through non-invasive activities (desktop studies and ground geophysical surveys) and invasive (drilling) activities.
- Assess if the resource can be extracted through future mining in an environmentally socially and economically viable manner.

Essentially the program can be summarized as:

Phase	Activity	Duration
Phase 1	Investigations & surface surveys	2 years
Phase 2	Drilling* and assay	2 years
Phase 3	Compilation & reporting	1 year

*Drilling denotes both RC and diamond / core drilling.

3.2 The Scope of the Proposed Activities

3.2.1 Phase 1: Investigations & surface surveys (24 months):

Aerial surveys

Imagery is one of the fields that have shown vast improvements in recent years. Today this is a powerful geological tool capable of providing a range of pertinent information. Newer methods may also show large scale features such a lineaments and fault/fracture patterns not discernible at ground level. Different image methods and suppliers will be evaluated and an appropriate package secured. A follow-up ground geophysical survey may be conducted, if warranted,

Geological Mapping

The geological surface mapping exercise will be conducted over the property and will include the mapping of the soil/sand overburden and where accessible, particular attention will be paid to basement lithology's. All geological features will be recorded and all results compiled for correlation purposes.

Geochemical Survey

From the information of the aerial surveys and mapping, a reconnaissance soil sampling program would be set up in a series of traverses across the area of interest to determine anomalous concentrations of copper and/or other base metals in surface samples. A surface sample (±25Kg) will be collected, sieved and the fine portion reduced (±500g) and sent for assay. Reconnaissance stream sediment sampling will also be conducted at regular intervals along the dry river beds. In both cases more

detailed and systematic sampling (probably on grid basis) would be carried out as a follow-up measure. Total material to be removed would be less than 1m³.
This approach is of secondary importance compared with geophysics, as most of the outcropping copper horizons have already been investigated and tested. Blind ore bodies do not give much of a geochemical expression. In addition, surface sampling over the Nama sediments is unlikely to yield any useful results.

Geophysical Surveys

As a secondary phase to the airborne work, ground surveys would give better definition to possible mineralized areas. A preliminary hand-held magnetometer survey followed by either electro-magnetic (EM) or gravity (the norites are more dense than surrounding country rocks) could yield the best results. It will only be possible to be more specific about methods to be employed after the aerial work.
At a further detailed stage, down-hole geophysics maybe employed during the drilling program and a valuable tool to locate mineralization.

Data Compilation

All geological, geochemical, geophysical and topographic information will be captured in electronic format. This will allow for the superimposition of the various layers of information (geology, geophysics and topography) and will form the basis for the interpretation of the information generated, resulting in the further definition of the potential 3D spatial distribution of any mineralization. It will further enable the creation of a GIS database
Upon completion of the data capture, a model will be generated defining the spatial distribution of the bedrock, the ore and the surrounding country rock.

3.2.2 Phase 2: Drilling and assay (24 months):

Underground Sampling

Although this has been included under invasive prospecting, its impact on the environment would be negligible as the sampling is solely underground and of extremely limited extent. There is limited access in a few locations to old adits which would afford the opportunity to conduct sampling in support of the drilling programme. Under qualified supervision, a channel of chip samples across various sections of the steep structure would be taken for analysis. A small channel would be chipped by hand across selected sections. The orientation of these samples is usually normal to the strike of the mineralised zone. Exposure is likely to be quite limited however; samples should give a good indication of the ore mineralogy for subsequent petrographic studies. Total material to be removed would be less than 1m³.

Drilling

Although two different types of drilling are to be applied to the concession, they both have some common operations. In all instances drilling would be:

- Under close supervision of a geologist
- Conducted along best practice guidelines
- Minimize environmental disturbance

In this area, most of the target horizons are relatively close to surface and hence drill holes should be quite short; in the range of 100 – 200m

RC Drilling

Reverse circulation or RC drilling is possibly the most definitive and powerful exploration tool in this hard rock environment. Under the direct supervision of a resident geologist, fairly wide spaced holes (probably 200m apart) would be sited over interesting structures and hot spots located from earlier aerial and ground surveys.

Cuttings would be collected by cyclone and the material split between the chip tray and sampling. Chippings would be photographed, logged and a sample taken for analysis on a 1m interval from all target horizons

Diamond Drilling

It is hoped to be able to employ more sophisticated drill rigs which can switch between RC and diamond drilling. These have advantages in speed and costs. Core drilling, being considerably slower and more expensive, will be used as a target follow-up method where more precise information is needed on geological features, underground conditions and grades. It is aimed to use core drilling to infill between RC drill fence lines and accurately define mineralized zones or horizons.

The size of core drilled will be determined by such factors as cost, proposed core sampling, the degree of logging required and proposed geotechnical investigations. Sizes commonly used are HQ (63.5 mm diameter core) and NQ (47.6 mm diameter core) or variations on these. The orientation and depth of core holes will vary depending on the drilling objective. In the case of delineation or scout drilling, angled core holes will be drilled to establish accurate ore/country rock boundaries at depth (in other words, where the edge of the ore body is at depth). Vertical holes will be drilled for geological modelling and / or sampling of the core.

Core holes allow for maximum control on information such as overburden thickness, density, country rock dilution and likely ore body intersections.

Drill spacing's would be initially closed down to 50m. The target lithology is usually quite shallow and maximum depths drilled are expected to be between 100 – 200m. Mineralized core or core from the target zone (even if it does not show visible ore) after logging and photographing, would be halved used a core splitter. One half being put aside for sample testing which includes both assay and metallurgical work (if selected on a proportional basis). The remaining half forms part of the permanent record which is loaded in a core tray in the core shed.

Geologically select holes are picked for down-hole surveying using portable geophysics for magnetic and radiometric expression. This is the last geophysics to be carried out.

Collars would be marked with a numbered and dated steel peg and exact positions recorded on a GPS. Since drilling generates a larger and more precise sample it is also key for preparing any metallurgical samples.

<u>Metallurgical Sampling</u>

This would be scheduled towards the end of the programme as it requires the completion of the drilling to generate most of the sample. This sample must be carefully prepared to cover all different ore types and a proportional composite for test work and grade determination. Such sample would be made up from surface and underground chip samples along with cutting and split cores from the drilling. In this regard IT IS NOT A BULK SAMPLE, requiring excavation of a significant volume of rock from any one place and requiring explosives.

The samples would undergo pilot scale investigation to determine optimal crushing, screening, and floatation characteristics. This work would be carried out off site, probably at a metallurgical laboratory in or around Johannesburg.

Grade information will be generated to verify the earlier sampling results by treating samples through the smaller scale recovery circuit utilizing the same method as would be considered for commercial operations. The same information would be used to size the process plant and to select equipment. Layout and location would be designed in such a manner as to minimize any visual or environmental impact.

3.2.3 Phase 3 Compilation & reporting (12 months)

Completion Studies and Pre-feasibility

Any program such as this culminates with an overall completion study and in this case the objective would be to provide a pre-feasibility study at a suitably detailed level for planning and to enable the commencement of financing and development.

During the fifth and final year all data needs to be compiled, interpreted, summarized and evaluated in a final report. Several additional studies will need to be completed in order for an informed decision to be made on whether or not to proceed with development. Aside from all the information already discussed, expert input is frequently required in geohydrology, rock mechanics, statistical grade distribution, pyro- or hydro-metallurgy and other specialized fields.

A direct follow-on from the report is the ability to start looking at various funding alternatives, be they private, public or listed. In mine development this is a normal sequence because of the amounts of money involved that the latter two sources of finance predominate. These avenues often require separate reporting and the creation of relationships with key financial advisors, stockbrokers and fund managers.

3.3 Description of the activities to be undertaken

3.3.1 Invasive prospecting activities

- The percussion drilling of approximately 20 holes for the extraction of sand, calcrete and gravel chips;
- The drill material (sand and stone chips) will be analysed on site i.e. the drill material is laid out next to each hole in heaps to indicate the sequence and drilling depth (samples are taken every meter drilled);
- Access to the drill site will be via existing farm tracks. If no tracks area available, 'twee-spoor' tracks will be made by driving the drilling rig (4 x 4) to such a site. This should be done under the supervision of an ECO;
- The area of each drill pad which will be disturbed (total surface area) is approximately 160m² (Refer to **Figure 1** for a layout of a typical drill site);
- Water required for drilling purposes (which may be required if drilling through soft clays are required) will be brought to site;
- Only where necessary will existing vegetation be removed. The topsoil will be kept aside for later rehabilitation around each drill pad to prevent contamination.

3.3.2 Associated infrastructure

- Equipment laydown/ storage area: A temporary equipment laydown area will be located on an environmentally non-sensitive area (identified in consultation with the ECO and landowner), where the drill rig will be parked when not in use and will include an equipment/ materials laydown (storage) area and a chemical toilet. Diesel will be contained in a mobile bowser. Accommodation will be provided off-site in one of the nearby towns, and not at the drill site.
- Access Roads: Equipment will be transported to site via the existing roads (including gravel and jeep track). No new roads will be required. Any new tracks created by driving the drill rig to the drill site will be rehabilitated by means of raking and/or scarifying trampled surfaces (tracks).

3.3.3 Drilling Program

- Drilling will take place over a period of approximately 24 months.
- Diagram 3 indicates the proposed prospecting area and the location of the primary target area for drilling. The location of the holes will be refined based on the outcomes of the geological mapping and modelling.

Drilling Method

- The reverse circulation drilling machine is a modified percussion compressed air rig. The compressor that supplies the compressed air is a 900 cfm Atlas Copco.
- The 6m rods that are used have an inner barrel so they can handle two directions of flow. The air is forced down between the outer and inner barrel to the hammer. The hammer pulverises the rock and the particles are forced up the inner barrel to the cyclone where the air is removed out the top and the sample falls in to the bag at the bottom of the cyclone.
- The reason for using the reverse circulation technique is to collect representative samples at meter intervals drilled for on-site visual analysis.
- The limited amount of water required for drilling purposes will be transported to site and stored in bowsers in the immediate area of prospecting. Vehicle routes between the water source and the prospecting drilling site will be along existing vehicle tracks and/or the limited 'twee-spoor' tracks that may be required to drive the drilling rig to the drill site.
- Each drill pad will be contained to an area of about 160m², i.e. the total disturbed area will be about 160m². Should any clay horizons be intersected in the drilling of boreholes, it may be necessary to use water mixed with a drilling lubricant to assist with removing the clay and rock chips from the borehole. Such lubricant will also prevent the sides of the borehole collapsing. If such drilling is required, a drill sump will be excavated at each drill pad where clay is intersected and will be approximately 2.5m x 2.5m x 1.7m in extent and will be used to store and manage drilling fluid used during the drilling process (recycling of water).
- Each sump will be lined with a thick plastic liner to prevent seepage of the drilling water into the subsurface layers. The plastic liner will be reused at the other drill sites. The sumps will be demarcated with red and white tape or by other appropriate means. Each site will be rehabilitated directly after drilling.
- The drilling mud captured in the sumps will be dried and stored in leak proof receptacles and drill spoils will be removed from site and disposed of at a suitably licenced Municipal waste disposal facility.
- Drilling lubricants comprising non-polluting, biodegradable chemicals will be used during drilling. Such drilling lubricants thicken the water to assist with the sealing off of the sidewalls of the borehole and the removal of mud generated by drilling through the clay horizons.
- The drilling equipment consists of a drill rig mounted on a truck chassis with compressor, water tank and all other drilling ancillaries such as compressor pipes, drill rods, etc. refer **Figure 2**.

3.3.4 Rehabilitation

- Rehabilitation is carried out on a continuous basis as work progresses. It consists mostly of backfilling drill holes with the drill chips, removing of drill spoils from possible sumps, backfilling and profiling of sumps and ripping and cleaning up of drill pads and tracks used for drilling.
- Such rehabilitation is undertaken by scarifying the disturbed and or compacted areas to promote natural revegetation. This will be monitored continuously to ensure effective restoration and revegetation of disturbed areas. The rehabilitation work will be conducted in-house under the supervision of an ECO.

3.4 Listed and specified activities

Table 2

NAME OF ACTIVITY	Aerial extent Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE (*GNR 544, GNR 545 or GNR 546)*
Prospecting Activities (non-invasive)	735.0133 Ha	x	GNR 983, Activity 20[1]
Drilling Activities (invasive) [2]	±3 200m^2	x	GNR 983, Activity 20
Chip Sampling Activities[3]	Less than 5m^3	x	GNR 983, Activity 20
Access Roads (temporary, jeep track roads less than 4m wide) [4]	±2 600m^2		Not listed
Site clearance and removal of vegetation (the minimum area required for the equipment laydown area and drilling area will be cleared)	< 5Ha		Not listed
Sludge from drilling activities	Less than 5m^3		Not listed
Hydrocarbon storage	less than 30m^3		Not listed
Sanitation requirements (Chemical toilets)			Not listed

[1] Any activity including the operation of that activity which requires a **prospecting right** in terms of section 16 of the MPRDA, including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the MPRDA.

[2] Each drill pad is estimated to be 160m^2 in total.

[3] The estimated volume of material to be extracted from each drill hole is 1.8m^3 (based on a diameter of drill hole of 165mm, and depth of drill hole of 100m). This total ±36m^3 of material that will be extracted from the drill holes, and thereafter replaced during rehabilitation of the drill holes

[4] Calculated as follows: drill profile AM1: 400m track x 3.5m wide; drill profile AM2: 350m track x 3.5m wide.

Figure 1 Typical layout of a drill platform

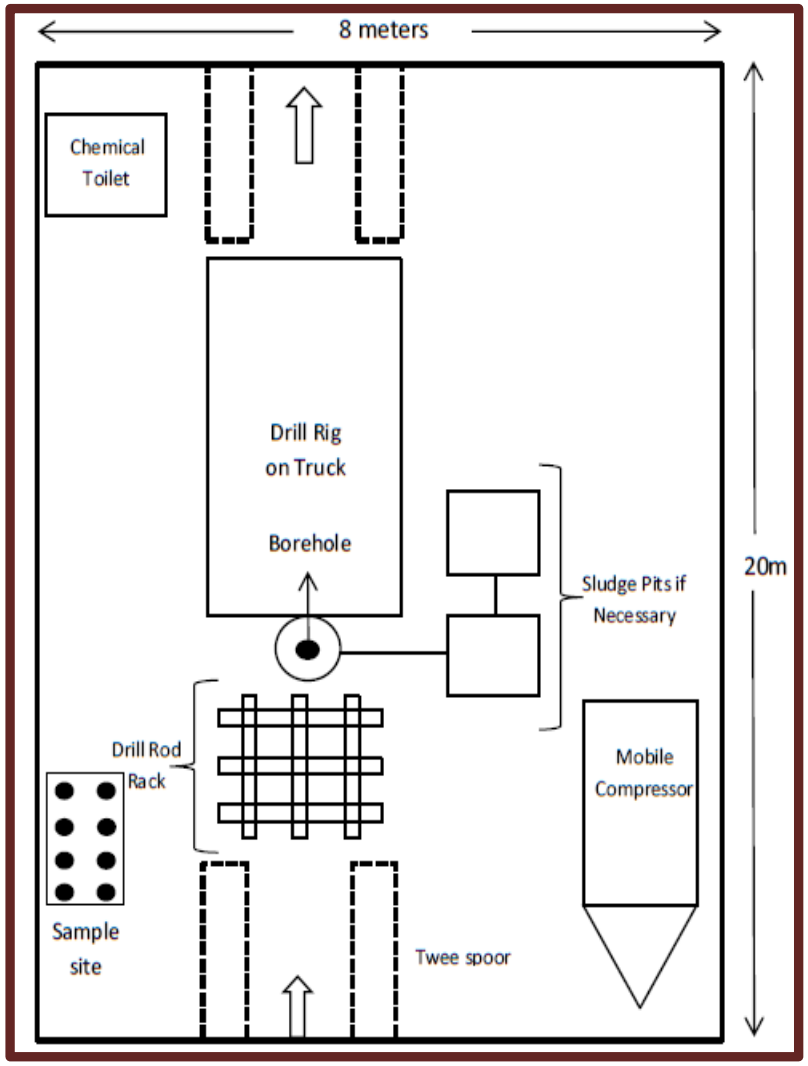


Figure 2 Typical configuration of a drill rig

Diagram 3: Site Plan showing landscape and existing copper mining activities - the two proposed drill traverses can only be determined after completion of non-invasive investigations

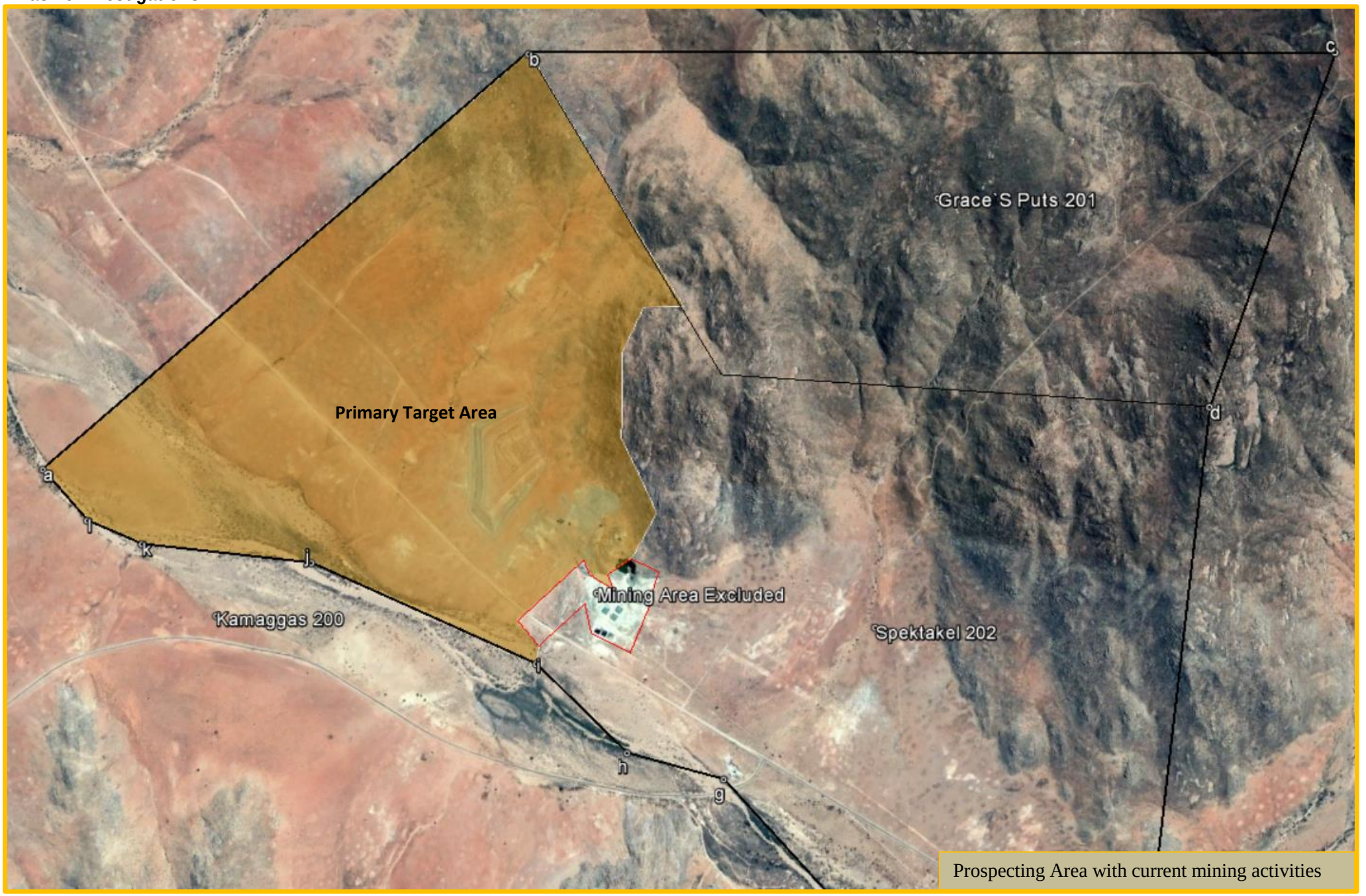


Diagram 3a: Location of mining operation with infrastructure, logistics and services to be used during prospecting operation

