



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL MANAGEMENT PLAN

REMAINDER & 1 WORTEL 42, PORTION 2 ROZYNBOSCH 41, PORTION 1 KOENABIB 43

NAME OF APPLICANT:
Black Mountain Mining (PTY) LTD (BMM)

DMR REFERENCE NUMBER:
NC 30/5/1/1/2/11296 PR

SUBMITTED
IN TERMS OF SECTION 39 AND OF REGULATION 52 OF THE
MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT,
2002,
(ACT NO. 28 OF 2002) (the Act)

29 July 2014

STANDARD DIRECTIVE

Applicants for prospecting rights or mining permits, are herewith, in terms of the provisions of Section 29 (a) and in terms of section 39 (5) of the Mineral and Petroleum Resources Development Act, directed to submit an Environmental Management Plan strictly in accordance with the subject headings herein, and to compile the content according to all the sub items to the said subject headings referred to in the guideline published on the Departments website, within 60 days of notification by the Regional Manager of the acceptance of such application. This document comprises the standard format provided by the Department in terms of Regulation 52 (2), and the standard environmental management plan which was in use prior to the year 2011, will no longer be accepted.

IDENTIFICATION OF THE APPLICATION IN RESPECT OF WHICH THE ENVIRONMENTAL MANAGEMENT PLAN IS SUBMITTED

ITEM	COMPANY CONTACT DETAILS
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Note that maps and photographs are included as Addendums.

1 REGULATION 52 (2): Description of the environment likely to be affected by the proposed prospecting operation

1.1 The environment on site relative to the environment in the surrounding area

1.1.1 Regional locality

The proposed area (site) of exploration is located approximately 22 km north of the town Aggeneys in the Northern Cape Province, and falls within the area jurisdiction of the Khai Ma Local Municipality (KMLM) and the Namakwa District Municipality. The land is privately owned and utilised for the farming of small stock. The areas surrounding the site is also privately owned and characterised by farming activities. The broader area is generally characterised by a mining and farming community.

The prospecting area includes the the properties as described in Tables 1 and 2. The site boundaries are depicted in Figure 1, while Figure 2 shows the site in relation to the surrounding area (Addendum A).

Table 1: Application Area

No.	Registered Land Description	Magisterial District	Extent (Ha)	Land Owner	Title Deed	SG Code
1	Portion 2 Rozyboch 41	NAMAQUALAND	4567.6356	VAN NIEKERK IZAK JACOBUS	T41025/1984	C0530000000004100002
2	Portion 1 Koenabib 43	NAMAQUALAND	4144.7076	OONAB BOERDERY C C	T62340/2001	C0530000000004300001
3	RE Wortel 42	NAMAQUALAND	5688.5499	VAN DEN HEEVER PIETER ANDRIAS	T35898/2007	C0530000000004200000
4	Portion 1 Wortel 42	NAMAQUALAND	5691.4113	VAN DEN HEEVER RAYMOND PAUL	T22713/1965	C0530000000004200001
TOTAL AREA (HA)			20092.3044			

Table 2: Coordinates of Farm Boundaries

FARM	POINT No.	X-COORDINATE	Y-COORDINATE
Remaining Extent Wortel 42	1	18.777389°	-28.993979°
	2	18.87892°	-28.987825°

	3	18.871369°	-29.037412°
	4	18.861393°	-29.055146°
	5	18.77279°	-29.031855°
Wortel 42 portion 1	1	18.77279°	-29.031855°
	2	18.861393°	-29.055146°
	3	18.819271°	-29.131493°
	4	18.766973°	-29.079586°
Rozybosch 41 portion 2	1	18.842612°	-29.089271°
	2	18.939676°	-29.087102°
	3	18.908102°	-29.140456°
	4	18.823404°	-29.124046°
Koenabib 43 portion1	1	18.68366°	-29.024662°
	2	18.772074°	-29.037753°
	3	18.766973°	-29.079586°
	4	18.674369°	-29.065461°

A site and area investigation was undertaken from 24 – 26 June 2014. The following land uses and infrastructure are present in the area:-

1.1.2 Farming activities

Current activities include livestock grazing at low densities, with sheep, goats and some cattle currently present on the farms (the site).

The surrounding environment is similar to that of the on-site environment. Surrounding farms are also used for the ranching of small stock, mostly sheep, goats, and some cattle. The land is arid and primarily used for grazing. Surrounding farms are either privately owned or owned by the municipality and used for communal purposes.

Table 3: Adjacent Farms and Owners

Portion	Farm Name	Owner
36	Hartebeest River 36	Gemeenskapsontwikkelingstrust: Witbank
36/1	Hartebeest River 36	J C Straus Agriculture PTY (LTD)
37	Hoogoor 37	Pella Plaaslike Owerheid
40	Klein Pella	Karsten Boerdery CC
41	Rozybosch 41	JW Luttig
41/1	Rozybosch 41	SD Luyt

43/2	Koenabib 43	Albert Johannes van de Heever
44	Dabenoris 44	Plaaslike Munisipaliteit Orrgangsraad: Pella
53	Haramoep 53	Haramoep Boerdery CC
53/1	Haramoep 53	Frank Bassingthwaighte Agenbag
54/3	Koeris 54	Municipality Pofadder
57/1	Aroams 57	AJA Van Niekerk Familie Trust
57/3	Aroams 57	Petrus Daniel Carstens

1.1.3 Mining and prospecting activities

The area to be prospected is within ore trucking distance of Black Mountain Mining's existing concentrator plant at Aggeneys, and 5 km from the Gamsberg Project. BMM at Aggeneys / Gamsberg is currently the only operating mine within the area. However, over the years the area has been subjected to various prospecting and smaller mining campaigns, undertaken by a number of different companies.

The site in particular has been subjected to several previous prospecting projects undertaken by different companies. Mr. Izak van Nieker (Portion 2 Rozybosch 41) indicated that he is satisfied with the rehabilitation of the previously affected areas, and does not object to the proposed future prospecting activities by BMM.

1.1.4 Water Use

Water is not readily accessible, and a scarce commodity. Water is pumped from boreholes and is used for for both domestic and agricultural supply. In terms of water quality, it is assumed that groundwater is fit for human consumption. There are various farm dams and windmills present on the farms.

1.1.5 Roads

The prospecting area is situated approximately 9 km north of the N14, and accessible via gravel road. Due to its remote location, these roads do not carry large volumes of traffic. On-site roads or tracks are visible on Figure 3 – Appendix A.

1.1.6 Infrastructure

Only the Remainder of the Farm Wortel 42 is permanently occupied by Mr. Pieter van den Heever. The owners of Portion 1 Wortel 42, Portion 2 Rozybosch 41 and Portion 1 Koenabib 43 reside elsewhere. Infrastructure present on all of the farms includes homesteads, outbuildings, worker accommodation, boreholes, dams, windmills, water pipelines, fences, gates, animal enclosures, feeding-troughs and gravel roads.

Telephone lines are present along the main access roads. There is no power lines present on site. The images provided in Addendum B depict the environment typical of the application area and beyond.

1.1.7 Description of the Environment

1.1.7.1 Climate

The mean annual precipitation is 99 mm, with a high annual coefficient of variation (40%). Rain can fall in any month but is mainly in the later austral summer, peaking in February - April. Mean annual evaporation potential exceeds rainfall almost 30-fold, so mean annual soil moisture stress is high (87%). The mean annual temperature is 17.3°C, but mean monthly temperatures exceed 30°C in mid-summer and drop close to zero in mid-winter, with 21 mean frost days annually.

The terrain varies from flat lying plains with poor outcrop of granitic gneiss and slivers of meta-sediments in the east to mountainous terrain in the west. Meta-sedimentary rocks underlie the mountainous terrain. The mountains raise some 100m above the plain and are capped by massive white quartzite. The meta-sedimentary rocks are of mid-Proterozoic age and correlate to the Bushmanland Sequence.