4. Policy and Legislative Context

Table 3

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT** (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
Legislation		
Constitution of South Africa, specifically everyone has a right; a. to an environment that is not harmful to their health or wellbeing; and b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. prevents pollution and ecological degradation; ii. promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.	Prospecting activities	The prospecting activities shall be conducted in such a manner that significant environmental impacts are avoided, where significant impacts cannot all together avoided be minimised and mitigated in order to protect the environmental right of South Africans.
Minerals and Petroleum Development Resources Act, Act 28 of 2002 (MPRDA) section 16 (as amended) MPRDA Regulations as amended by GNR349 of 18 April 2011.	Application to the DMR for a prospecting right in terms of Section 16	The conditions and requirements attached to the granting of the Prospecting Right will apply to the prospecting activities. DMR is the Competent Authority (CA) for this NEMA and NEM:WA application.
National Environmental Management Act, No 107 of 1998 (as amended) (NEMA)	Application to the DMR for Environmental Authorisation in terms of the 2014 EIA Regulations as amended by the 2017 EIA Regulations. Refer to Table in section 3(d)(i)	An Application for Environmental Authorisation must be submitted to DMR for an Environmental Authorisation. The listed activities in Table 3(d)(i) that are triggered determine the Environmental Authorisation (EA) application process to be followed. The appropriate EA will be obtained before proceeding with any prospecting activities in terms of the prospecting right application. The compilation of this BAR, EMPr and the Public Participation Process is required in terms of NEMA.

National Environmental Management: Waste Act, Act 59 of 2008 (NEMWA)NEM: WA (as amended) Waste listed activities in GNR 921 (dated 29/11/ 2013) Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation in GNR 632 of 24 July 2015.	Refer to Table 3(d)(i) No applicable waste listed activities identified in terms of GNR 921 (dated 29/11/ 2013) General waste management measures as part of environmental awareness plan	No listed activities are triggered or included as part of the Environmental Authorisation (EA) application process. The generation of potential waste will be minimized through ensuring employees of the drilling contractor are subjected to the appropriate environmental awareness campaign before commencement of drilling. All waste generated during the drilling activities will be disposed of in a responsible legal manner. Proof of legal disposal will be maintained on site.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] National list of ecosystems that are threatened and in need of protection, 2011 (in GN 1002 dated 2 December 2011)	Section 8 Diagram 4, 5, 6, 7 & 8.	There are no listed Critically Endangered, Endangered or Vulnerable ecosystems on site. The site is located within in a CBA1, CBA2 Area and within a River FEPA sub-catchment. The target area however only includes transformed areas and ecological support areas.
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) [NEMBA] Alien and Invasive Species List, 2016 (in GN No. 864 dated 29 July 2016)	Section 8	Alien invasive vegetation management is included in the EMPr.
National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004). National Dust Control Regulations in GN R827 of 1 November 2013	Section 8	Dust control measures are included in the EMPr
National Heritage Resources Act, 25 of 1999 (“NHRA”)	Section 8	Most if not all of the drilling will concentrate on areas transformed by historic mining. A Phase 1 Heritage Impact Assessment was conducted prior to drilling to ensure that significant impacts on heritage resources are mitigated according to management measures in the AIA. A Paleontological desktop assessment was also done at this stage by a competent person. All mitigating measures will be included as part of the EMPr.
National Water Act (Act 36 of 2008)	Section 8 for description of water resources in local area,	A Water Use Authorisation (License or GA) is only required for drilling within or within 500m of any drainage channels. No water use license is required for this application. Any water required for drilling activities will be obtained from a legal source within the area or brought in via a mobile water tanker.
Promotion of Administrative Justice Act, 2000 (Act 3 of 2000) [PAJA]	Decision by the Competent Authority	Gives effect to section 33 of the Constitution that requires that “Everyone has the right to administrative action that is lawful, reasonable and procedurally fair”. All administrative actions must be based on the relevant considerations

Land Use Planning Act, 2014 (Act 3 of 2014) (LUPA)	Comments required from the Nama Khoi Local Municipalities.	Consent use in terms of the Municipal Planning By-Law, 2015 is required to permit mining on properties that are zoned for Agricultural purposes.
Municipal Plans and Policies		
Namakwa District Municipality Integrated Development Plan (IDP) 2017/2022	Section 5.2	The Need & Desirability of the project is referenced in terms of the District Municipality IDP, specifically relating to employment creation, and ensuring the implementation of environmentally sustainable practices, along with an integrated approach to addressing climate change response, which are included in the EMPr
Nama Khoi Local Municipality Integrated Development Plan (IDP), Draft 2018/2019	Section 5.3	The Need & Desirability of the project is referenced in terms of the IDP, specifically relating to employment creation, adaption to climate change and sustainable resource utilisation. Relevant mitigation measures are included in the EMPr.

Standards, Guidance and Spatial Tools		
Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.	Section 5.1 & 8. Diagram 4	The mitigation measures to address and mitigate the potential impacts of the mining are included in the EMPr.
DEA Guideline on Need & Desirability (2017)	Section 5.6	Refer to Section 5.6
DEA Guideline on PPP DMR Guideline on Consultation with Communities and I&APs (undated)	Section 7 & Table 4	Refer to Section 7 & Table 4
DEAT Integrated Environmental Management Information Series 5: Impact Significance (2002)	Section 8	Refer to **Appendix 1**: Impact Assessment Tables
DEAT Integrated Environmental Management Information Series 7: Cumulative Effects Assessment (2004)	Section 8	Refer to **Appendix 1**: Impact Assessment Tables
Namakwa District Biodiversity Sector Plan (2008)	Baseline environmental description and	Used during desktop research to identify sensitive environments within the mining right area.
BGIS (www.bgis.sanbi.org)		
SANS 10103:2008 The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and to Speech Communication	Management / Monitoring measures	Used to set the standard allowable for noise mitigation measures are included in the EMPr.
SANS 1929:2005 Edition 1.1 – Ambient Air Quality Limits for Common Pollutants		Standard for dust fallout. Dust mitigation measures are included in the EMPr.

5. Need and desirability of the proposed activities

5.1 Mining and Biodiversity Guidelines (2013)

The Mining and Biodiversity Guidelines (2013)[1] state that: "Sustainable development is enshrined in South Africa's Constitution and laws. The need to sustain biodiversity is directly or indirectly referred to in a number of Acts, not least the National Environmental Management: Biodiversity Act (No. 10 of 2004) (hereafter referred to as the Biodiversity Act) and is fundamental to the notion of sustainable development. International guidelines and commitments as well as national policies and strategies are important in creating a shared vision for sustainable development in South Africa".

DMR, as custodian of South Africa's mineral resources, is tasked with enabling the sustainable development of these resources. This includes giving effect to the constitutional requirement to "prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"[2].

The primary environmental objective of the MPRDA is to give effect to the "environmental right"[3] contained in the South African Constitution. The MPRDA further requires the Minister to ensure the sustainable development of South Africa's mineral resources, within the framework of national environmental policies, norms and standards, while promoting economic and social development.

The Mining and Biodiversity Guidelines (2013) document identifies four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining. The categories of relevance to this Prospecting Right area as shown in **Diagram 4** are: Category B: Highest Biodiversity importance – highest risk for mining; Category C: High Biodiversity Importance – high risk to mining; and "Category D: Moderate Biodiversity Importance" – moderate risk for mining.

These categories have since been super-ceded by the Critical Biodiversity Area (CBA) map (refer to **Diagram 4 and 8**), which would be interpreted as Category B is now CBA 1, Category C is now CBA 2 and Category D is now Ecological support areas. These categories basically require an environmental impact assessment process to address the issues of sustainability.

In terms of **employment opportunities and job security**, the prospecting activities themselves would not directly lead to job opportunities. Should prospecting activities prove that a feasible resource mineral is present to allow for mining, a new mine may be developed which would generate extensive employment opportunities in an area where employment is needed.

---

[1] Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum, and South African National Biodiversity Institute. 2013. Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria.

[2] Constitution of the Republic of South Africa (No. 108 of 1996).

[3] Section 24 of the Constitution states that "everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

Diagram 4: Location of Prospecting area in terms of Mining and Biodiversity Guidelines sourced off SANB BGIS Map Viewer

5.2 Namakwa District Municipality IDP 2017-2022

The vision of the Namaqua District Municipality IDP is: “Namakwa District Municipality, a centre of excellence!”

The Mission Statement is:

- The stimulation of radical economic and social transformation;
- The fostering of partnership with relevant role-players;
- Supporting and capacitating of local municipalities;
- Transparent and accountable processes; and
- Providing of local leadership

The Strategic Objectives are

- Monitor and support local municipalities to deliver basic services which include water, sanitation, housing, electricity and waste management
- Support vulnerable groups
- Improve administrative and financial viability and capability
- Promote and facilitate Local Economic development
- Enhance good governance
  - ✓ Promote and facilitate spatial transformation and sustainable urban development
  - ✓ Improve communication and communication systems
  - ✓ Establish a customer care system
  - ✓ Invest in the improvement of ICT systems
  - ✓ To render a municipal health services
  - ✓ To coordinate the disaster management and fire management services in the district
  - ✓ Implement the climate change response plan
  - ✓ Caring for the environment

Values

- The Namakwa District Municipality adheres to the values contained in the Batho Pele Principles.
- Caring for the environment and the effects of climate change, such as flood events, on the proposed prospecting project will be mitigated as per the measures contained in the EMPr. The mitigation for emissions of greenhouse gases from vehicles and machinery associated with the prospecting activities are addressed in the EMPr.

5.3 Nama Khoi Local Municipality IDP (Draft 2018-2019)

In the Constitution of South Africa (108 of 1996) the objectives of a municipality or local government structure are described as follows under “section 152. (1) The objects of local government are-

(a) to provide democratic and accountable government for local communities;
(b) to ensure the provision of services to communities in a sustainable manner;
(c) to promote social and economic development;
(d) to promote a safe and healthy environment; and
(e) To encourage the involvement of communities and community organisations in the matters of local government”.

The vision of the Nama Khoi Local Municipality is: “To proudly deliver sustainable local economic development & climate resilient quality services to the Nama Khoi Municipality”

The IDP states that it is important that economic opportunities are expanded in local areas, in a way that takes both people and biodiversity into account to ensure sustainable livelihoods.
The report highlights that the Industrial mining corridor as indicated in the PSDF must be investigated for opportunities and exploited where possible.
The IDP identifies its strengths which include high quality & unspoiled environment, diversity of scenic landscapes and vast amounts of open land, a large labour pool and solar energy; weaknesses which include undiversified economy: over-dependence on mining and government services sectors, lack of jobs and economic development, lack of skills and poor quality of education; opportunities which include unexploited mineral opportunities' and Eco-tourism initiatives; and threats as water supply, water quality and brain-drain as individuals from the Northern Cape migrate from scarcity of business, finance and technical skills.
In terms of employment opportunities and job security, the prospecting activities themselves would not directly lead to job opportunities. Should prospecting activities prove that a feasible resource mineral is present to allow for mining, a new mine may be developed which would generate extensive employment opportunities in an area where employment is needed. The proposed prospecting operation will however assist in providing job security, local employment, local skills transfer and economic upliftment, in a sustainable manner as ensured through this environmental impact assessment process and implementation of the EMPr (Part B) and Closure and Rehabilitation Plan (Appendix 2).

5.4 Northern Cape Provincial Spatial Development Framework (NCPSDF)

The NCPSDF states that the: "Cape is not one of South Africa's richest provinces in monetary terms. Accordingly, there is a need for coherent prioritisation of projects within a spatial economic framework that takes due cognisance of environmental realities and the imperative to create a developmental state". The NCPSDF was designed as an integrated planning and management tool for all spheres of government to facilitate on-going sustainable development throughout the province.
The NCPSDF, together with the Provincial Growth and Development Strategy (PGDS), is set to fulfil an important role as a spatial and strategic guideline that addresses the key challenges of poverty, inequality and environmental degradation through the innovative use of the resources (capital) of the province for the benefit of all concerned."
The potential for job security, employment and skills transfer are identified as positive environmental impacts in this impact assessment. The potential negative environmental impacts will be mitigated through the implementation of the EMPr and the Closure and Rehabilitation Plan, to ensure a sustainable mining activity.

5.5 Northern Cape Provincial Growth and Development Strategy (NCPGDS)

The NCPGDS has the following vision for the Province: "Building a prosperous, sustainable growing provincial economy to reduce poverty and improve social development." The strategy for the growth and development of the Province is guided by the following key principles:

- Equality – notwithstanding the need to advance persons previously disadvantaged, development planning should ensure that all persons should be treated equally;
- Efficiency –the promotion of the optimal utilisation of existing physical, human and financial resources;

- Integration – the integration of spatially coherent regional and local economic development and improved service delivery systems.
- Good Governance – the promotion of democratic, participatory, cooperative and accountable systems of governance and the efficient and effective administration of development institutions;
- Sustainability – the promotion of economic and social development through the sustainable management and utilisation of natural resources and the maintenance of the productive value of the physical environment;
- Batho Pele – the placement of people and their needs at the forefront of its concern and serve their physical, psychological, developmental, economic, social and cultural interests equitably.

5.6 DEA Guideline on Need and Desirability (2017)

As referenced in the DEA Guideline on Need and Desirability (2017), NEMA defines "evaluation" as "the process of ascertaining the relative importance or significance of information, in the light of people's values, preferences and judgements, in order to make a decision." In evaluating each impact (negative and positive) in terms of each of the aspects of the environment, "need and desirability" must specifically be considered in the analysis of each impact of the proposed activity. However, to determine if the proposed activity is the best option when considering "need and desirability", it must also be informed by the sum of all the impacts considered holistically. In this regard "need and desirability" also becomes the impact summary with regard to the proposed activity. The impact summary is attached at **Appendix 1**. These Guidelines state that: "In considering the impact summary it must be remembered that ultimately the aim of EIA is to identify, predict and evaluate the actual and potential risks for and impacts on the geographical, physical, biological, social, economic and cultural aspects of the environment, in order to find the alternatives and options that best avoid negative impacts altogether, or where negative impacts cannot be avoided, to minimise and manage negative impacts to acceptable levels, while optimising positive impacts, to ensure that ecological sustainable development and justifiable social and economic development outcomes are achieved".

The **principles of Integrated Environmental Management (EIM)** as set out in Section 23 of NEMA have been considered in this environmental assessment as explained below.

- **Environmental management placing people and their needs at forefront of its concern, and serve their physical, physiological, developmental, cultural and social interests equitably** – This process is being undertaken in a transparent manner and all effort is being been made to involve all the relevant stakeholders and Interested and Affected Parties. I.e. Public participation is being undertaken to obtain the issues / concerns / comments of the affected people for input into the process. Refer to Section 7 in this report.
- **Socially, environmentally and economically sustainable development** – All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures have been proposed to ensure that the impact is mitigated, and these are detailed in **Appendix 1**, and included in the EMPr.
- **Consideration for ecosystem disturbance and loss of biodiversity** – the project site includes portions identified as Critical Biodiversity Area (CBA) 1 and 2 but all invasive activities will be restricted to the ecological support and transformed

areas **(refer Diagram 8)**. The vegetation type found on site is not listed in the "National List of Threatened Ecosystems that are Threatened and in Need of Protection" in GN 1002 dated 9/12/2011. Ecosystem disturbance and loss of biodiversity are considered in the impact assessment. The prospecting process that only include limited drilling is considered to be a relatively benign type of operation. Rehabilitation back to the natural state is a key component and will be undertaken in a phased manner as the activities progress. This EMPr and Closure Plan (**Appendix 2**) proposes mitigation measures which will minimise the impacts of the mining on the environment.

- **Pollution and environmental degradation** – The implementation of recommendations made and proposed mitigations are detailed in **Appendix 1**, EMPr, and Closure Plan (**Appendix 2**) to ensure minimum environmental degradation.
- **Landscape disturbance** – All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures have been detailed in **Appendix 1**, the EMPr and Closure Plan (**Appendix 2**) to ensure that the impacts are mitigated. For example, landscape disturbance impacts associated with the development of drill pads, erosion and dust have been identified and detailed mitigation measures are included in the EMPr to minimise the impacts.
- **Waste avoidance, minimisation and recycling** – These aspects were considered and incorporated into **Appendix 1**, the EMPr and the Closure Plan (**Appendix 2**).
- **Responsible and equitable use of non-renewable resources** – These aspects have been considered and there is not much scope to reduce the use of non-renewable resources, such as vehicle transport.
- **Avoidance, minimisation and remedying of environmental impacts** - All aspects of the receiving environment and how this will be impacted have been considered and investigated to ensure a minimum detrimental impact to the environment. Where the impact could not be avoided, suitable and effective mitigation measures will be proposed to ensure that the impact is mitigated. A number of mitigation measures have been included in **Appendix 1**, the EMPR and the Closure Plan (**Appendix 2**).
- **Interests, needs and values of Interested and Affected Parties** – This process has been undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and Interested and Affected Parties (I&APs). Comments received from I&APs on the Draft Basic Assessment Report to be included as part of the Final Basic Assessment Report are summarised in Section 7, Table 4.
- **Access of information** – Potential Interested and Affected Parties were notified of the proposal and the availability of the DBAR. They were also notified of having the opportunity to register as an I&AP and registered I&APs have been kept informed of the commencement of the Basic Assessment process.
- **Promotion of community well-being and empowerment** – This process is being undertaken in a transparent manner and all effort is being made to involve all the relevant stakeholders and registered I&APs.

Potential impacts on the biophysical environment and socio-economic conditions have been assessed, and steps have been taken to mitigate negative impacts, and enhance

positive impacts. Adequate and appropriate opportunity is being provided for public participation. Environmental attributes have been considered based on the available information, and environmental management practices have been identified and established to ensure that the proposed activities will proceed in accordance with the principles of IEM.

6. Motivation for the overall preferred site, activities and technology alternative.

No site or technology alternatives have been considered for this prospecting application. The areas included in the prospecting right application were identified through historical prospecting and production records for the area and from designated research. Copper exploitation and exploration in the general area has been ongoing for many years. The area applied for is located within close proximity to Spektakel Copper Mine, which is therefore considered highly prospective.

Geophysical methods have been proven to be very useful in detecting potential targets and will therefore be used to identify optimal locations of potential bodies of economic interest within the prospecting area prior to drilling. Subsequent drilling has been proven to be a suitable technique for sampling and recovering material to test for economic potential.

- The preferred and only location of the prospecting activity is on the earmarked section of the Farm Spektakel 202 and Graces Puts 201.
- The preferred and only activity is the prospecting for Copper Ore.
- The preferred and only technology is the use of drilling equipment for the location of potential Copper Ore bodies.
- The Site Plan or layout of the activity on the site is shown in **Diagram 2 and 3.**

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline.

7. Details of the Public Participation Process Followed

7.1 Introduction

The public participation process has been conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended).

The formal public participation process, which meets the requirements of the NEMA EIA Regulations and the MPRDA has been followed and include the following activities: (Refer **Appendix 3** Public Participation Process)

Potential I&APs were notified about the project and of commencement of the Basic Assessment (BA) process and invited to registration as stakeholders by means of:

- Letters of notification to directly affected landowners;
- Written notifications to other stakeholders including neighbors, Local and District Municipalities (including traditional authorities where applicable); and
- Media advertisements and site notices.
- Circulation of a Background Information Document (BID) with the notification letter to the landowner, neighbouring landowners and potential I&APs;
- Registered I&APs including the Relevant Government Department were given the opportunity to review and comment on the Draft Basic Assessment Report.
- Registered I&APs will be notified of the outcome of the environmental authorisation, and if required the appeal process to be followed.

7.2 Summary of issues raised by I&Aps

Table 4a

Cuprachem (Pty) Ltd Prospecting Right NC 30/5/1/2/2/12171 PR - I&AP Database

A - ORGANS OF STATE

No.	Surname	Initials	Organisation	Tel/Fax	Mobile	email	Post Box	Physical address
1	Ndzumo	Ms. Onwabile	Department Environment and Nature Conservation	027 718 8800 027 718 8814		onyndzumo@gmail.com	Private Bag X16 Springbok 8240	DENC Atlas Cop-Co Building Cnr of Voortrekker & Magasyn St.
2	Ntoi	Mr Mosala	Department of Water & Sanitation	054 338 5836	0795665183	NtoiM@dws.gov.za	Private Bag X5912 Upington 8800	Dept. of Water Affairs Building Louisvale Road
3	Municipal Manager		Namakwa District Municipality: Municipal Manager	027 712 8000 027 712 8040		info@namakwa-dm.gov.za	Private Bag X20 Springbok 8240	HJ Visser Building Van Riebeeck Street
4	Municipal Manager Nama Khoi Municipality		Landowner Farm Graces Puts No. 201	027 718 8100 027 712 1635		Russel.Hartley@namakhoi.gov.za	P Bag 17 Springbok, 8240	4 Namakwa Street, Springbok
5	Department of Rural Development and Land Reform Provincial State Land Manager: Northen Cape		Landowner Farm Spektakel No. 202	053 830 4000 053 831 4095	NA	Cynthia.Nkoane@drdlr.gov.za	P Bag X5007 Kimberley, 8300	6th floor, New Public Building Cnr Knight & Stead Streets
6	Smit	Mr Christo	Department of Agriculture, Land Reform & Rural Development;	054 337 8000 027 712 2270	082 5609 254	jabu.smit@gmail.com	P.O. Box 52 Upington 8800	Water Affairs Offices, Louisvale Rd, Upington
7	Case officer	SAHRA	SAHRA	NA	NA	SAHRIS online application system		

B - NEIGHBOURS

No.	Surname	Initials	Property	Tel	Mobile	email	Post Box	Physical
1	Municipal Manager Nama Khoi Municipality		Landowner Farm Komaggas No. 200	027 718 8100 027 712 1635		Russel.Hartley@namakhoi.gov.za	P Bag 17 Springbok, 8240	4 Namakwa Street, Springbok

C - OTHER

No.	Surname	Initials	Company	Tel	Mobile	email	Post Box	Physical
1	Public Library	NA	Library Springbok	NA	NA	NA	NA	NA

Table 4b

Interested and Affected Parties List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted.		Date Comments Received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
ORGANS OF STATE					
Dept. Water & Sanitation	X	No Comments	No issues raised	Water is only required when drilling activities commence. The water that will be used for the prospecting activities will be sourced on agreement from an existing authorized water user which could be either the land owner or local municipality. The department responsible for water resources shall be informed with regards to any water related agreement with either the land owner or local municipality prior to drilling. No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998). Prevent any drilling activities within 100m from a water course. Maintaining all equipment as per supplier specification and lining under the drill rig and diesel bowser with PVC plastic lining to contain any spillages, should it occur including having oil spill kit as a recovery measure.	Par 8.6 The possible mitigation measures that could be applied and Appendix 1

SAHRA	X			A Phase 1 Heritage Impact Assessment inclusive of a Paleontological Impact Assessment was conducted by a suitably qualified archaeologist and paleontologist respectively of the drill sites prior to drilling in order to identify any resources of significance.	Par 8.6 The possible mitigation measures that could be applied and Appendix 1 Par 12.1 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act
Landowners or Lawful occupier/s of the land					
	X	No Comments	No issues raised		
Landowners or lawful occupiers on adjacent properties					
	X	No Comments	No issues raised		
Municipality					
	X	No Comments	No issues raised		
Communities					
	X	No Comments	No issues raised		
Traditional Leaders					
None identified	NA				
Interested parties					
Reply on advertisement and site notices	X	No Comments	No issues raised		

8. Process to reach the proposed preferred alternative

8.1 Process to Reach the Proposed Preferred Alternative

No site or technology alternatives have been considered for this prospecting application. The areas included in the prospecting right application were identified through historical prospecting and production records for the area and from designated research. Copper exploitation and exploration in the general area has been ongoing for many years. The area applied for is located within close proximity to Spektakel Copper Mine, which is therefore considered highly prospective.

Geophysical methods have been proven to be very useful in detecting potential targets and will therefore be used to identify optimal locations of potential bodies of economic interest within the prospecting area prior to drilling. Subsequent drilling has been proven to be a suitable technique for sampling and recovering material to test for economic potential.

- The preferred and only location of the prospecting activity is on the earmarked section of the Farm Spektakel 202 and Graces Puts 201.
- The preferred and only activity is the prospecting for Copper Ore.
- The preferred and only technology is the use of drilling equipment for the location of potential Copper Ore bodies.
- The Site Plan or layout of the activity on the site is shown in **Diagram 2 and 3.**

There are therefore no other reasonable or feasible sites, layouts, activities, technologies, or operational alternatives for further consideration in the impact assessment component, other than the mandatory “no-go” alternative that must be assessed for comparison purposes as the environmental baseline.

The No-Go Alternative will mean that Copper mining will not take place. There will be no supply of Copper for industrial purposes. There will be no new employment opportunities or guaranteed job security for the existing mine employees on the adjacent mine.

The No-Go Alternative will result in the status quo remaining, and the Copper deposit located adjacent to the existing mine not being exploited.

The assessment of alternatives must at all times include the “no-go” option as a baseline against which all other alternatives must be measured. The “no go” alternative is therefore assessed together with the preferred alternative.

8.2 The Environmental attributes associated with the alternatives (Baseline Environment)

8.2.1 Regional setting

The proposed Prospecting Area is located on the following properties:

Property 1

Portion of the farm Graces Puts No. 201 in extent approximately 6300.0242Ha. Registered in the name of The Plaaslike Oorgangsraad Komaggas by virtue of title deed T29430/1997.

SG Code C05300000000020100000

Property 2:

The Farm Spektakel No. 202 in extent approximately 1195.3830Ha. Registered in the name of The Republic of South Africa by virtue of title deed T88538/1998

SG Code C05300000000020200000

Remainder of Farm Mooikloof No 150MR LPI Code T0MR00000000015000000 and covering an area of 735.0133 Ha.

The farms are located within the Nama Khoi Local Municipality area of the Namakwa District Municipality within the Northern Cape Province. The prospecting area is located approximately 35km west of Springbok (**Refer Diagram 1 and 2**).

8.2.2 Geology

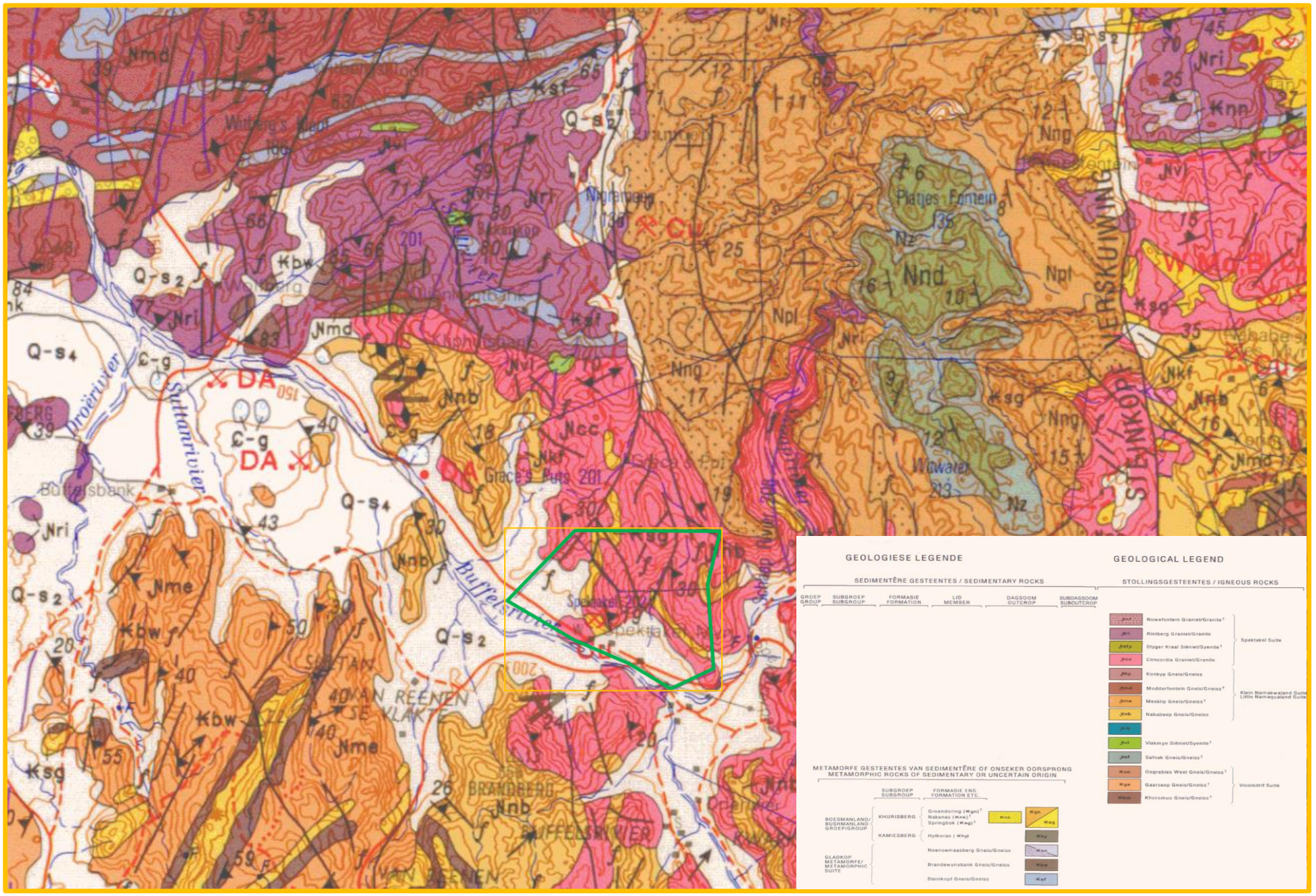
The regional rocks are predominantly hybrid migmatites with grantes / granodiorites and minor mafic intrusives, such as gabbro's and diorites in the form of sills and dykes. In the eastern portion (where Spektakel is located) granitoid emplacements predominate and are then replaced by metamorphosed schists and phyllites. Metamorphism declines towards the East but is still regionally intense. Excluding some of the intrusives, all these rocks are Precambiran in age and form part of the Namaqua Metamorphic Complex. There is a large variety of lithological types, many of which grade into one another and are genetically related and influenced by poly-phase intrusion and metamorphism.

The copper district in Namaqualand underlain by a basement of a meta-volcanosedimentary rocks known as the Bushmanland Group (previously the Okiep Group). Sequential intrusions followed with the Gladkop Suite, the Klein Namaqualand Suite, the Spektakel Group and the youngest Koperberg Suite. The latter comprises copper bearing basic intrusives and associated megabreccias. Rock types include anothosites, diorites, glimerites, norites and hyperstenites. It is the latter two rock types that contain the majority of the mineralisation.

The Koperberg Suite forms in places the host rock of upright, easterly trending structures, known as steep structures. It is within these structures that most mineralisation occurs and hence identification of the structural domain is highly important. Mineralisation can be quite variable in the form of podiform, massive and disseminated with higher concentrations in lensoid bodies along margins which form massive sulphides. The oxides are dominated by malachite and chrysocolla but are limited to shallow depths as the weathered profile in Namaqualand is not deep. Generally, the sulphides form the bulk of the orebodies and consist of bornite and chalcopyrite with lesser pyrite, pyrrohtite and chalcosite.

Steep structures have been identified on the Spektakel property as has the occurrence of mineralised norites. The property has a long mining history but previously only for high grade, shallow orebodies in the central area. This operation is now extending the exploration to deeper and low-grade areas. In some cases, mineralisation is evident at surface and extends to unknown depths (**Refer Diagram 5**).

Diagram 5: Geology of Prospecting area



8.2.3 Soil and land capability

Approximately 90% of NDM is used for livestock grazing and production, with the remainder comprising of mining, agriculture and urban development. The main crops currently grown in the NDM include lucerne, oats, wheat and rooibos. Approximately 10% of the crops are planted near rivers for chance/accidental irrigation. The other approximately 90% are dry land crops, which are being planted in high rainfall areas with approximately 600mm/year.

Tourism is a seasonal but rapidly growing feature – with visitors to the region arriving almost exclusively between July and October in order take in the world renowned yearly flower display. Urban development is not a major feature of the landscape and is not expected to increase much in the coming years. As such the proposed prospecting activities will not have an impact on agricultural land or agricultural production.

Land use involves mostly cultivated drylands and mining (diamonds, copper, base-metals, granite, sandstone and gypsum), as well as salt pans. Future pressures on biodiversity are likely to come from:

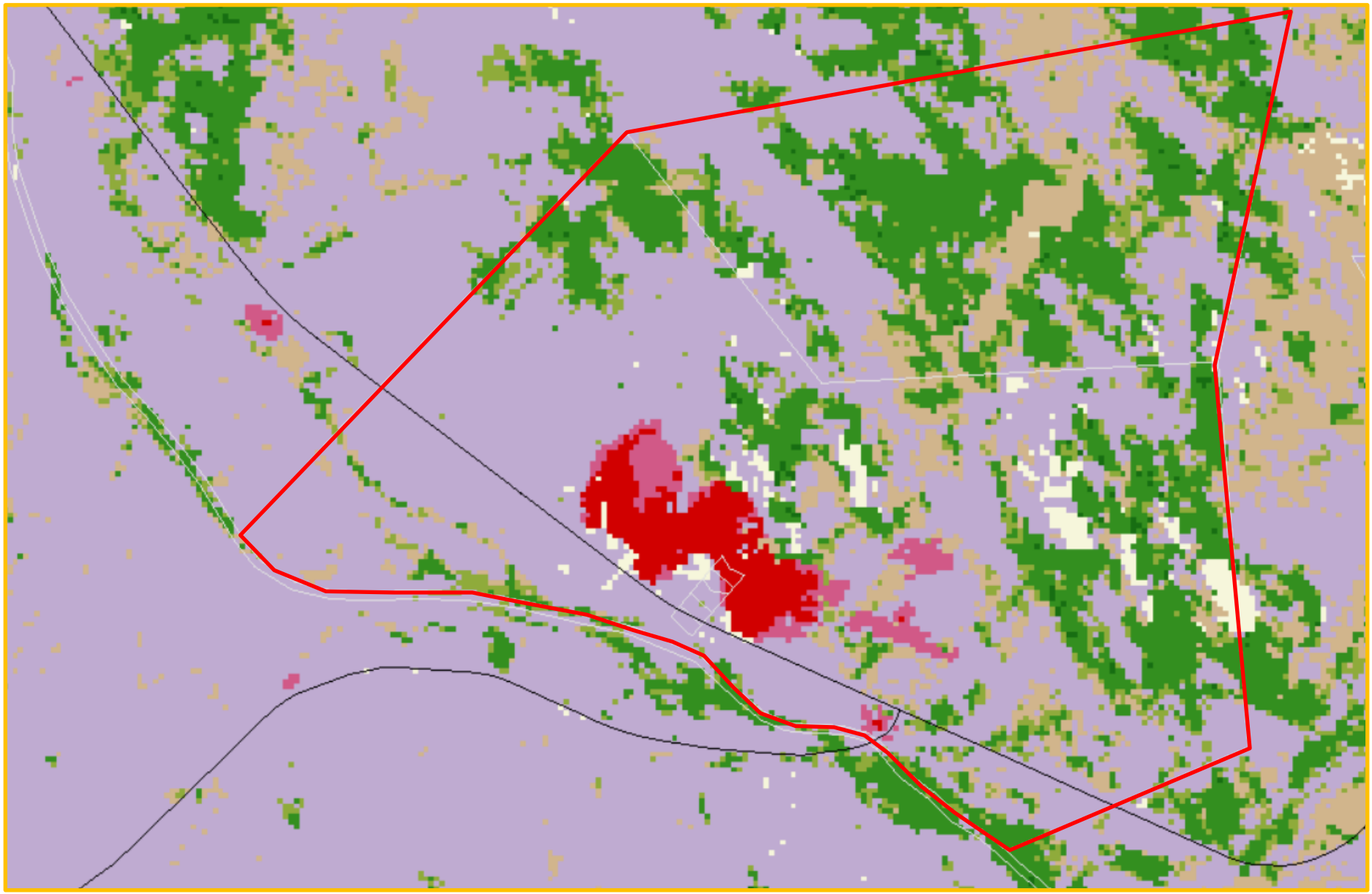
- new mining development
- expansion of crop agriculture
- ostrich farming (an unsustainable land use in this area)
- unsustainable use of natural resources, (especially due to overgrazing), and
- to a certain extent urban development

Note that current land cover indicators do not take into account degradation due to, for example, spread of alien plants, secondary impacts of mining (e.g. sand mobilization) or overgrazing by livestock. The Land Capability map is provided **as Diagram 6**.