1.1.7.2 Geology

The Prospecting Right application area is located between 7km and 25km north of the town of Aggeneys, and the Aggeneys - Gamsberg base metal mines. The terrain varies from flat lying plains with poor outcrop of granitic gneiss and slivers of meta-sediments in the east to mountainous terrain in the west. Meta-sedimentary rocks underlie the mountainous terrain. The mountains raise some 100m above the plain and are capped by massive white quartzite. The meta-sedimentary rocks are of mid-Proterozoic age and correlate to the Bushmanland Sequence. These metamorphosed sedimentary rocks consist of white to blue quartzite, biotite - sillimanite schist and poorly developed iron formations. These rocks correlate to the metasedimentary sequence hosting the zinc – copper – lead – silver deposits at Aggeneys and Gamsberg which is illustrated in the geological map (Figure 4). The inferred tectono-stratigraphic setting of the prospecting area is therefore considered favourable for hosting zinc-copper-lead-silver mineralization similar to that currently being exploited at the Black Mountain Mine.

The broad stratigraphy is described below. The following stratigraphic classification is used in the Aggeneys area:

The Wortel Subgroup

The Wortel Subgroup is subdivided into the Aluminous Schist (bottom) and White Quartzite Formations (top). Quartz- biotite- sillimanite- muscovite schist forms the bulk of the Aluminous Schist Formation. The White Quartzite Formation consists of layered to massive, white to light grey weathering metaquartzite.

The Kouboom Subgroup

The Kouboom Subgroup is subdivided into the Pelitic Schist, Dark Quartzite and Diamictite Formations. The Pelitic Schist Formation consists of quartz - muscovite - biotite - sillimanite schist with sparse interlayers of thin, lenticular muscovite quartzite beds. The Dark Quartzite Formation consists of quartz with accessory zircon, apatite, muscovite, sericite, sillimanite, hematite and magnetite. Conglomerate lenses are locally developed in the quartzite.

The Gams Formation

The Gams Formation conformably overlies the Kouboom Formation. Stratiform basemetal (Cu, Pb, Zn, Fe, Mn and Ba) mineralization and chemical sediments (banded iron formation, calc-silicate rocks, marble and baritic rocks) are characteristic of the sequence.

The Koeries Formation

Muscovite quartz rocks, grading from schist to quartzite, conglomerate lenses and amphibolite form the bulk of the Koeries Formation.

SEQUENCE	GROUP	SUBGROUP	FORMATION
BUSHMANLAND	AGGENEYS		KOERIES
			GAMS
		KOUBOOM	DIAMICTITE
			DARK QUARTZITE
			PELETIC SCHIST
		WORTEL	WHITE QUARTZITE
			ALUMINOUS SCHIST
			GNEISS

The Pb, Zn, Cu & Ag deposits occur as a cluster around Aggeneys within the upper part of the Kouboom Formation and are classified as Broken Hill Type Deposits. The deposits are hosted by banded iron formation with associated magnetite and garnet rich quartzite. The magnetite rich rocks are responsible for magnetic anomalies associated with the different deposits. The mineralization of the deposits consist of disseminated to massive sulphide mineralization within the banded iron formation and in the schists and quartzites that are in contact with the banded iron formation. Broken Hill, Black Mountain, Big Syncline and Gamsberg deposits outcrop, while Broken Hill Deeps orebody is situated down plunge of Broken Hill orebody at a depth of 800m to 1350m. The deposits are associated with fold structures and follow the plunge of these structures.

Relevant base metal deposits in the region are listed below:

DEPOSIT NAME	COMMODITY	TYPE CODE	FARM
Broken Hill & Broken Hill Deeps	Lead, zinc, copper and silver	<u>B</u>	Zuurwater 62/4 Aggeneys 56/1
Swartberg	Lead, zinc, copper and silver	<u>B</u>	Zuurwater 62/4
Gamsberg	Zinc and lead	<u>B</u>	Gams 60/1 Bloemhoek 61/1

1.1.7.3 Soil

Much of the area is covered with rocky mountains with shallow soil on the southern parts of the farms Wortel and Koenabib. Shallow soil also occur on the granites on much of Rozynbosch, while sandy plains with grassland occur in the northern parts of Wortel and Koenabib and the south-eastern parts of Rozynbosch.

Typical dunes are rare within the site; however deeper red soil occurs in the western parts of Koenabib. The quartzite gravels occur in three main forms, i.e. small fine-grained patches on the tops and foothills of the mountains, more variable and widespread sizes around the erosion zones below the mountains, and small feldspar patches, with calcrete gravels also emerging in a few patches where exposed by erosion on the flats.

1.1.7.4 Topography and drainage

The topography is generally flat and open, except for the gabbro, quartzite and Granite Mountains on the farm Wortel and the Witberg on Rozynbosch. Given the low rainfall, recent drainage lines are relatively lightly incised and shallow. The area forms part of the palaeo-

drainage system of the Gariep River basin, evident on and around the site as rather ill-defined washes (i.e. small, dry, non-perennial, seasonal spruits. No pans occur on the site. The mountains on site generally have steep slopes, with coolest sides facing southwest, into the prevailing wind, and their warmer and steep sides facing northeast, with associated effects on the biodiversity on either side.

The Hartbees River drains northwards and is prominent on the farms Wortel and Koenabib, while the Rooiwal River drains northwards from Rozybosch.

Drainage lines are of conservation concern and regarded as sensitive ecosystems, due to the ecosystem processes linked to the provision and transport of water in the landscape. The drainage lines which are present on site are not classified National Freshwater Ecosystem Priority Areas (FEPAs). However, a 30 m buffer is applicable around drainage lines, from the outer edge of the riparian zone of a drainage line implying that no activity must be undertaken within 30 m of these features.

1.1.7.5 Groundwater

As mentioned in Section 1.1.4 above, water is a scarce commodity. Water is pumped from boreholes and is used for for both domestic and agricultural supply. In terms of water quality, it is assumed that groundwater is fit for human consumption.

1.1.7.6 Vegetation

The study site is located within the area of jurisdiction of the Khai Ma Local Municipality (KMLM). The KMLM comprises virtually the entire extent of the Bushmanland Inselberg priority area. The latter is one of the nine zones identified through the Succulent Karoo Ecosystems Project (SKEP) process as important conservation areas in the Succulent Karoo. Inselbergs are important refugia for plants and animals and act as steppingstones for rock-loving species migrating east west across the sand-covered plains of Bushmanland. The isolation of populations has led to diversification within the dwarf succulent shrublands, creating remarkable local populations of plant life. The area is unique, containing many rare and fragile habitat types. These unique and confined areas are host to a remarkable number of endemic plants (Marsh et al. 2009).

According to SANBI & DEAT (2009) none of the ecosystems occurring on the prospecting area are considered as threatened ecosystems. Nonetheless, the areas north of Aggeneys are considered as Critical Biodiversity Areas (CBAs) within the Namakwaland District.

The main vegetation types occurring on the prospecting area are classified in terms of Mucina & Rutherford (2006), as Bushmanland Arid Grassland, Bushmanland Sandy Grassland, Aggeneys Gravel Vygieveld, Eastern Gariep Plains Desert and Eastern Gariep Rocky Desert (Figure 5 – Addendum A).

The VEGMAP classification was refined during the site investigation, with six broad vegetation mapping units recognised as indicated in Figure 6. An additional unit is the Dry Drainage Lines (Spruits).

Figure 6 shows the identified vegetation categories as follows:-

- A. Bushmanland Arid Grassland
- B. Bushmanland Sandy Grassland
- C. Aggeneys Gravel Vygieveld
- D. Sandy Gravel Vygieveld
- E. Eastern Gariep Plains Desert
- F. Eastern Gariep Rocky Desert
- G. Dry Drainage Lines (Spruits) (represents wetland systems)

Figure 7 differentiates between areas identified as being of low, medium and high environmental sensitivity.

The identified vegetation units are described below.