Table 5. A summary of the extent (% of total LM area) of different land cover categories for local municipalities based on 2005 SPOT5 satellite imagery.

LM Name	Natural	Cultivated Dryland	Cultivated Irrigated	Mining	Settlement
DMA Bushmanland	99.75	0.17	0.02	0.04	0.02
DMA Tankwa	98.69	1.06	0.24	0	0.01
Hantam	97.71	2	0.21	0.01	0.07
Kamiesberg	97.35	2.14	0	0.43	0.07
Karoo Hoogland	99.49	0.32	0.13	0.01	0.06
Khâi-Ma	99.63	0.02	0.18	0.07	0.11
Nama Khoi	98.85	0.36	0.08	0.52	0.19
Richtersveld	97.7	0	0.06	2.15	0.09

Diagram 6: Location of Prospecting area in terms of Land Cover sourced off SANB BGIS Map Viewer



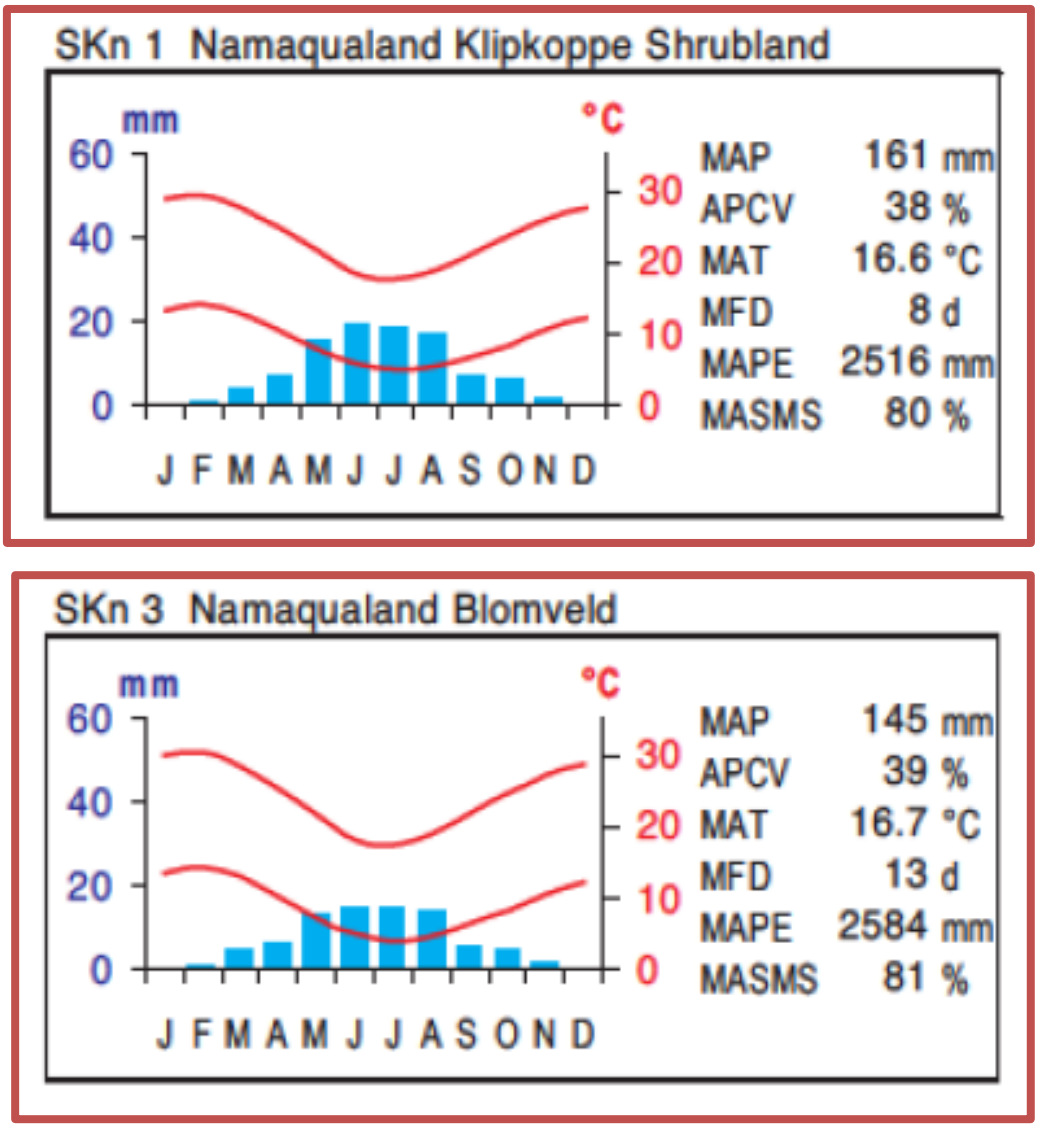
8.2.4 Landscape - Topography

Refer to Figure 2 which shows the contours at 20 meter intervals located between 180m and 500m above mean sea level.

8.2.5 Climate

The cold Benguela Current that flows northwards along the coast of Namaqualand has a marked effect on the climate with regular fog occurring over the coastal zone, adding substantially to high soil moisture levels. Similar to the coast of Namibia further north, but not as extreme, the Namaqualand coastal region is a hyper- arid area. It experiences winter rainfall ranging between 50 mm and 100 mm per annum (Le Roux, 2005). Seasonal winter rainfall (May to September). MAP about 160 mm, with epizodic drought periods (well below 100 mm per year) of one or two years in succession. Dew is present throughout the winter. MAT 16.6°C. Hot summers, with mean maximum and minimum daily temperatures 30°C and 5°C for January and July, respectively. Frost occurs about 8 days per year but can vary widely from year to year. See also climate diagram (Figure 3).

Figure 3: Climate diagram



8.2.6 Biodiversity (Flora and Fauna)

The proposed prospecting right is located in the Succulent Karoo Biome and dominated by the Namaqualand Klipkoppe Shrubland (SKn1) and Namaqualand Blomveld (SKn3) vegetation units (**Refer Diagram 7**).

The conservation status of the Namaqualand Klipkoppe Shrubland, according to Driver et al. 2005 and Mucina et al. 2006 is given as Least Threatened. Some 6% statutorily conserved in Namaqua National Park (incl. former WWF Skilpad Wild Flower Reserve), Goegab Nature Reserve with spectacular granite-koppie landscapes, and a small portion in the Moedverloren Nature Reserve. Target 28%. Largely without any alien invaders and hardly any transformation due to agriculture (steep rocky habitats), but old mine spoils (mainly copper) are a disturbing view in some localities. Erosion is moderate (35%), very low (35%) or low (30%).

The conservation status of the Namaqualand Blomveld, according to Driver et al. 2005 and Mucina et al. 2006 is also Least Threatened. Conservation Target 28%. Small areas (1.5%) statutorily conserved in Goegab Nature Reserve and Namaqua National Park. Some protection is warranted on private game farms. Only about 6% of the total area is transformed, mainly by grain cultivation and some planting of salt-bush (*Atriplex nummularia*). Overgrazing is found almost throughout this unit. All alien infestations are only of local extent. Erosion is low (40%), very low (30%) or moderate (30%).

The Buffelsrivier portion of the prospecting area is classified as a Critical Biodiversity Area (CBA1) (**Refer Diagram 8**) but this area to the south of the R355 main road is excluded from any prospecting and mining.

There are no Centres of Endemism that occur near to the proposed prospecting area and the area is not included as part of the NPAES. No protected areas are located within a 10Km radius of the prospecting area therefore this activity will not trigger Listing notice 3 of the NEMA EIA regulations.

Diagram 7: Vegetation

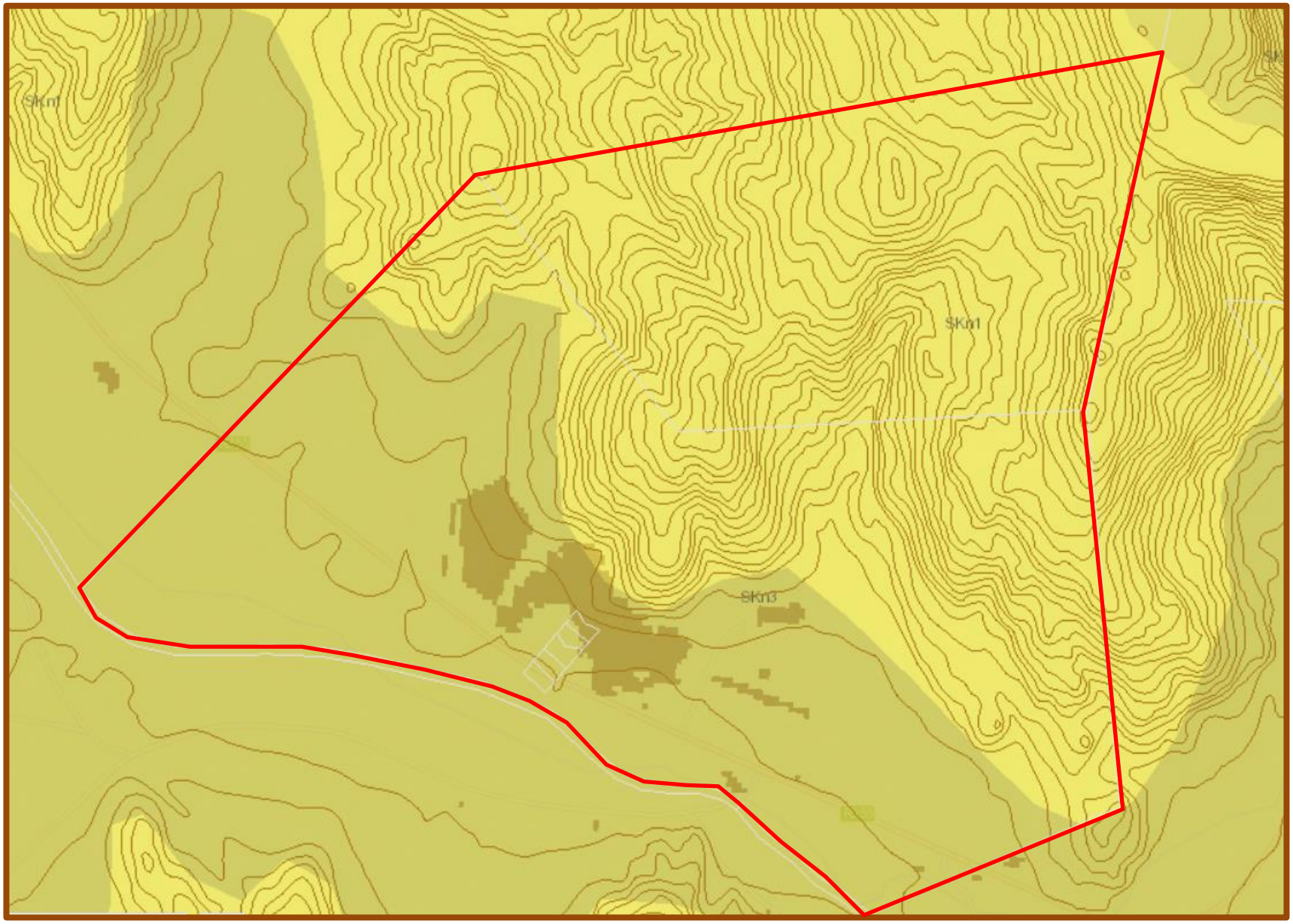
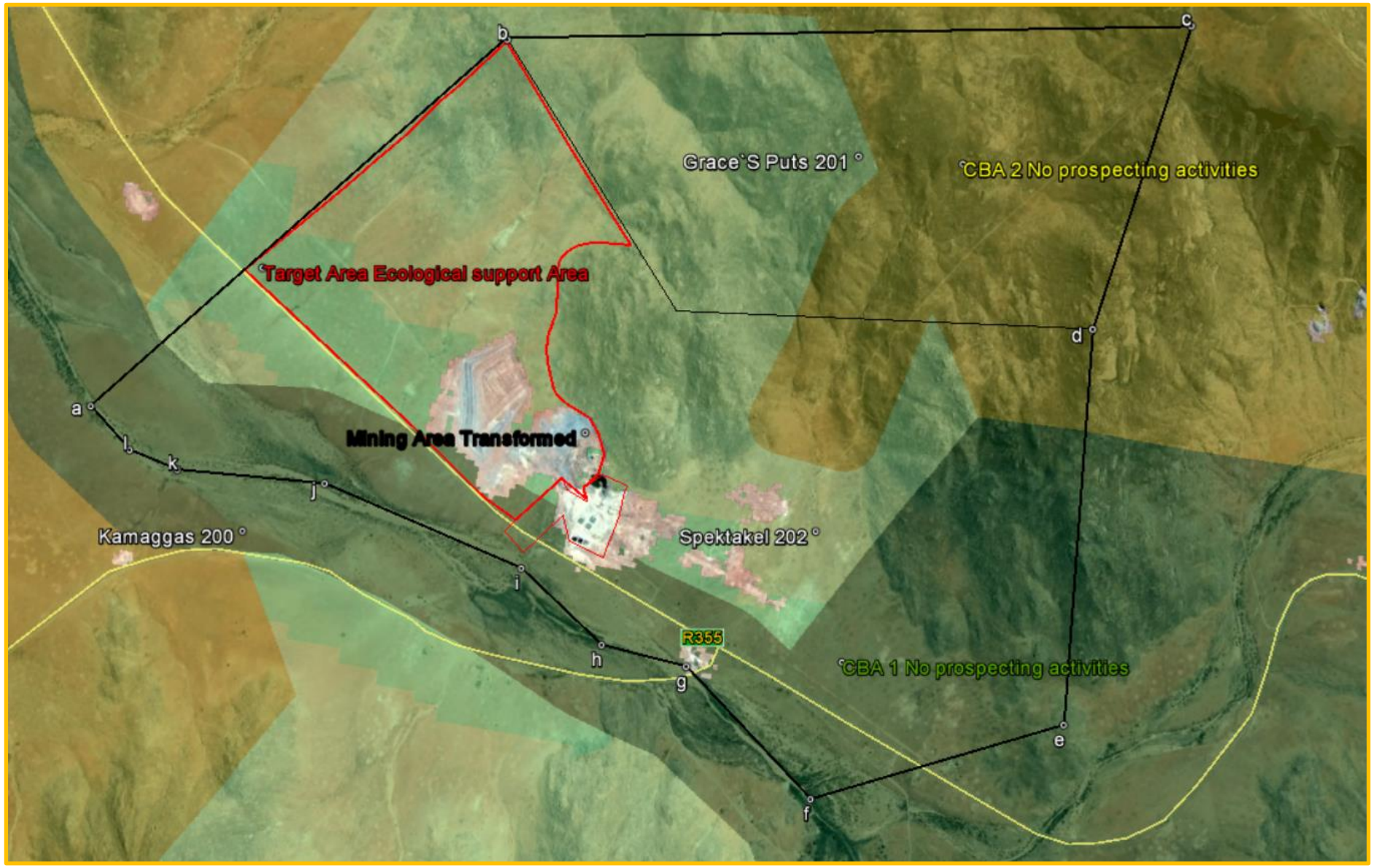


Diagram 8: Threatened Ecosystems



8.2.7 Water Resources

The property is located within the Department of Water & Sanitation's Lower Orange Water Management Area (14).

Two drainage channels the Buffels River (Type: 27NL) and Skaap River (Type: 27NU) are close to the prospecting area and both are classified as National Freshwater Ecosystems Priority Areas (NFEPA) – Rivers (**Refer Diagram 9**). Surface water only accumulates in the drainage channels after exceptionally good rains. The Mean Annual Run-off (MAR) is in any event very low given the low rainfall average is 106mm occurring mainly in the winter months, high evaporation rates, and shallow grade of the slope toward the drainage channels and the permeability of the soils.

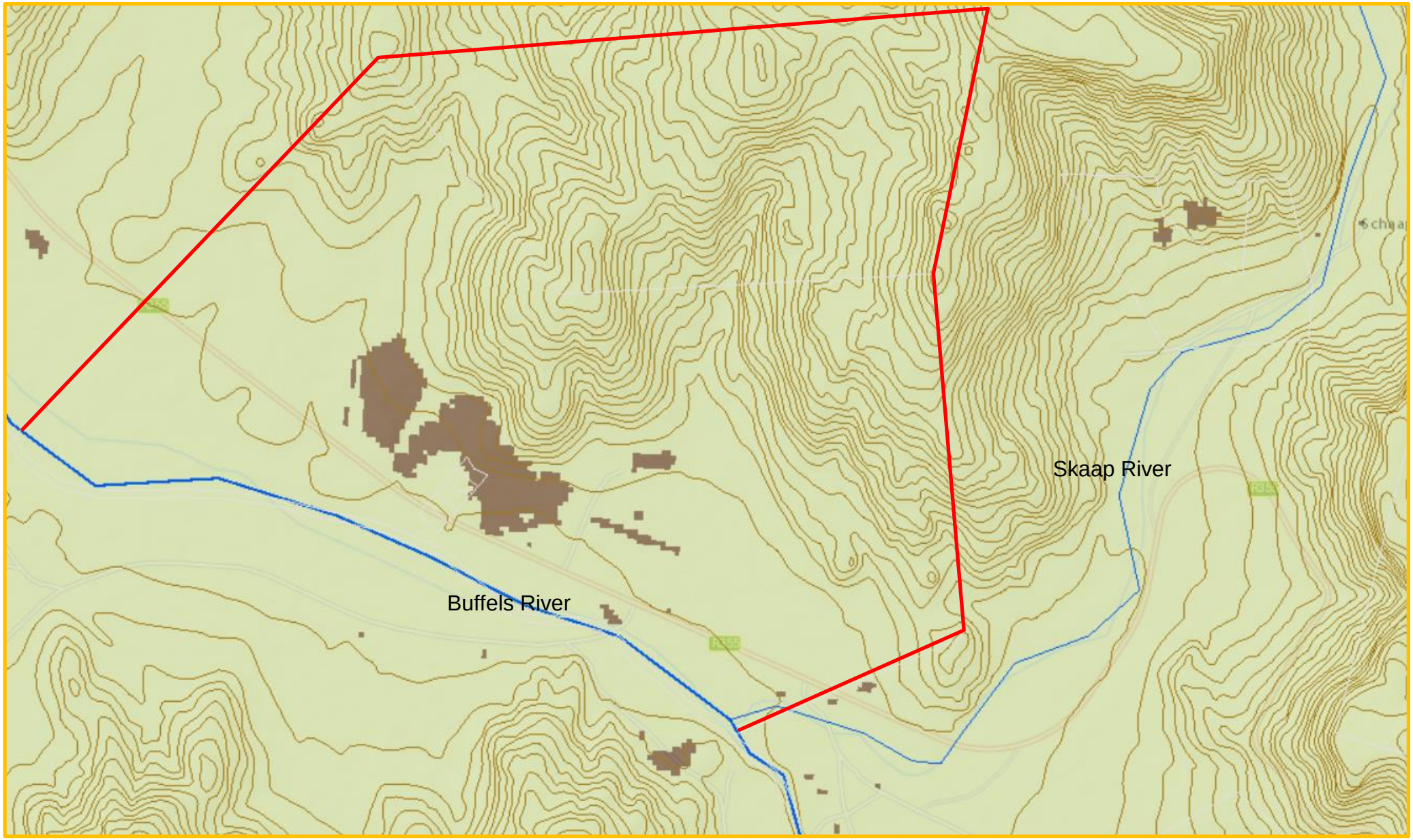
The surface water quality (when available) is suitable for animal consumption but not for potable water. No natural wetlands exist in the area.