A. Bushmanland Arid Grassland

This vegetation type has a wide distribution, from Namaqualand in the west to Prieska in the east. In the vicinity of Aggeneys, the Bushmanland Arid Grassland is interrupted by Bushmanland Sandy Grassland, especially in the Koa River valley, and also by the Bushmanland Inselberg Shrubland that occurs on the scattered mountains and hills in the Aggeneys area and the Aggeneys Gravel Vygieveld, which is considered to be a rare ecosystem, restricted to gravel patches.

On the farm Rozybosch the soil is red-yellow, apedal freely drained but shallow, often on extensive granite sheets, typically representing the Ag and Ae land types. Rainfall is low, 70-110 mm per annum, mostly falling in late summer to autumn (Mucina & Rutherford 2006).

Quite intensive drainage systems occur within this area, forming a rugged rocky granite landscape with small drainage lines.

The extensive plains are sparsely vegetated by grassland with *Stipagrostis* species giving the appearance of a semi-desert steppe (refer to Addendum C, Image 5). Drought resistant dwarf shrubs are often present, while annual forbs flower abundantly in years with good rainfall. The most prominent and general species include:

Trees, Shrubs and Dwarf shrubs

<i>Eriocephalus spinescens</i>		<i>Pteronia mucronata</i>	
<i>Kleinia longiflora</i>		<i>Rhigozum trichotomum</i>	D
<i>Lycium bosciifolium</i>		<i>Rosenia humilis</i>	
<i>Lycium cinereum</i>	d	<i>Salsola aphylla</i>	d
<i>Pentzia spinescens</i>		<i>Salsola tuberculata</i>	
<i>Plinthus karroicus</i>			

Grasses

<i>Aristida adscensionis</i>		<i>Sporobolus nervosus</i>	
<i>Aristida congesta</i>		<i>Stipagrostis brevifolia</i>	d
<i>Cenchrus ciliaris</i>		<i>Stipagrostis ciliata</i>	D
<i>Enneapogon desvauxii</i>		<i>Stipagrostis obtusa</i>	D
<i>Enneapogon scaber</i>		<i>Stipagrostis uniplumis</i>	
<i>Eragrostis nindensis</i>		<i>Tragus berteronianus</i>	
<i>Schmidtia kalahariensis</i>	d		

Forbs

<i>Acanthopsis hoffmannseggiana</i>		<i>Hermannia spinosa</i>	
<i>Aizoon canariense</i>		<i>Hirpicium echinus</i>	
<i>Amaranthus praetermissus</i>		<i>Hoodia gordonii</i>	RD
<i>Aptosimum spinescens</i>		<i>Limeum aethiopicum</i>	
<i>Arctotis leiocarpa</i>		<i>Lophiocarpus polystachyus</i>	
<i>Avonia albissima</i>		<i>Mesembryanthemum guerichianum</i>	
<i>Barleria rigida</i>		<i>Monechma incanum</i>	
<i>Berkheya annectens</i>		<i>Monsonia parviflora</i>	
<i>Berkheya canescens</i>		<i>Peliostomum leucorrhizum</i>	
<i>Blepharis mitrata</i>		<i>Polygala seminuda</i>	
<i>Cotula microglossa</i>		<i>Senecio niveus</i>	
<i>Dicoma capensis</i>		<i>Solanum capense</i>	
<i>Foveolina albida</i>		<i>Tephrosia dregeana</i>	
<i>Galenia africana</i>		<i>Trianthema parvifolia</i>	

Tribulus terrestris

During the site visit it was found that different plant communities occur within the Bushmanland Arid Grassland, but for the purposes of this EMP, these are not described.

B. Bushmanland Sandy Grassland

This is the grassland of the valley bottoms on mobile or semi-mobile dunes. The sands and calcrete are of Quarternary sediments. The area is mostly representing the Af land type, with deep red sands predominant, with red sand dunes (Image 6 – Addendum C). The sand dunes suggest similarity to southern Kalahari duneveld flora (Mucina & Rutherford 2006). Rainfall is low, 70-110 mm per annum, mostly falling in late summer to autumn.