Refer to **Diagram 9** that shows the location of the project site in relation to the Buffels and Skaap Rivers, which has been earmarked as a Phase 2 Freshwater Ecosystem Priority Area (FEPA). The project site is located approximately 500m from the edge of the drainage channel. The Buffels River has a "Class C: Moderately Modified" river status (as referenced from the SANBI BGIS NFEPA Database Map Viewer) which means that a loss and change of natural habitat and biota have occurred but that the basic ecosystem functions are still predominantly unchanged (Technical Report for the National Freshwater Ecosystem Priority Areas Project; WRC Report No. 1801/2/11, August 2011). For river FEPAs the whole sub-quaternary catchment is applicable, although FEPA status applies to the actual river reach within such a sub-quaternary catchment.

There are no wetlands near the proposed project site as shown in **Diagram 9**.

Due to the shallow nature of operations the impact on the groundwater is considered insignificant. The absence of a waste handling program can however have a significant impact through oil and fuel spills and soil contamination.

Diagram 9: Location of Prospecting area in relation to NFEPA Rivers



8.2.8 Emissions

Air Quality

Dust is generated by wind over un-vegetated or denuded areas and given the surrounding extent of semi-desert dust generation is high under windy conditions (dust storm). Dust is generated off un-surfaced roadways on site, and during the existing mining operations from the adjacent mine which has transported the finer sand over the adjacent areas. Mining activities will take place in a very remote area and dust generation will be limited to a small radius around the operation.

Noise

Farm traffic-generated noise occurs in the area and such noise levels are low (observed estimate at ±55dBA).

Noise from earth moving equipment and machinery associated with the existing mining operation on the adjacent mine will be within the norm and due to the remote locality of the operation will have no impact.

8.2.9 Socio-economic

The Namaqua District is sparsely populated, with a population of 115 842 and is the least populated district in the Northern Cape Province (and Country, although geographically the largest) with a population comprising 10,11% of the Province's total population.

- The average growth rate for GGP in the area from 1996-2011 was 5.4 % and in 2007-2011 this has slowed down slightly to an average growth rate of 4.8%.
- The largest contributing sector to employment in the local economy (21.12% of total employment in the formal sector) is the Retail, Catering and accommodation sector

8.2.10 Description of specific environmental features and infrastructure on the site

Based on the outcomes of the initial prospecting phases (non-invasive activities), the location of any invasive activities such as drilling will be determined and the impacts on the identified water courses will subsequently be determined. It is expected that for the invasive activities (drilling), only localised clearing of grass and shrubs are required in order to prepare a drill pad.

The farmstead dwellings other farm infrastructure will be avoided as far as possible.

The area also has a number of roads that traverse the sites, from the R355 national roads to various provincial and secondary roads as well as farm tracks. The invasive activities will seek to use existing roads in order to access the property and it is not expected that any new access roads will be opened up. The map Diagram 2 above gives an overview of the sites and the main watercourses, settlements and roads that traverse the site.

8.2.11 Environmental and current land use maps

Refer to **Diagram 6** provided as part of the specific attributes

8.3 Impacts and risks identified

As described earlier in this report, the prospecting activities will comprise of desktop and geophysical activities and dependant on the outcome of these phases, targets will be selected for drilling activities. The impact assessment therefore focuses only on the invasive aspects (drilling and associated activities) as these will have the potential to impact on the biophysical and social environment. The impact assessment is furthermore separated into three distinct phases, namely:

- Construction phase (Site establishment);
- Operational phase (Drilling), and.
- Decommissioning

The potential environmental and social impacts

Phase	Activities	Potential Impacts	Reversible	Irreplaceable Damage	Can impact be avoided
Construction Phase Site establishment	Site Access	Disturbance of onsite flora and fauna	Yes	No	No
		Soil compaction from repeated use of access track to drill sites (twee-spoor)	Yes	No	No
	Site Establishment Activities (including: topsoil stripping and stockpiling (if necessary), erection of temporary equipment laydown area, waste generation and management)	Impact on heritage artefacts, heritage sites and grave yards	No	Yes	Yes
		Noise Generation	Yes	No	No
		Visual intrusion	Yes	No	No
		Dust fall & nuisance from activities, dust emission from top soil stripping (if necessary)	Yes	No	No
		Wildlife and Vegetation disturbance from drill pad preparation	Yes	No	No
		Surface water and groundwater use and contamination from hydrocarbons	Yes	No	Yes
		Contamination and disturbance of soil from drill pad preparation, compaction and soil disturbance due to topsoil stockpiling	Yes	No	No
		Socio- economic impact on existing land use practices	Yes	No	No

Operational Phase Drilling	Drilling and Sample Analysis (including: refueling, soil/ rock-chip sample analysis, drill fluid collection, storage and evaporation, waste generation and management)	Disturbance or damage to cultural and heritage resources such as graves or historic ruins	No	Yes	Yes
		Noise caused by the drilling rig travelling to and being established on each site, the diesel engine driving the drill, vehicles going to and from the drilling site	Yes	No	No
		Visibility of the drilling rig	Yes	No	No
		Dust emissions from drilling and general site activities (vehicle entrained dust)	Yes	No	No
		Wildlife and Vegetation disturbance from drilling	Yes	No	No
		Impact on limited water resources abstraction	Yes	No	Yes
		Surface- and groundwater use and contamination from drill fluids, hydrocarbon spills and drill maintenance activities (if necessary)	Yes	No	Yes
		Contamination and disturbance (compaction) of soil due to drilling activities	Yes	No	No
		Socio- economic impact on existing land use practices	Yes	No	No
Decommissioning Phase	Removal of excess drilling mud, soil rock chips and rehabilitation of the drill site by scarifying compacted areas and vehicle tracks, spreading topsoil and borehole capping)	Dust emission from decommissioning activities (vehicle entrained dust)	Yes	No	Yes
		Soil erosion of topsoil	Yes	No	Yes

8.4 Methodology used in determining potential environmental impacts

Ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.

Evaluating the impact of a risk is to determine the probability, severity, frequency and duration of the risk. These are all valuated separately and then combined to produce a risk impact; insignificant (1, green), medium (2, yellow) or significant (3, red). In some instances, the impact of a risk will be classified as uncertain due to lack of information. For a risk with a rating of 3 (i.e. significant), strategies are put in place to reduce the risk to 1 (insignificant) or 2 (medium, provided that the risk can be controlled with management actions).

To maintain the rating at 1 or 2, monitoring is implemented for a period of time to enable the confirmation of the risk as insignificant or as medium and under control.

At the time of final mine closure an application will be made to DMR for a mine closure certificate only when all risks have been confirmed as insignificant or medium and under control via management actions.

8.4.1 Evaluating the probability

There are no standard methods of evaluating the probability of occurrence. All methods used rely on some form of subjective judgment and, therefore, agreed criteria have to be used in the evaluation. Values are assigned for the probability of occurrence of the relative strength of the factors involved to each of the criteria. Three evaluation ratings are used, viz. 1 for unlikely, 2 for could be/could happen/unknown, and 3 for definite/has happened/highly likely.

8.4.2 Evaluating the severity

In evaluating the severity of a potential impact there are various criteria that can be applied to determine the level of risk associated with the consequences of an action occurring. These are the quantity of material/substance released and the probable size of the covered area or possible spread of impact. Combinations of descriptions for what are considered to be different levels of importance for the criteria can be integrated.

Values are assigned for the severity of the relative strength of the factors involved to each of the criteria. Three evaluation ratings are used, viz. 1 for insignificant, - natural and social functions and processes are not affected or minimally affected, 2 for medium significance - affected environment is notably altered; natural and social functions and processes continue albeit in a modified way and 3 for high significance - natural or social functions or processes could be substantially affected or altered to the extent that they could temporarily or permanently cease.

8.4.3 Evaluating the frequency

When evaluating the frequency of a potential impact any repetitive, continuous or time-linked characteristics of the impacts are taken into account. Values are assigned for the frequency of the factors involved to each of the criteria. Three evaluation ratings are used, viz. 1 for once off, 2 for intermittent, and 3 for ongoing/continuing/usually.

8.4.4 Evaluating the duration

The duration of a potential impact is based on the duration of the impact should the risk realise, i.e. the duration could be short-term, medium-term, long-term or permanent.

Values are assigned for the duration of the factors involved to each of the criteria. Three evaluation ratings are used, viz. 1 for an instant/point in time, 2 for temporary/ intermittent, and 3 for forever.
Values are calculated, as a function of the probability, severity, frequency and duration for different risks. The individual scores are added and a risk impact is assigned. The calculated sums of the possible permutations of probability, severity, frequency and duration range from 4 to 12. Combinations with a sum total of 6 and less were rated as insignificant, while those rating 10 and higher were defined as significant. Risks with ratings in between 6 and 10 have medium outcomes.
Environmental Significance rating of **insignificant** (combined score 0-6)
An insignificant impact is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
Environmental Significance rating of **medium** (combined score 7-9)
If left unmanaged, an impact of medium significance could influence a decision about whether or not to proceed with a proposed project. Mitigation measures should be implemented.
Environmental Significance rating of **significant** (combined score 10-12)
A significant impact could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.

8.5 Positive and negative impacts of proposed activity and alternatives
Refer to **Appendix 1** for the impact assessment tables.
Positive Impacts
This application is for prospecting activities which fall under the mining sector and would therefore make a contribution to one of the main employment sectors of the Namakwa District. Mining is the most contributing economic sector for the municipality at 59.21%. The prospecting activities themselves would not directly lead to job opportunities. Should the prospecting activities however prove to be financially viable, then mining activities would generate employment opportunities
Negative Impacts
The key potential negative impacts associated with the prospecting activity are those typically associated with drilling activities, which include the following:

- Site Access
  - Disturbance of onsite flora and fauna
  - Soil compaction from repeated use of access track to drill sites (twee-spoor) and soil disturbance due to topsoil stockpiling
- Site Establishment Activities (including: topsoil stripping and stockpiling (if necessary), erection of temporary equipment laydown area, waste generation and management)
  - Impact on heritage artefacts, heritage sites and grave yards
  - Noise Generation
  - Visual intrusion
  - Dust fall & nuisance from activities, dust emission from top soil stripping (if necessary)
  - Wildlife and Vegetation disturbance from drill pad preparation
  - Soil, surface water and groundwater use and contamination from hydrocarbons
  - Socio- economic impact with regard to overlapping activities of other mining activities on the same property, existing land use impact on farming and friction between local resident's land owners and construction personnel

- Drilling and Sample Analysis (including: refueling, soil/ rock-chip sample analysis, drill fluid collection, storage and evaporation, waste generation and management)
  - Noise caused by the drilling rig travelling to and being established on each site, the diesel engine driving the drill, vehicles going to and from the drilling site
  - Impact on limited water resources abstraction
  - Water and soil pollution from drill fluids, hydrocarbon spills and drill maintenance activities (if necessary)
  - Dust emissions from drilling and general site activities (vehicle entrained dust)
  - Disturbance of soil from drill pad preparation and compaction
  - Visibility of the drilling rig
  - Disturbance or damage to cultural and heritage resources such as graves or historic ruins
  - Socio- economic impact with regard to overlapping activities of other mining activities on the same property, existing land use impact on farming and friction between local resident's land owners and construction personnel
- Removal of excess drilling mud, soil rock chips and rehabilitation of the drill site by scarifying compacted areas and vehicle tracks, spreading topsoil and borehole capping)
  - Dust emission from decommissioning activities (vehicle entrained dust)
  - Soil erosion of topsoil

8.6 The possible mitigation measures that could be applied and the level of risk.
Refer to **Appendix 1** for the impact assessment tables.
The key measures taken to mitigate the key potential impacts are as follows:

8.6.1 Site Access

- **Disturbance of onsite wildlife and vegetation on access track**

The impacts of access on wildlife and vegetation have been assessed as being of **insignificance** even before mitigation. The impact can be reduced by only using existing farm roads and tracks. Vehicles speed must take into account the possibility of collisions with fauna.
Where new access tracks (twee-spoor) are required to get the drill rig to the drilling site the activity will be limited to the smallest area that is necessary and by rehabilitating the disturbed area immediately after completion of the activity. Furthermore, no clear scraping (dozing) will be carried out unless absolutely necessary. Rather that surface vegetation be cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow.

- **Soil compaction from repeated use of access track to drill sites**

The impacts of access on soil compaction have been assessed as being of **insignificance** even before mitigation. The impact can be reduced by the mitigating measure above and where new access tracks are required to get the drill rig to the drilling site, such compacted tracks must be scarified immediately after completion of the activity. All tracks and drill traverses (twee-spoor) will be scarified and any topsoil stockpiled removed to be spread over the disturbed area. Duel use access roads must be handed back to the landowner in a good state of repair.

8.6.2 Site Establishment

- **Cultural and Heritage Resources**

This stage entails clearing a maximum of 260m² per site to cater for the drill rig setup including associated equipment. This activity has the potential to impact on heritage artefacts, heritage sites and grave yards. The impacts could potentially be **significant.** The following mitigation measures will be implemented to **reduce the potential impact to insignificant:**

- A Phase 1 Heritage Impact Assessment inclusive of a Paleontological Impact Assessment done by a suitably qualified archaeologist and palaeontologist respectively has shown that Precolonial/Stone Age material at Spektakel, was found to be of generally low significance, where present at all. Criteria used for impact significance assessment for archaeological traces rate the impacts as not worthy of further mitigation (**Refer AIA appendix 3**).
- As part of the specialist report the following measures were recommended for inclusion in this EMPr:

Project component/s	Any road or other infrastructure construction over and above what is outlined in respect of the proposed site development.
Potential Impact	The potential impact if this objective is not met is that wider areas or extended linear developments may result in further destruction, damage, excavation, alteration, removal or collection of heritage objects (minimal as they are) from their current context along the route.
Activity/risk source	Activities which could impact on achieving this objective include deviation from any planned development without taking heritage impacts into consideration.
Mitigation: Target/Objective	An environmental management plan that takes cognizance of heritage resources in the event of any future extensions of infrastructure. Mitigation (based on present observations and mining proposal as communicated) is not considered to be necessary.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Provision for on-going heritage monitoring in an environmental management plan which also provides guidelines on what to do in the event of any major heritage feature being encountered during any phase of mining.	Environmental management provider with on-going monitoring role set up by the mining company for the mining phase and for any instance of periodic or on-going land surface modification thereafter.	Environmental management plan to be in place before commencement of mining.
Should unexpected finds be made (e.g. precolonial burials; ostrich eggshell container cache; or localised Stone Age sites with stone tools, pottery; military remains), the relevant Heritage Authority should be contacted.	Environmental Control Officer should become acquainted at a basic level with the kinds of heritage resources potentially occurring in the area and should report to the Heritage Authority as needed (see next column).	In the event of finding any of the features mentioned in column 1, reporting by the developer to relevant heritage authority should be immediate. Contact: SAHRA Ms N. Higgins 021-4624502 or NC Heritage Resources Authority Mr Andrew Timothy 053-8312537/8074700.

Performance Indicator	Inclusion of further heritage impact consideration in any future extension of mining or any infrastructural elements.
Monitoring	Officials from relevant heritage authorities (National, Provincial or Local) to be permitted to inspect the site at any time in relation to the heritage component of the management plan.

- The following general mitigation measures will also be implemented to reduce the potential impact to insignificant:
  - All personnel including contractors involved in the construction activities will be made aware of the locations of all identified resources, the necessity of avoiding impacts on such resources and the penalties for damaging them.
  - Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with these sites. It will be emphasised that archaeological artefacts such as potsherds, stone tools, grinding stones, etc. must be left in situ and undisturbed.
  - A safe distance of at least 50 metres will be maintained between the identified resource and the construction activities. The heritage feature should be cordoned off with stakes and Chevron tape; and
  - If any resources not identified during the specialist study are discovered as a result of the construction/set-up activities, such activities will cease with immediate effect and a qualified archaeologist will be commissioned to assess their significance and determine appropriate mitigation measures. This may include obtaining authorisation (permits) from SAHRA to conduct mitigation measures if any resources have been affected. Authorisation must be obtained from SAHRA before any mitigation measures are implemented.

- **Noise**

Typical noise levels generated by various types of construction equipment are listed in the table below. Conservative attenuation conditions, related to intervening ground conditions and screening, have been applied.

Typical noise levels generated by construction equipment

Equipment	Typical operational Noise level at given offset (dBA)							
	5m	10m	25m	50m	100m	250m	500m	100m
Air compressor	91	85	77	71	65	57	51	46
Crane (mobile)	93	87	79	73	67	59	53	47
Dozer	95	89	81	75	69	61	55	49
Pump	86	80	72	66	60	52	46	40
Rock Drill	108	102	94	88	82	74	68	62
Trucks	87	81	73	67	64	60	57	54

In South Africa, the noise impact on human receptors is evaluated in terms of the SANS 10103 guidelines for sound pressure levels as listed in the table below.

Noise level standards for various districts

Type of District	Equivalent continuous rating level for ambient noise - dBA					
	Outdoors			Indoors with windows open		
	Day-night	Daytime	Night	Day-	Daytime	Night-
Rural districts	45	45	35	35	35	25
Suburban district	50	50	40	40	40	30
Urban traffic	55	55	45	45	45	35
Urban districts	60	60	50	50	50	40
Central business district	65	65	55	55	55	45
Industrial district	70	70	60	60	60	50

Daytime and night-time refer to the hours from 06h00 to 22h00 and 22h00 to 06h00 respectively

Taking into account the existing background noise levels of the general area which is rural in nature, the significance of the noise caused by the drilling rig travelling to and being established on each site, vehicles going to and from each drilling site and the voices of the drilling crew, the impact is assessed as being ***insignificant*** before mitigation. Although mitigation measure is put in place the significance rating remains the same at ***insignificant*** by limiting the site establishment activities to daylight hours (06h00 to 18h00) and not undertaking such activities at all on Sundays and public holidays, as well as by applying a separation distance of a minimum 500m, but preferably 1000m between drill sites and any dwellings. The vehicles on site are limited to three LDVs and one water truck. It must be noted that the speed limit for driving within a community and prospecting right shall be limited to 40Km/h.

- **Visual**

The visual impact of the construction / setup activities is assessed as being of **Medium** s***ignificant*** significance before mitigation. The impact can be reduced to one of **insignificance** by taking into account available vegetation screening, the locations of visual receptors on the prospecting areas and adjacent properties and locating the drilling rig in a way that it is screened from points of visual reception wherever possible.

- **Dust fall**

Acceptable dust fall rates in terms of the National Dust Control Regulations (GN R. 827 of 1 November 2013) are presented in the table below. In terms of these regulations, the local air quality officer may prescribe a dust fall monitoring programme, the implementation of dust control measures and continuous ambient air quality monitoring for PM10.

Acceptable dust fall rates

Restriction Areas	Dust fall rate (D) (mg/m^2/Day, 30- day average)	Permitted frequency of exceeding dust fall rate
Residential area	D < 600	Two within a year, not sequential months
Non-residential area	600 < D < 1 200	Two within a year, not sequential months

The method to be used for measuring dust fall rate and the guideline for locating sampling points shall be ASTM D1739: 1970, or equivalent method.

It is important to note that people experience dust deposition as a nuisance effect, and that there are no direct human health implications because the dust is not inhaled.

Heavy dust deposition can have detrimental effects on plants if the leaves are smothered to the extent where transpiration and photosynthesis are affected.

The proposed operation falls within the boundaries of the Namakwa District Municipality's and the company may be required to operate within the air quality requirements of the Municipality's Air Quality Management Plan.

The impact of dust generation by vehicles travelling over unpaved areas is assessed as being of **ins*ignificance*** even before mitigation. The impact can be reduced by wet suppression and enforcement of low vehicle speeds. Separation of distance of minimum 500m, but preferably 1000m to be maintained between drill sites and dwellings will also reduce the impact of dust fall.

- **Disturbance of wildlife and vegetation**

The impacts of drilling (drill pad clearing and compaction) have been assessed as being of ***medium*** **significance** before mitigation. The impact can be reduced to ***insignificant*** by limiting the activities and clearance to the smallest area that is necessary and rehabilitating the disturbed area as soon as possible. Furthermore, no clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. Rather that surface vegetation be cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow.

- **Surface water and groundwater use and contamination**

The impact of contamination with hydrocarbons and disturbance of water resources is assessed as being of **medium *significant*** before mitigation. The impact can be reduced to one of ***insignificant*** by ensuring that measures are put in place to prevent any drilling activities within 100m from a water course. Maintaining all equipment as per supplier specification and lining under the drill rig and diesel bowser with PVC plastic lining to contain any spillages, should it occur including having oil spill kit as a recovery measure.

- **Contamination and disturbance of soil from drill pad preparation, compaction and soil disturbance due to topsoil stockpiling**

The impacts of soil compaction have been assessed as being of **insignificance** even before mitigation. The impact on contamination can be reduced by the mitigating measure above and by limiting the activities and clearance of the drill pad to the smallest area that is necessary. Furthermore, no clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. All drill pads will be scarified and any topsoil stockpiled removed to be spread over the disturbed area immediately after completion of the activity.

- **Socio- economic impact**

The prospecting sites are located in a rural farming area with farm dwellings. Some landowners cherish the peaceful and quiet lifestyle of the area and friction between local residents and a crew of strangers is very possible. Conflict with other mining companies on the same property is also a possibility. The potential for conflict is assessed as being ***significant***, but it can be reduced to one of ***medium significance*** by taking appropriate social management measures.

Non-invasive activities that will be completed off-site. During field-investigations a maximum of three specialists will require access. All access will be arranged beforehand with landowner and the project manager will be present at all times and will report to the landowner when accessing and leaving the property. Indemnity will be signed by all mining personnel entering the property.

Any other mining companies operating legally will be listed as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed. Agreements between current mining operations and landowner will be respected and adopted as part of this operation. Co-ordinate invasive activities with existing mining activities to reduce the time of disturbances.

Landowner will be updated with regard to the progress of implementing the PWP and any invasive operation and concurrent rehabilitation will be planned in consultation with landowner.

8.6.3 Operational Phase

- **Cultural and Heritage Resources**

Drilling shall only be conducted on the target in which the heritage impact assessment was conducted and mitigation measures implemented. Therefore, the impact could be of insignificance. The significant rating will remain the same after mitigation measures at **insignificant**.

- Drilling equipment moving on site will, where ever possible, be confined to established roads and tracks. Where this is not possible, access routes will be walked prior to entry of equipment to ensure that there are no graves present.
- Should graves be identified, the access route will be realigned to avoid such heritage resources, which will then be clearly marked with stakes and Chevron tape to minimise risk of accidental damage.

- Efforts to achieve satisfactory prospecting results will employ appropriate methodologies aimed at the protection and conservation of heritage resources;
- All contractors and personnel involved in the prospecting activities will be made aware of the locations of all identified heritage resources, the necessity of avoiding impacts on such resources and the penalties for damaging them;
- Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. It will be emphasised that archaeological artefacts such as potsherds, stone tools, grinding stones, etc. must be left in situ and undisturbed.
- A safe distance of at least 50 metres will be maintained between the identified heritage resource and drilling rig or any other infrastructure associated with the prospecting activities; and
- Where necessary, directional drilling will be practised to assess ore reserves situated below identified heritage resources, without affecting such resources;

- **Noise**

The noise impact caused by the operation of the drilling rig, vehicles travelling to and from each drilling site and the voices of the drilling crew is assessed as being of ***medium* significance**. The impact can be reduced to one of ***insignificant*** by limiting the prospecting activities to daylight hours (07h00 to 18h00) and not undertaking such activities at all on Sundays and public holidays. Furthermore, a separation distance of minimum 500m, but preferably 1000m should be maintained between drill sites and dwellings as far as possible.

- **Visual**

The visual impact of the prospecting activities is assessed as being of **Medium Significance**. It can be reduced to one of **insignificance** by appropriate location of the drilling rig and other visually prominent items on the site and placement in consultation with the landowner. Existing vegetation must be use as far as possible to screen the prospecting operations from view. If necessary, the operations can be screened from view by erecting a shade cloth barrier.

- **Dust fall**

The impact of dust generated by vehicles travelling over unpaved areas is assessed as being of **insignificance**, but it can be readily mitigated further by enforcement of low vehicle speeds, as well as by applying a separation distance of a minimum 500m, but preferably 1000m between drill sites and any dwellings.

- **Disturbance of wildlife and vegetation**

Disturbance of wildlife and vegetation in areas where drilling is done is rated as being of ***medium significance***. The impact can be reduced to ***insignificant*** by prior delineation of the drill site area via geophysical characterisation and drilling in order to minimise the area that needs to be cleared. Furthermore, no clear scraping (dozing) must be carried out unless absolutely necessary to establish a level drill pad. Rather that surface vegetation be cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow.

Invasive drilling activities will be aligned in consultation with landowner not to coincide with the breeding or hunting season.

- **Surface- and groundwater contamination and use**

The potential contamination of surface and groundwater with hydrocarbons is assessed as an impact of ***Medium*** significance. The impact can be reduced to one of ***insignificant*** by implementing the measures recommended for the construction phase. Drilling muds will be contained in lined drill sumps and this material will be removed from site and disposed in a licensed disposal facility.

Water is only required when drilling activities commence. Drilling water requirements fall within the “small industrial user” where the use of water is less than twenty cubic meters per day for prospecting. The water that will be used for the prospecting activities will be sourced on agreement from an existing authorized water user which could be either the land owner or local municipality. The department responsible for water resources shall be consulted with regards to any water related agreement with either the land owner or local municipality prior to drilling. No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998).

- **Contamination and disturbance of soil from drill pad preparation, compaction and soil disturbance due to topsoil stockpiling**

The impacts of soil compaction have been assessed as being of **insignificance** even before mitigation. The impact on contamination can be reduced by the mitigating measure applicable to water contamination and by limiting the activities and clearance of the drill pad to the smallest area that is necessary. Furthermore, no clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. All drill pads will be scarified and any topsoil stockpiled removed to be spread over the disturbed area immediately after completion of the activity.

- **Socio- economic impact**

The prospecting sites are located in a rural farming area with farm dwellings. Some landowners cherish the peaceful and quiet lifestyle of the area and friction between local residents and a crew of strangers is very possible. Conflict with other mining companies on the same property is also a possibility. The potential for conflict is assessed as being ***significant***, but it can be reduced to one of ***medium significance*** by taking appropriate social management measures.

Most of the time will be spend on non-invasive activities that will be completed off-site. During field-investigations a maximum of three specialists will require access. All access will be arranged beforehand with landowner and the project manager will be present at all times and will report to the landowner when accessing and leaving the property. Indemnity will be signed by all mining personnel entering the property.

Any other mining companies operating legally will be listed as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed. Agreements between current mining operations and landowner will be respected and adopted as part of this operation. Co-ordinate invasive activities with existing mining activities to reduce the time of disturbances

Invasive drilling activities will be aligned in consultation with landowner not to coincide with the breeding or hunting season. Limiting the invasive activities to daylight hours (06h00 to 18h00) and not undertaking such activities at all on Sundays and public holidays.

Applying a separation distance of a minimum 500m, but preferably 1000m between drill sites and any tourism infrastructure and dwellings.

Available vegetation to be used as screening of the locations of visual receptors on the prospecting areas and tourism activities.

Locating the drilling rig in a way that it is screened from points of visual reception (tourism infrastructure, access roads) wherever possible.

Most of the time will be spend on non-invasive activities that will be completed off-site. During field-investigations a maximum of three specialists will require access. All access will be arranged beforehand with landowner and the project manager will be present at all times and will report to the landowner when accessing and leaving the property. Indemnity will be signed by all mining personnel entering the property.

8.6.4 Decommissioning phase:

Decommissioning of borehole sites will take place immediately after each borehole has been completed and the drilling rig is moved to the next site.

8.6.5 Assessment of potential cumulative impacts

The cumulative impact assessment considers a scenario where more than one drilling rig and drill site is in operation at any point in time throughout the duration of the prospecting programme.

- The cumulative noise impact of the proposed prospecting operations on the above sensitive receptors is assessed as being of significant significance before mitigation. The impact can be reduced to one of Medium significance by limiting the construction / setup activities to daylight hours (06h00 to 18h00) and not undertaking such activities at all on Sundays and public holidays;
- The cumulative visual impact on the above sensitive receptors is assessed as being of Significant significance prior to mitigation;
- Without mitigation, the potential cumulative impact of dust generation on the above sensitive receptors is assessed as being of Medium significance;

A total of 20 boreholes will potentially be drilled with a combined footprint area of <1hectares maximum at the end of the prospecting programme once all holes have been drilled and then rehabilitated.

- Without mitigation, the potential cumulative impact of soil, surface water and groundwater contamination, as experienced by the sensitive receptors, is assessed as being of medium significance.

8.7 Motivation where no alternative sites were considered.

As discussed in previous sections, the proposed prospecting right area holds potential because of the presence of known mineral occurrences in the area as well as the copper mining activities. The prospecting location has been informed by historical prospecting and production records for the area, as well as the most likely position of potential Copper deposits. As such the applicant believes there is a possibility of encountering further Copper Ore bodies within the prospecting area. The area included in this prospecting application is therefore regarded as the preferred site and alternative sites are not considered. The preferred site is informed by the most likely location of Copper deposits.

8.8 Statement motivating the alternative development location within the overall site.

As discussed in previous sections, each of the prospecting phases is dependent on the results of the preceding phase. The location and layout of drill sites will be determined based on information derived from the desktop and geophysical surveys (non-invasive activities). Proposed drill sites will be selected so as to avoid known heritage sites, water courses, dwellings and infrastructure where practicable. Since the invasive prospecting phase (drilling) is the dependent on the outcomes of Phases 1, the final site layout will be finalised on completion of Phases1. The conceptual site layout is provided in **Diagram 2**.

9. ENVIRONMENTAL IMPACT ASSESSMENT

9.1 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

This BAR and EMPr were compiled through a detailed desktop investigation in order to determine the environmental setting in which the project is located. Input from stakeholders during the public participation process also assist the EAP in the identification of any additional impacts associated with the proposed prospecting activities. The methodology described above was used to assess the significance of the potential impacts of the prospecting activities. The assessment of impacts is based on the experience of the EAP with similar projects. The applicant also has practical experience through exploration geologists and therefore the identification of impacts and assessment of their significance is informed by first-hand experience of drilling activities. The mitigation measures proposed are considered to be reasonable and based on the location of the prospecting area and must be implemented in order for the outcome of the assessment to be accurate.

9.2 Assessment of each identified potentially significant impact and risk

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFI-CANCE Without mitigation	MITIGATION TYPE	SIGNIFI-CANCE With mitigation
Site Access	Disturbance of onsite flora and fauna	Loss of/ disturbance to flora and fauna	Construction	In-significant	• Existing farm roads and tracks must be used as far as possible; • Where new access tracks are required to get the drill rig to the drilling site, such tracks must be scarified during decommissioning; • Vehicles speed must take into account the possibility of collisions with fauna.	In-significant
	Soil compaction from repeated use of access track to drill sites	Loss of soil resources	Construction	In-significant	• All compacted roads and drill sites will be scarified and any topsoil stockpiled to be spread over the disturbed area. • Duel use access roads must be handed back to the landowner in a good state of repair.	In-significant
Site Establishment Activities (including: topsoil stripping and stockpiling, erection of temporary structures such as drill rod racks, waste generation and management)	Cultural and Heritage	Destruction and/or loss of Cultural and Heritage Resources	Construction	Medium	• A heritage survey by a qualified archaeologist has shown that Precolonial/Stone Age material noted at this study area was found to be of generally low significance, where present at all. Criteria used here for impact significance assessment for archaeological traces rate the impacts as not worthy of further mitigation. • If any heritage resources are discovered as a result of the prospecting activities, such activities will cease with immediate effect and a qualified archaeologist will be commissioned to assess their significance and determine appropriate mitigation measures. • All personnel and contactors will be made aware of the locations of all identified heritage resources and the necessity of avoiding them.	In-significant

Site Establishment Activities (including: topsoil stripping and stockpiling, erection of temporary structures such as drill rod racks, waste generation and management)	Cultural and Heritage - continues			Medium	• Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. • A safe distance of at least 50 metres will be maintained between the identified heritage resource and prospecting activities. • Where necessary, directional drilling will be practised to assess ore reserves situated below identified heritage resources.	In-significant
	Noise	Noise Generation	Construction / Set-up	In-significant	• Construction/setup, operational and decommissioning activities will be limited to daylight hours on Mondays to Saturdays and no activities on Sundays and public holidays. • Separation of distance of minimum 500m, but preferably 1000m to be maintained between drill sites and dwellings. • Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition. • If intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.	In-significant
	Visual	Visual intrusion	Construction / Set-up	Medium	• The drilling rig and other visually prominent items on the site will be located in consultation with the landowner. • Make use of existing vegetation as far as possible to screen the prospecting operations from view. • If necessary, the operations can be screened from view by erecting a shade cloth barrier.	In-significant
	Dust fall	Dust fall & nuisance from activities	Construction / Set-up	In-significant	• Separation of distance of minimum 500m, but preferably 1000m to be maintained between drill sites and dwellings. • Low vehicle speeds will be enforced on unpaved surfaces.	In-significant

Site Establishment Activities (including: topsoil stripping and stockpiling, erection of temporary structures such as drill rod racks, waste generation and management)	Wildlife and Vegetation disturbance from drill pad preparation	Vegetation and fauna disturbance from drill pad preparation	Construction / Set-up	Medium	• The soil disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required. • Rather that surface vegetation be cleared to make way for the drilling rig leaving the roots intact so that vegetation can coppice and regrow. • No clear scraping (dozing) or removal of topsoil will be carried out unless absolutely necessary to establish a level drill pad. • If dozing of drill pad is required topsoil must be stored separately and drill sites must be rehabilitated by scarifying disturbed and compacted areas and spreading topsoil • Disturbed areas will be revegetated with locally indigenous species as soon as possible. • Where new access tracks are required to get the drill rig to the drilling site, such tracks must be raked and revegetated during decommissioning. • Vehicles speed must take into account the possibility of collisions with fauna. • The design of the drill fluid sump must be such that it prevents fauna from gaining access to site and becoming trapped.	In-significant
	Surface water and groundwater	Soil, surface water and groundwater contamination from hydrocarbons	Construction / Set-up	Medium	• To ensure that measures are put in place to prevent any drilling activities within 100m from a water course. • A lined sump (with sufficient capacity) will be constructed to receive drill fluids and allow for evaporation should clays be intersected in the borehole. • If a drill pad needs to be levelled by dozing topsoil must be stripped from the area immediately surrounding the drill area and stockpiled. • Storm water must be diverted around the drill site topsoil stockpile to prevent erosion, if necessary. • Oils and lubricants must be stored within sealed containment structures.	In-significant

Site Establishment Activities (including: topsoil stripping and stockpiling, erection of temporary structures such as drill rod racks, waste generation and management)	Surface water and groundwater - continues			Medium	• Fuel storage must be contained in mobile bowsers and refuelling will be done with care to minimise the chance of spillages. • Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevents spills/ leaks onto the soil. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Machinery must be kept in good working order and regularly inspected for leaks. • A spill kit will be available on each site where prospecting activities are in progress. • Any spillages will be cleaned up immediately. • Drilling muds will contain in lined drill sumps and this material will be removed from site and disposed in a licensed disposal facility. • Storm water must be diverted around the drill site to prevent ingress of storm water. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling.	In-significant
	Soil	Contamination and disturbance of soil from drill pad preparation, compaction and soil disturbance due to topsoil stockpiling	Construction / Set-up	Medium	• Same mitigating measures as for surface water and groundwater contamination from hydrocarbons • Limiting the activities and clearance of the drill pad to the smallest area that is necessary. No clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. • All drill pads will be scarified and any topsoil stockpiled removed to be spread over the disturbed area immediately after completion of the activity	In-significant