The area is typically covered by sparse open grassland, with *Stipagrostis* species and *Schmidtia kalahariensis* prominent, with scattered, drought resistant dwarf shrubs or small trees, e.g. *Rhigozum trichotomum*, *Boscia albitrunca*, *Parkinsonia africana* and *Lycium cinereum*.

The most prominent species include:

Trees, Shrubs and Dwarf shrubs

<i>Aridaria noctiflora</i>		<i>Plinthus karroicus</i>	
<i>Boscia albitrunca</i>		<i>Pteronia mucronata</i>	
<i>Eriocephalus microphyllus</i>	d	<i>Rhigozum trichotomum</i>	D
<i>Galenia fruticosa</i>		<i>Rosenia humilis</i>	
<i>Lycium bosciifolium</i>		<i>Sarcostemma viminale</i>	
<i>Lycium cinereum</i>		<i>Tetragonia arbuscula</i>	
<i>Parkinsonia africana</i>		<i>Zygophyllum microphyllum</i>	d
<i>Pentzia spinescens</i>			

Grasses

<i>Aristida adscensionis</i>		<i>Stipagrostis anomala</i>	
<i>Aristida congesta</i>		<i>Stipagrostis brevifolia</i>	d
<i>Centropodia glauca</i>		<i>Stipagrostis ciliata</i>	D
<i>Cladoraphis spinosa</i>		<i>Stipagrostis namaquensis</i>	d
<i>Enneapogon desvauxii</i>		<i>Stipagrostis obtusa</i>	D
<i>Schmidtia kalahariensis</i>	d		

Forbs

<i>Barleria rigida</i>		<i>Monechma incanum</i>	
<i>Berkheya spinosissima</i>		<i>Oxalis eckloniana</i>	
<i>Crassula muscosa</i>		<i>Peliostomum leucorrhizum</i>	
<i>Dicoma capensis</i>		<i>Requienia sphaerosperma</i>	
<i>Felicia namaquana</i>		<i>Ruschia robusta</i>	
<i>Gazania lichtensteinii</i>		<i>Salsola tuberculata</i>	
<i>Grielum humifusum</i>		<i>Senecio cotyledonis</i>	
<i>Heliophila arenaria</i>		<i>Sesamum capense</i>	
<i>Hermannia coccocarpa</i>		<i>Thesium lineatum</i>	
<i>Hermannia spinosa</i>		<i>Tribulus zeyheri</i>	
<i>Hirpicium echinus</i>		<i>Wahlenbergia prostrata</i>	
<i>Indigofera daleoides</i>		<i>Zygophyllum flexuosum</i>	
<i>Manulea nervosa</i>			

This vegetation is the habitat for the rare and endemic Red Lark, which is unique to this area. The farmers in the area regard this vegetation as most valuable grazing for livestock.

C. Aggeneys Gravel Vygieveld

On this particular study site, Aggeneys Gravel Vygieveld is quite rare, with a very limited distribution (see Figure 6). However, large patches occur, especially on the southern parts of the farm Wortel.

A few small patches gravel plains occur on the apron of some of the mountains. The floristically extremely rich Aggeneys Gravel Vygieveld which is restricted to gravel patches (Image 7). Having a high proportion of sand on the surface, the vegetation shows similarity to the grassland on flat sandy plains with *Stipagrostis obtusa* and *Stipagrostis ciliata* the dominant species, while the shrub *Zygophyllum decumbens* is often dominant. However, the gravel forms the habitat for some smaller, rare succulent plant species, such as *Lithops julii* subsp *fulleri*, *Titanopsis hugo-schlechteri* and *Crassula mesembrianthemopsis*.

This plant community with its specific floristic composition is regarded as highly sensitive. This plant community is regarded as Aggeneys Gravel Vygieveld, which is regarded as a rare and threatened ecosystem.

D. Sandy Granite Vygieveld

A relatively small area on the farm Rozybosch and also the northern parts of Wortel is covered with loose sand and quartz gravel, grading into Aggeneys Gravel Vygieveld. Vygies are often dominant on these areas, with scattered shrubby bushes also being present. Species typical of sand and rocky sheet areas occur in this community, forming a heterogeneous mix of species (Image 8).

Trees, Shrubs and Dwarf shrubs

<i>Acacia mellifera</i>		<i>Pappea capensis</i>	
<i>Boscia albitrunca</i>	P	<i>Pentzia spinescens</i>	
<i>Ehretia rigida</i>		<i>Plinthus karroicus</i>	
<i>Eriocephalus spinescens</i>		<i>Pteronia mucronata</i>	
<i>Kleinia longiflora</i>		<i>Rhigozum trichotomum</i>	D
<i>Lycium bosciifolium</i>		<i>Rosenia humilis</i>	
<i>Lycium cinereum</i>	d	<i>Salsola aphylla</i>	d
		<i>Salsola tuberculata</i>	
<i>Maerua gilgii</i>			

Grasses

<i>Aristida adscensionis</i>		<i>Sporobolus nervosus</i>	
<i>Aristida congesta</i>		<i>Stipagrostis brevifolia</i>	d
<i>Cenchrus ciliaris</i>		<i>Stipagrostis ciliata</i>	D
<i>Enneapogon desvauxii</i>		<i>Stipagrostis obtusa</i>	D
<i>Enneapogon scaber</i>		<i>Stipagrostis uniplumis</i>	
<i>Eragrostis nindensis</i>		<i>Tragus berteronianus</i>	
<i>Schmidtia kalahariensis</i>	d		

Forbs

<i>Acanthopsis hoffmannseggiana</i>		<i>Dicoma capensis</i>	
<i>Aizoon canariense</i>		<i>Foveolina albida</i>	
<i>Amaranthus praetermissus</i>		<i>Galenia africana</i>	
<i>Aptosimum spinescens</i>		<i>Hermannia spinosa</i>	
<i>Arctotis leiocarpa</i>		<i>Hirpicium echinus</i>	
<i>Avonia albissima</i>		<i>Hoodia gordonii</i>	RD
<i>Barleria rigida</i>		<i>Limeum aethiopicum</i>	
<i>Berkheya annectens</i>		<i>Lophiocarpus polystachyus</i>	
<i>Berkheya canescens</i>		<i>Mesembryanthemum guerichianum</i>	
<i>Blepharis mitrata</i>		<i>Monechma incanum</i>	
<i>Brownanthus pseudoschlichtianus</i>		<i>Monsonia parviflora</i>	
<i>Cotula microglossa</i>		<i>Peliostomum leucorrhizum</i>	

Polygala seminuda
Psilocaulon subnodosum
Ruchia barnardii
Senecio niveus

Solanum capense
Tephrosia dregeana
Trianthema parvifolia
Tribulus terrestris

E. Eastern Gariiep Rocky Desert

Mountains and hills occur widespread on the farm Wortel, especially the southern parts. These mountains and hills are covered with sparse shrubby vegetation (Image 9), considered as a rare vegetation type. These are described as a group of individual mountains and hills towering over the surrounding flat plains in northern Bushmanland in the Aggeneys and Pofadder regions. These mountains are located north of the Bushmanland Inselberg Shrubland and the vegetation is similar but drier and transitional areas are often found.

This vegetation type as a whole is considered to be rare and highly sensitive, due to its specific plant species composition.

The vegetation on the slopes and crests of the mountains and hills is a shrubland with both succulent and non-succulent bushes and a sparse grassy layer. The geology is varied and complex with metamorphic rocks consisting of clastic sediments, volcanic and intrusive rocks of Mokolian age. The land type is mostly Ib and Ic, indicating the shallow rocky or gravelly soils.