Site Establishment Activities (including: topsoil stripping and stockpiling, erection of temporary structures such as drill rod racks, waste generation and management)	Socio - economic impact	Conflicting land use	Construction / Set-up	Significant	Non-invasive activities will be completed off-site. • During field-investigations a maximum of three specialists will require access. • All access will be arranged beforehand with landowner and the project manager will be present at all times and will report to the landowner when accessing and leaving the property. • Indemnity will be signed by all mining personnel entering the property. • Any other mining companies operating legally will be listed as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed. • Agreements between current mining operations and landowner will be respected and adopted as part of this operation. • Co-ordinate invasive activities with existing mining activities to reduce the time of disturbances • Landowner will be updated with regard to the progress of implementing the PWP and any invasive operation and concurrent rehabilitation will be planned in consultation with landowner. • All operations will be carried out under the guidance of strong, experienced manager with proven skills in public consultation and conflict resolution. • All personnel will be made aware of the local conditions and sensitivities in the prospecting area and the requirements of the local residents. • There will be a strict requirement to treat local residents with respect and courtesy at all times.	Medium

Exploration drilling - Drilling - Drill maintenance & refueling - Core sample collection & storage - Vehicle movements - Waste generation & management	Cultural and Heritage	Destruction or loss of Cultural and Heritage Resources	Operations	In-significant	• If any heritage resources are discovered as a result of the prospecting activities, such activities will cease with immediate effect and a qualified archaeologist will be commissioned to assess their significance and determine appropriate mitigation measures. • All personnel and contactors will be made aware of the locations of all identified heritage resources and the necessity of avoiding them. • Personnel will be informed about the consequences of unlawful removal of cultural and historical remains and artefacts associated with heritage sites. • A safe distance of at least 50 metres will be maintained between the identified heritage resource and prospecting activities. • Where necessary, directional drilling will be practised to assess ore reserves situated below identified heritage resources.	In-significant
	Noise	Noise Generation	Operations	Medium	• Construction/setup, operational and decommissioning activities will be limited to daylight hours on Mondays to Saturdays and no activities on Sundays and public holidays. • Separation of distance of minimum 500m, but preferably 1000m to be maintained between drill sites and dwellings. • Noise abatement equipment, such as mufflers on diesel engines, will be maintained in good condition. • If intrusive noise levels are experienced by any person at any point, the source of the noise will be moved if practical, or it will be placed in an acoustic enclosure, or an acoustic barrier will be erected between the source and the recipient.	In-significant

Exploration drilling - Drilling - Drill maintenance & refueling - Core sample collection & storage - Vehicle movements - Waste generation & management	Visual	Visual intrusion	Operations	Medium	• The drilling rig and other visually prominent items on the site will be located in consultation with the landowner. • Make use of existing vegetation as far as possible to screen the prospecting operations from view. • If necessary, the operations can be screened from view by erecting a shade cloth barrier.	In-significant
	Dust fall	Dust fall & nuisance from activities	Operations	In-significant	• Separation of distance of minimum 500m, but preferably 1000m to be maintained between drill sites and dwellings. • Low vehicle speeds will be enforced on unpaved surfaces.	In-significant
	Wildlife and Vegetation disturbance from drilling	Vegetation and fauna disturbance from drilling	Operations	Medium	• The drill sites will be informed by the findings of non-invasive prospecting. • The disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required. • The drill sites must be clearly demarcated, and no activities may take place outside of demarcated areas. • Drill holes must be backfilled as soon as is practically possible after drilling is completed. • Drill sites must be rehabilitated by scarifying disturbed and compacted areas and spreading topsoil. • Disturbed areas will be revegetated with locally indigenous species as soon as possible. • The design of the drill fluid sump must be such that it prevents fauna from gaining access to site and becoming trapped. • Invasive drilling activities will be aligned in consultation with landowner not to coincide with the breeding or hunting season.	In-significant

Exploration drilling - Drilling - Drill maintenance & refueling - Core sample collection & storage - Vehicle movements - Waste generation & management	Surface water and groundwater	Surface water and groundwater use and contamination from hydrocarbons	Operations	Medium	• Proper vehicle maintenance. • Refuelling will be done with care to minimise the chance of spillages. • A spill kit will be available on each site where prospecting activities are in progress. • Any spillages will be cleaned up immediately. • Drilling muds will contain in lined drill sumps and this material will be removed from site and disposed in a licensed disposal facility. • Storm water must be diverted around the drill site to prevent ingress of storm water; • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Drilling water requirements will be less than twenty cubic meters per day for prospecting. • The water will be sourced on agreement from an existing authorized water user. • The department responsible for water resources shall be consulted with regards to any water use related agreement prior to drilling. • No water will be abstracted in terms of sec 21(a) of National Water Act, 1998.	In-significant
	Soil	Contamination and disturbance of soil from drill pad preparation, compaction and soil disturbance due to topsoil stockpiling	Operations	In-significant	• The impact on contamination can be reduced by the mitigating measure applicable to water contamination. • Limiting activities and clearance of the drill pad to the smallest area that is necessary. • No clear scraping (dozing) will be carried out unless absolutely necessary to establish a level drill pad. • All drill pads will be scarified and any topsoil stockpiled removed to be spread over the disturbed area immediately after completion of the activity.	In-significant

Exploration drilling - Drilling - Drill maintenance & refueling - Core sample collection & storage - Vehicle movements - Waste generation & management	Socio- economic impact	Conflicting land use and friction between local resident's land owners and construction personnel	Operations	Significant	• Non-invasive activities will be completed off-site. • During field-investigations a maximum of three specialists will require access. • All access will be arranged beforehand with landowner and the project manager will be present at all times and will report to the landowner when accessing and leaving the property. • Indemnity will be signed by all mining personnel entering the property. • Any other mining companies operating legally will be listed as affected parties and consulted. Areas of operations will be demarcated and no overlapping will be allowed. • Agreements between current mining operations and landowner will be respected and adopted as part of this operation. • Co-ordinate invasive activities with existing mining activities to reduce the time of disturbances • Landowner will be updated with regard to the progress of implementing the PWP and any invasive operation and concurrent rehabilitation will be planned in consultation with landowner. • All operations will be carried out under the guidance of strong, experienced manager with proven skills in public consultation and conflict resolution. • All personnel will be made aware of the local conditions and sensitivities in the prospecting area and the requirements of the local residents. • There will be a strict requirement to treat local residents with respect and courtesy at all times.	Medium

Assessment of Potential Cumulative Impacts			Without mitigation	With mitigation
Noise	Noise generation	Construction / set-up and operation	Medium	Medium
Visual	Visual intrusion	Construction / set-up and Operation	Medium	Insignificant
Dust fall	Dust fall & nuisance from activities	Construction / set-up and Operation	Medium	Insignificant
Wildlife and vegetation	Soil and vegetation disturbance from drill pad preparation	Construction / set-up and Operation	Medium	Insignificant
Surface water and groundwater	Soil, surface water and Groundwater contamination from hydrocarbons	Construction / set-up and Operation	Medium	Insignificant

The supporting impact assessment conducted by the EAP is attached as **Appendix 1** at the end of this document

9.3 Summary of specialist reports.

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):

LIST OF STUDIES UNDERTAKEN	**RECOMMENDATIONS OF SPECIALIST REPORTS**	**RECOMMEN-DATIONS INCLUDED IN THE EIA REPORT (Mark with an X where applicable)**	**REFERENCE TO APPLICABLE SECTION OF REPORT WHERE RECOMMENDATIONS HAVE BEEN INCLUDED.**
PIA and AIA by an independent Heritage professional.	Mitigation (based on present observations and mining proposal as communicated) is not considered to be necessary.		
	Provision for on-going heritage monitoring in an environmental management plan which also provides guidelines on what to do in the event of any major heritage feature being encountered during any phase of mining.	Yes	8.6 The possible mitigation measures that could be applied and the level of risk 9.2 Assessment of each identified potentially significant impact and risk
	Should unexpected finds be made (e.g. precolonial burials; ostrich eggshell container cache; or localised Stone Age sites with stone tools, pottery; military remains), the relevant Heritage Authority should be contacted.	Yes	Appendix 1

10. Environmental impact statement

10.1 Summary of the key findings of the environmental impact assessment

The majority of the prospecting activities are non-invasive and hence will have no environmental or social impact. The invasive activities will entail the drilling of approximately 20 exploration holes; which will have a minimal environmental and social impact as each drill pad will be confined to an area of approximately 160m² per site. The total anticipated area for disturbance is anticipated at less than 1 Ha which need to be viewed in the context of the entire prospecting license area under application which covers more than 1767 hectares. The assessed impact ratings after implementation of the mitigation measures described above are as follows:

- Cultural and heritage – **ins*ignificant***;
- Noise – **insignificant**;
- Visual impact – ***medium significance,*** *reducing to* ***insignificant***
- Dust fall – **insignificant**;
- Disturbance of wildlife and vegetation – ***medium significance***, reducing to **insignificant**;
- Contamination of surface water and groundwater – ***medium significance***, reducing to **insignificant**;
- Soil – ***medium significance***, reducing to **insignificant**; and
- Socio - economic impact – **significant** impact reducing to ***medium significance***.

All of the identified impacts will occur for a limited period and the extent of the impacts will be localised. All of the identified impacts can be suitably mitigated with the residual impact ratings being of insignificant.

The conservation status of the vegetation types in the area is regarded as “Least Threatened”; and no threatened ecosystems are present (Refer to **Diagram 6,7 & 8**).

The main impacts associated with the drilling activities (site disturbance) can be suitable mitigated.

After drilling activities have been completed and the drill pads rehabilitated to predrilling status, the impacts will cease to exist

10.2 Final Site Map

Please refer to **Diagram 8** for the Environmental Sensitivities Map including the target area of interest for proposed prospecting activities

10.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives

10.3.1 Positive Impacts

This application is for prospecting activities. Should favourable results be obtained from exploratory drilling, and it is believed that diamond mining will be economically viable; such mining would contribute to one of the main employment sectors of the Local Municipality. The prospecting activities themselves would not directly lead to job opportunities.

10.3.2 Negative Impacts

- Possible destruction or loss of Cultural and Heritage Resources during the construction/set-up phase as well as during the operational phase as drilling commencing;
- Noise Generation from construction / set-up and operational activities of drilling;
- Visual intrusion caused by the drilling activities in the largely rural setting;
- Dust fall & nuisance from construction / drill site set-up;

- Wildlife and vegetation disturbance from drill pad preparation during the construction / set-up and operational phase as contractors rehabilitate one site and move to the next site and prepare it;
- Surface water and groundwater contamination from hydrocarbons during the construction/set-up and operational activities which include drill rig operation and use of vehicles on site; and
- Socio-Economic impact due to conflicting land uses during the construction / set-up and operational phase.

10.4 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

- Provide sufficient information to strategically plan the prospecting activities as to avoid unnecessary social and environmental impacts.
- Provide sufficient information and guidance to plan prospecting activities in a manner that would reduce impacts (both social and environmental) as far as practically possible.
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance.
- Provide a management plan that is effective and practical for implementation.
- Through the implementation of the proposed mitigation measures it is anticipated that the identified social & environmental impacts can be managed and mitigated effectively.
- Through the implementation of the mitigation and management measures it is expected that: Heritage/cultural resources can be managed by avoidance of known resources and through consultation with landowners/stakeholders. Contractor personnel will also be briefed of these sensitivities and consequences of any damage/removal of such features;
- Noise generation can be managed through consultation and restriction of operating hours and by maintaining equipment and applying noise abatement equipment if necessary;
- Visual intrusion can be managed through consultation with landowners /stakeholders and by suitable siting of drill pads and use of screens (natural vegetation or shade cloth etc);
- Dust fall can be managed by reducing driving speeds when driving on unpaved roads and the use of water during drilling;
- Wildlife disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required and disturbed areas will be re-vegetated with locally indigenous species as soon as possible;
- Surface water and groundwater contamination by hydrocarbons can be managed by conducting proper vehicle maintenance, refuelling with care to minimise the chance of spillages and by having a spill kit available on each site where prospecting activities are in progress;
- Socio - economic impact can be managed by employing strong, experienced personnel with proven skills in public consultation and conflict resolution during stakeholder consultation phases. All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and that they treat local residents with respect and courtesy at all times.

10.5 Aspects for inclusion as conditions of Authorisation.

It is the opinion of the EAP that the following conditions should form part of the authorisation:

- Maintain a buffer of 100m from a water course;
- Maintain a minimum 500m (preferably 1000m) buffer from any infrastructure or dwelling;
- Landowners and land occupiers should be engaged (re-consulted) at least 1 month prior to any site activities being undertaken once drill sites are known.

10.6 Description of any assumptions, uncertainties and gaps in knowledge.

This report has been completed to the best of the EAPs ability, based on his experience and on information currently available to the EAP as well as provided by the applicant.

Comment received on the draft BAR were reviewed and incorporated into this finalised BAR. As such, the public perception of the proposed activity is known. In addition, comments and inputs received from the authorities and public provided additional information which has been considered.

Mitigation measures are proposed which are considered to be reasonable and must be implemented in order for the outcome of the assessment to be accurate.

The location of drill sites is not yet known and will be identified through the phased approach of the prospecting programme. This assessment is therefore based on a desktop approach at a broad scale and assuming that drilling could occur anywhere around the anomalies identified for this programme.

In addition, landowners will be re-engaged at this stage to communicate the company's intent to progress to drilling and to discuss the proposed drilling activities and identified locations with the landowner at that point in time.

10.7 Reasoned opinion as to whether the proposed activity should or should not be authorized

10.7.1 Reasons why the activity should be authorized or not.

It is the opinion of the EAP that the proposed prospecting activities should be authorised. In reaching this conclusion the EAP has considered that;

- Based on historical prospecting results, there is a good possibility of encountering copper deposits in the area
- The exploration program will be developed in a stepwise manner commencing with non-invasive activities to bring refinement to understanding of the geological anomaly.
- Should the exploration program advance to include the need for exploration drilling, the environmental impacts associated with the limited drilling activities are deemed to be minimal provided that the proposed mitigation is implemented;
- The spatial extent of the physical impact is less than 1Ha over a prospecting right license area of 1767 Ha hectares;
- With appropriate care and consideration, the impacts resulting from drilling can be suitably avoided, minimised or mitigated;
- With implementing the appropriate rehabilitation activities, the impacts associated with the drilling activities can be reversed.
- Without implementation of prospecting activities, the knowledge concerning the potential mineral resource within the prospecting right area will not be confirmed.

10.7.2 Conditions that must be included in the authorisation
It is the opinion of the EAP that the following conditions should form part of the authorisation:

- Maintain a buffer of 100m from a water course;
- Maintain a 500m (preferably 1000m) buffer from any infrastructure or dwelling;
- Landowners and land occupiers should be engaged (re-consulted) at least 1 month prior to any site activities being undertaken once drill sites are known

10.7.3 Period for which the Environmental Authorisation is required.
The authorisation is required for the duration of the prospecting right which is an initial 5 years plus a potential to extend the right by an additional 3 years. Normally there is also a time delay in the granting of applications for renewal therefore a total period of 10 years may be required.

10.7.4 Undertaking
An undertaking is provided at the end of this report.

11. Financial Provision

11.1 Legal Framework
With the repeal of Section 41 of the MPRDA (Act 28 of 2002) that requires that the owner of a mine must make financial provision for the remediation of environmental damage, regulations pertaining to the financial provision for prospecting, exploration, mining or production operations under section 44, read with sections 24 of the National Environmental Management Act, 1998 (Act No.107 of 1998) were issued in 2015.
According to regulation 7 the applicant or holder of a right or permit must ensure that the financial provision is, at any given time, equal to the sum of the actual costs of implementing the plans and report contemplated in regulation 6 and regulation 11(1).
In terms of regulation 11(1) the holder of a right or permit must ensure that a review is undertaken of the requirements for (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

Financial provision in terms of reg. 6(c) are covered by the requirements for the actual costs of implementation of the measures required for final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in the final rehabilitation, decommissioning and mine closure plan in terms of regulation 6(b) and attached as **appendix 2**.

11.2 Calculation
Financial provision in terms of reg. 6(c) is covered by the requirements for the actual costs of implementation of the measures required for final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in the final rehabilitation, decommissioning and mine closure plan in terms of regulation 6(b) and attached as **appendix 2**.

11.3 Explain how the aforesaid amount was derived.
According to regulation 6 an applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for— (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report (**Refer Appendix 2**).

11.4 Confirm that this amount can be provided for from operating expenditure.
The amount needed for the implementation of the final rehabilitation, decommissioning and closure plan will be provided to DMR in the form of a bank guarantee and the plan will be revised on an annual basis in terms of regulation 11(1) of the Nema Financial Regulations 2015.

Provision for implementation of annual rehabilitation plan to be provided as part of the environmental audit report in terms of Regulation 34 (1)(b) of the NEMA EIA Regulations (2014) will be provided as part of the operational budget and proof of access to the necessary fund were provided as part of the PWP together with proof of access to the necessary financial resources.

12. Specific Information required by the competent Authority

12.1 Compliance with sections 24(4)(a) and (b) of NEMA
According to the National Environmental Management Act (Act 107 of 1998). the EIA report must include the impact on:
The socio-economic conditions of any directly affected person.
A full consultation process has been implemented during the environmental authorisation process. The purpose of the consultation was to provide affected persons the opportunity to raise any potential concerns. Concerns raised has been captured and addressed within the public participation section of this report to inform the decision-making process.
As the final positioning of the drill sites cannot be confirmed without completion of phase 1 of the prospecting work programme, a recommendation has been made to ensure that the directly affected landowners are re-consulted a minimum of 1 month prior to drilling. The purpose of the re-consultation is to allow for socio-economic impacts on directly affected persons to be raised and where possible addressed.

Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.
A Phase 1 Heritage Impact Assessment inclusive of a Paleontological Impact Assessment was conducted by a suitably qualified archaeologist and palaeontologist respectively in order to identify any resources of significance. The study has shown that Precolonial/Stone Age material noted and investigated in this study was found to be of generally low significance, where present at all. Criteria used for significance assessment for archaeological traces rate the impacts as not worthy of further mitigation.

12.2 Other matters required in terms of sections 24(4)(a) and (b) of the Act.
A motivation for not investigating reasonable and feasible alternatives is provided in **Section 8.7** above. The prospecting location has been informed by historical prospecting and production records for the area. The proposed prospecting activities requested as part of this authorisation is the only current viable manner in which a mineral resource can be evaluated to determine its economic viability.

13. Environmental Management Program

13.1 Details of the EAP,
This has already been covered. Refer **Section 1** of this document

13.2 Description of the Aspects of the Activity
This has already been covered. Refer **Section 3** of this document

13.3 Composite Map
This has already been covered. Refer **Diagram 1 & 2**.

13.4 Description of Impact management objectives including management statements
The main management objectives for the invasive drilling activities are:

- Avoid potential impacts by positioning the drill sites in a manner which avoids /minimise potential impacts. This can be achieved by implementing appropriate buffer zones;
- Reduce impacts through implementing realistic operational management measures such as imposing restrictions on the time of day when drilling can take place and adherence to the site EMPr; and
- Ensure that chemical and hydrocarbon spillages are avoided, where they cannot all together be avoided minimised and mitigated.
- Establish appropriate waste management system
- Restore the physical impact of drilling through implementation of concurrent rehabilitation as and when drilling at one site is completed.

13.5 Determination of closure objectives.

- Objective 1 - To create a safe and healthy post-mining environment
  - Safe mining area
  - Limited residual environmental impact
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape
  - Economically viable and sustainable land fit for grazing, as close as possible to its natural state.
- Objective 3 – To provide optimal post-mining social opportunities
  - Optimised benefits for the social environment
  - Minimal negative aesthetic impact

13.6 Volumes and rate of water use required for the operation.
The drilling activities will use between 5 000L to 10 000L per day which falls within “small industrial user” where the use is less than twenty cubic metres per day for prospecting. The water that will be used for the prospecting activities will be sourced on agreement from an existing authorized water user which could be either the land

owner or local municipality. No water will be abstracted in terms of section 21(a) of National Water Act, 1998 (Act no. 36 of 1998).

13.7 Has a water use license has been applied for?

No – Based on the limited water needs of the proposed prospecting activities, water from a legal source will be brought to the drill sites by mobile water tanker as and when required.

The department responsible for water resources shall be consulted with regards to any water related agreement with either the land owner or local municipality prior to drilling.

13.8 Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
Non-invasive activities	Pre-Construction	1767 Ha	• All operations will be carried out under the guidance of a strong, experienced manager with proven skills in public consultation and conflict resolution, including environmental coordinator where applicable. • All prospecting personnel will be made aware of the local conditions and sensitivities in the prospecting area and the fact that some of the local residents may not welcome the prospecting activities in the area.	Environmental Awareness Plan	Before and during prospecting activities
Site Access Access Roads (temporary, jeep track roads less than 4m wide)	Construction	±2 600m^2	• Existing farm roads and tracks must be used as far as possible; • Where new access tracks are required to get the drill rig to the drilling site, such tracks must be raked / scarified during decommissioning; • Vehicles speed must take into account the possibility of collisions with fauna. • All compacted roads and drill traverses will be scarified and any topsoil stockpiled to be spread over the disturbed area.	Approved PWP Environmental Authorisation; NEMA Section 2 Principles.	Upon cessation of the individual activity

Site establishment activities: - Vegetation clearance - Topsoil stripping & stockpiling - Drill pad compaction - Placement of temporary portable toilets and resting place.	Construction	160m² per drill site Max ±3 200 m² for 20 holes	• Undertake heritage survey prior to site activities in order to identify cultural/heritage features. • Avoid cultural/heritage impacts by maintaining 50m buffer from any identified heritage feature and demarcation. • Any buried artefacts that may be uncovered during site activities will require such activities to stop to assess their significance and determine appropriate mitigation measures • The minimal area required for site establishment must be provided. • The soil disturbance and clearance of vegetation at drill pad areas will be limited to the absolute minimum required and will not be dozed or scraped with vegetation roots left intact for later re-growth. • Topsoil must be kept aside for rehabilitation; • The design of the drill fluid sump must be such that it prevents fauna from gaining access to site and becoming trapped.	Heritage Act Environmental Authorisation; NEMA Section 2 Principles	Before and during drilling activities Upon cessation of the individual activity
Exploration drilling: - Drilling - Core or chip sample collection & storage	Operational phase	Max. 20 drill holes 165mm diameter and average depth of 100m Chip samples 1.8m³ per hole Max ±36m³ for 20 holes Equipment laydown area & Sanitation requirements < 5Ha	• The drilling rig and other visually prominent items on the site will be located in consultation with the landowner; • Make use of existing vegetation as far as possible to screen the prospecting operations from view; and • If necessary, the operations can be screened from view by erecting a shade cloth barrier. • Low vehicle speeds will be enforced on unpaved surfaces. • Maintain a buffer of 500m between drill sites and dwellings.	SANS 10103 guideline GN R. 827 (NEM:AQA) GN R. 704 (NWA) NEMA	Upon cessation of the individual activity

Exploration drilling: - Drill maintenance & refuelling - Vehicle movements - Waste generation & management	Operational phase	Sludge from drilling activities <5m^3 Hydrocarbon storage <30m^3	• Oils and lubricants must be stored within sealed containment structures. • Fuel storage must be contained in mobile bowsers. • All chemicals and hydrocarbons shall be stored within 110% bund wall capacity. • Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevents spills/ leaks onto the soil. • Refuelling will be done with care to minimise the chance of spillages. • A spill kit will be available on each site where prospecting activities are in progress; and any spillages will be cleaned up immediately. • Underneath the drill rig or any equipment with potential oil spillages shall be lined with plastic liner to prevent soil and water contamination. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Avoid hydrocarbon spills by employing proper vehicle maintenance. • A lined sump (with sufficient capacity) will be constructed to receive drill fluids and allow for evaporation should clays be intersected in the borehole. • Storm water must be diverted around the drill site to prevent ingress of storm water. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. Waste separation must be undertaken if practical for recycling. • Drill muds to be contained in lined sump and disposed of off-site at licensed facility.	SANS 10103 guideline GN R. 827 (NEM:AQA) GN R. 704 (NWA) NEMA	Immediately in case of spills Upon cessation of the individual activity

Final Rehabilitation and removal of temporary infrastructure	Decommissioning	<5Ha	• Due to the remote location of the site, dust emissions are unlikely to be a source of nuisance; however, the site must be wetted if required. • Rehabilitation and preparation for re-vegetation must be done as soon as work is completed and before moving to the next drill site. • The disturbed site should be rehabilitated by scarifying hardened areas and filling the sludge catch pits (if any were required). • Any stored topsoil should be spread over the scarified surface to promote re-vegetation and prevent soil erosion.	Environmental Authorisation; NEMA Section 2 Principles	Ongoing during construction and operation phase.

13.9 Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ();

ACTIVITY (whether listed or not listed).	**POTENTIAL IMPACT**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated	**MITIGATION TYPE**	**STANDARD TO BE ACHIEVED**
General prospecting	Conflict with other land users	Social	Life of operation	Control through monitoring & management	Impact minimised and mitigated.
Site Access	Disturbance of onsite flora and fauna	Fauna and Flora	Construction	Remedy through restriction and rehabilitation	Impact minimised and mitigated.
	Soil compaction from repeated use of access road to drill sites	Soil resources		Remedy through rehabilitation	
Site Establishment Drill pads and laydown area Vegetation clearance	Disturbance of onsite flora and fauna	Fauna and Flora	Construction	Remedy through restriction and rehabilitation	Impact mitigated end use objectives
	Noise Generation	Noise		Control through monitoring & management	Impact mitigated
	Visual intrusion	Visual			Impact mitigated
Site Establishment Drill pads and laydown area Topsoil stripping & stockpiling Compaction due to levelling and vehicle movement	Destruction or loss of Cultural and Heritage Resources	Cultural and Heritage	Construction	Avoidance by relocation of activity	Impact avoided
	Soil disturbance and compaction and topsoil stockpiling	Soil		Remedy through restriction and rehabilitation	Impact mitigated end use objectives
	Noise Generation	Noise		Control through monitoring & management	Impact mitigated
	Dust fall & nuisance from activities	Air quality			Impact mitigated
Erection of temporary structures such as drill rod racks, toilets, fuel tanker, water tanker	Visual intrusion	Visual	Construction	Remedy through restriction and rehabilitation	Impact mitigated end use objectives

Drilling Core and Chip sample collection & storage	Vehicle and drill noise disturbing on-site flora and fauna	Noise	Operational	Control through management and monitoring	Impact mitigated
	Dust emissions from drilling and general site activities (vehicle entrained dust)	Air quality		Control through management and monitoring	Impact mitigated
Drill maintenance & refuelling Waste generation & management facilities	Surface and ground water contamination From hydrocarbons	Soil and water		Avoidance through management and monitoring	Impact avoided
Removal of temporary infrastructure and drill site rehabilitation	Dust emissions (vehicle entrained dust)	Air quality	Decommissioning	Control through management and monitoring	Impact mitigated
	Erosion due to slow recovery of vegetation	Soil and vegetation		Remedy through restriction and rehabilitation	Impact mitigated

13.10 Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

ACTIVITY whether listed or not	**POTENTIAL IMPACT**	**MITIGATION TYPE**	**TIME PERIOD FOR IMPLEMENTATION**	**COMPLIANCE WITH STANDARDS**
General prospecting	• Conflict with other land users	Control through monitoring & management	Concurrently with prospecting activities	Remain within the ambits of the Prospecting Works Programme and Environmental Authorisation.
Site Access	• Disturbance of onsite flora and fauna • Soil compaction from repeated use of access road to drill sites	Remedy through restriction and rehabilitation	Immediately on cessation of drilling.	
Site Establishment Drill pads and laydown area Vegetation clearance	• Disturbance of onsite flora and fauna • Noise Generation • Visual intrusion	Remedy through restriction and rehabilitation Control through monitoring & management	Concurrently with prospecting activities as far as possible, otherwise immediately on cessation of drilling.	
Site Establishment Drill pads and laydown area Topsoil stripping & stockpiling Compaction due to levelling and vehicle movement	• Destruction or loss of Cultural and Heritage Resources • Soil disturbance and compaction and topsoil stockpiling • Noise Generation • Dust fall & nuisance from activities	Avoidance by relocation of activity Remedy through restriction and rehabilitation Control through monitoring & management		
Erection of temporary structures such as drill rod racks, toilets, fuel tanker, water tanker	• Visual intrusion	Remedy through restriction and rehabilitation	Immediately on cessation of drilling.	

Drilling Core and Chip sample collection & storage	• Vehicle and drill noise disturbing on-site flora and fauna • Dust emissions from drilling and general site activities (vehicle	Control through management and monitoring	Concurrently with prospecting activities as far as possible, otherwise immediately on cessation of drilling.	Remain within the ambits of the Prospecting Works Programme and Environmental Authorisation.
Drill maintenance & refuelling Waste generation & management facilities	• Soil, surface and ground water contamination From hydrocarbons	Avoidance through management and monitoring		
Removal of temporary infrastructure and drill site rehabilitation	• Dust emissions (vehicle entrained dust) • Erosion due to slow recovery of vegetation	Control through management and monitoring Remedy through restriction and rehabilitation		

14. Financial Provision

14.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

- Objective 1 - To create a safe and healthy post-mining environment
  - Safe mining area
    - Maintain affected environment in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.
    - No potentially dangerous areas; secured if required
  - Limited residual environmental impact
    - No surface and/or groundwater contamination
    - Waste management practices not creating or leaving legacies
    - Develop a landscape that reduces the requirement for long term monitoring and management
- Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape
  - Economically viable and sustainable land fit for grazing, as close as possible to its natural state.
    - Improve Land use with an increased production with regard to grazing.
    - Minimise disturbance of ecology due to loss of habitat and noise/visual/dust
    - Minimise risk of erosion from either increased base flow or prospecting operations:
    - Management of air emissions to minimise nuisance effects; implementation of dust suppression activities.
    - Increase of land with agricultural potential: profiling and sloping of remaining drill sumps and removal of all drill spoils and ripping of all compacted areas to facilitate recovery of natural vegetation through colonization by dispersing species (patch dynamics)
    - Prevent long term changes in land use: revert back to mainly stock farming (grazing).
    - Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
- Objective 3 – To provide optimal post-mining social opportunities
  - Optimised benefits for the social environment
    - Maintain positive and transparent relationships with stakeholders: maintaining communication channels to all stakeholders and forums.
    - Provide stakeholders with relevant information: making all information available to stakeholders and providing information to authorities as per legislative requirements.
    - Undertaking environmental management in accordance with the implementation, maintenance and auditing of an environmental management system.
  - Minimal negative aesthetic impact
    - Maintain affected environment in an improved state containing no foreign debris or other materials.

The legal framework within which all the above lies entails:

- Defining and meeting closure standards.
- Complying with legislation.
- Sufficient financial provision for mine closure activities.
- Monitoring and plan for latent environmental impact.

14.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The closure objectives were reported in the draft BAR as well as the Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment and was made available to all registered interested and affected parties.

14.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

Refer Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment **appendix 2**.

14.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The closure objectives are to return the land disturbed by drilling activities back to its original condition taking into account the transformation due to historic large-scale mining in the area. The rehabilitation plan provides the detail on how this will be achieved. Through experience, it can be confirmed that effective rehabilitation of drill sites is possible and achievable with the rehabilitation plan set out in **appendix 2**.

14.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

As per Paragraph 11 of this report and **appendix 2**.

14.6 Confirm that the financial provision will be provided as determined.

As per Paragraph 11 of this report and **appendix 2**.

14.7 Mechanisms for monitoring compliance with and performance assessment against the environmental management program and reporting thereon, including

i) Monitoring of Impact Management Actions
ii) Monitoring and reporting frequency
iii) Responsible persons
iv) Time period for implementing impact management actions
v) Mechanism for monitoring compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All Prospecting Activities	N/A	Ensure that the prospecting programme is being implemented in line with the approved prospecting works programme	Site Manager and Geologist	**Annual** Submit a prospecting progress report to DMR
	All commitments contained in the BA Report and accompanying EMPr	Ensure commitments made within the approved BAR and EMPr are being adhered to.	Site Manager and independent EAP	**Annual** Undertake and submit an environmental performance audit to DMR
Site establishment	Visual inspection of soil erosion and/or compaction	All exposed areas, access roads, the drill site and soil stockpiles must be monitored for erosion on a regular basis and specifically after rain events.	Site Manager Contractor (or sub-contractors)	**Weekly, and after rain events** Weekly monitoring reports to be signed-off by the Site Manager Corrective action to be confirmed and signed-off by the Site Manager Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted to the Site Manager.
Drilling Activities	Visual inspection of biodiversity impacts	Visual inspection of drill site activities and other possible secondary impacts • Ensure that the fire brake is maintained. • Rehabilitation of drill pads • Records of water intersections on borehole logs • Monitor groundwater quality and level within 500m from a drill site (If any). • Control and minimise the development of new access tracks • Appropriate storage and handling of topsoil		

Drilling Activities	Visual inspection of pollution incidents, the integrity of secondary containment structures and waste management Housekeeping & maintenance	• All secondary containment structure will be inspected on a daily basis to confirm the integrity thereof and to identify potential leaks timeously. • All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure. • Standard waste management practices must be implemented to prevent contamination and littering.	Site Manager Contractor (or sub-contractors)	**Daily** Weekly monitoring reports to be signed-off by the Site Manager Corrective action to be confirmed and signed-off by the PSM Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted Report incidents in terms of the relevant legislation, including the MPRDA, NWA and NEMA.
Post Drilling Post Closure	Groundwater Revegetation Stability Soil erosion Alien invasive species	Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required. • Identify any areas of subsidence around drill holes and under take additional backfilling if required.	Site Manager	**Bi-Annual** A final audit report for site closure must be submitted by the DMR for approval

14.8 Indicate the frequency of the submission of the performance assessment/ environmental audit report.

An external environmental performance audit shall be conducted annually by an independent environmental assessment practitioner that include an annual rehabilitation plan for implementation during the next reporting period. A review of the Final decommissioning, rehabilitation and mine closure Plan will also be done on an annual basis together with an update of the quantum calculations for financial provision for rehabilitation.

15. Environmental Awareness Plan

15.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

Training is part of its Induction process and environmental Management System (EMS). The induction includes:

- Awareness training for contractors and employees;
- Job specific training – training for personnel performing tasks which could cause
- potentially significant environmental impacts;
- EMS training;
- Comprehensive training – on emergency response, spill management, etc;
- Specialised skills; and
- Training verification and record keeping

Before commencement of the prospecting activities all employees and contractors who are involved with such activities should attend relevant induction and training. It is standard practice for employees and the employees of contractors that will be working on a new project or at a new site to attend an induction course where the nature and characteristics of the project and the site are explained.

The training course should include key information abstracted from the EMP pertaining to the potential environmental impacts, the mitigation measures that will be applied, the monitoring activities that will be undertaken and the roles and responsibilities of contractors' and personnel.

The full EMP document is also made available to attendees.

15.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Environmental risks and how to manage them are dealt with in the induction course referred to in section (m) (i) above. If an incident of environmental pollution or damage does occur it is analysed and appropriate prevention and/or mitigation measures are developed. These measures are added to the EMP and conveyed to the relevant personnel.

All unplanned incidents with the potential to cause pollution or environmental degradation or conflict with local residents will be reported to the Mineral Resources Manager within 24 hours.

Hydrocarbon Spills

Hydrocarbon spills that are considered to be emergency incidents are large-scale spills (cover a surface area >1m2), resulting from situations such as; a leaking diesel bowser, an oil drum that is knocked over, large spillages from equipment, etc.

Activities that are involved in the clean-up of such instances include:

- The containment of the spill,
- The removal of all contaminated material, and
- The disposal (at a licenced hazardous disposal facility) or bioremediation (at a licenced facility) of this material.

Fire

There is the potential for fire to occur in the following locations of the drill site:

- Veld fires across vegetated areas; and
- Vehicles and equipment.

Veld fires: Any person who observes the fire must report it to the fire brigade immediately and then to their supervisor. If possible, additional personnel may be sent to contain the fire, but only if the lives of the personnel will not be endangered.

Vehicles and Equipment: Fire extinguishers will be available at the site where drilling activities will take place and in the vehicles. All staff members will be trained in the use of fire-fighting equipment.

15.3 Specific information required by the Competent Authority
(Among others, confirm that the financial provision will be reviewed annually).

Not applicable at this stage

16. Undertaking

The EAP herewith confirms

the correctness of the information provided in the reports
the inclusion of comments and inputs from stakeholders and I&APs
the inclusion of inputs and recommendations from the specialist reports where relevant; and
that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the environmental assessment practitioner:

N.J. van Zyl Private Enterprise
Name of company:
09 July 2018
Date:

-END-

Appendix 1: Impact assessment

Appendix 2: Final Rehabilitation, decommissioning and mine closure plan Including Environmental Risk Assessment and quantum calculations

Appendix 3a: Archaeological Impact Assessment

Appendix 3b: Palaeontological Impact Assessment

Appendix 4: Public Participation Process