The most prominent or general species found in this vegetation include the following:

Trees, Shrubs and Dwarf shrubs and Succulent Shrubs

<i>Adromischus diabolicus</i>		<i>Nymanina capensis</i>	
<i>Aloe dichotoma</i>	PRD	<i>Othonna euphorbioides</i>	
<i>Boscia albitrunca</i>	P	<i>Ozoroa dispar</i>	
<i>Boscia foetida</i>		<i>Pachypodium namaquanum</i>	p
<i>Cyphostemma juttae</i>		<i>Pappea capensis</i>	
<i>Ehretia rigida</i>		<i>Petalidium setosum</i>	
<i>Erioccephalus pauperrimus</i>		<i>Pteronia unguiculata</i>	
<i>Euphorbia avasmontana</i>		<i>Rhigozum trichotomum</i>	D
<i>Euphorbia gariiepina</i>		<i>Salsola aphylla</i>	d
<i>Euphorbia gregaria</i>		<i>Sarcostemma viminalis</i>	
<i>Euphorbia mauritanica</i>		<i>Searsia undulata</i>	
<i>Ficus cordata</i>		<i>Tetragonia reduplicata</i>	
<i>Ficus ilicina</i>		<i>Tylecodon rubrovenosus</i>	
<i>Kleinia longiflora</i>		<i>Tylecodon sulphureus</i>	
<i>Lycium cinereum</i>	d		

Grasses

<i>Aristida adscensionis</i>	
<i>Aristida congesta</i>	
<i>Digitaria eriantha</i>	
<i>Enneapogon desvauxii</i>	
<i>Eragrostis annulata</i>	
<i>Eragrostis nindensis</i>	
<i>Oropetium capense</i>	
<i>Stipagrostis obtusa</i>	D

Forbs

Acanthopsis hoffmannseggiana
Anacampseros karasmontana
Aptosimum spinescens
Blepharis mitrata
Blepharis pruinosa
Ceraria namaquensis
Chascanum garipense
Conophytum fulleri
Conophytum sp
Cotyledon orbiculata
Crassula sericea
Dicoma capensis
Cucumis rigidus
Drosanthemum godmaniae
Dyerophytum africanum
Galenia fruticosa
Helichrysum tomentosum
Hermannia stricta
Hermbsaedia glauca
Hibiscus elliottiae
Hirpicium alienatum
Hoodia gordonii
Monechma spartioides
Osteospermum armatum
Pelargonium spinosum
Rogeria longiflora
Ruschia robusta

Due to the cooler south-facing slopes and availability of moisture in winter, this vegetation is regarded by Desmet (2010) as a remarkable outlier of Succulent Karoo vegetation and shows some similarity to the Namaqualand Klipkoppe Shrubland. It is therefore considered as being floristically very important and is regarded as highly sensitive.

The scree habitats with the rocks and gravel (Image 9) form an exceptional habitat for a large number of plant species, including rare and protected species, notably succulent plants. This area is considered to have a high sensitivity.

The steep south-facing slopes are covered with small trees and shrubs. These are special habitats for flora and fauna (reptiles and birds), but due to inaccessibility, and due to the fact that there will not be any development in or even close to these habitats, they were not sampled in detail and only general observations were made.

In spite of the low floristic richness of this dry habitat, it is still considered as a rare habitat and therefore as sensitive.

F. Eastern Gariep Plains Desert

This vegetation unit comprises of sheet wash plains that occur between the mountains of the Orange River. Grassland is dominated by *Stipagrostis* species. Drought resistant dwarf shrubs are often present, while annual forbs flower abundantly in years with good rainfall (Image10).

The most prominent and general species include:

Trees, Shrubs and Dwarf shrubs

<i>Eriocephalus spinescens</i>		<i>Plinthus karroicus</i>	
<i>Euphorbia gregaria</i>		<i>Pteronia mucronata</i>	
<i>Kleinia longiflora</i>		<i>Rhigozum trichotomum</i>	D
<i>Lycium bosciifolium</i>		<i>Rosenia humilis</i>	
<i>Lycium cinereum</i>	d	<i>Salsola aphylla</i>	d
<i>Parkinsonia africana</i>		<i>Sysindite spartea</i>	
<i>Pentzia spinescens</i>		<i>Zygophyllum microcarpum</i>	

Grasses

<i>Aristida adscensionis</i>		<i>Sporobolus nervosus</i>	
<i>Aristida congesta</i>		<i>Stipagrostis brevifolia</i>	d
<i>Enneapogon desvauxii</i>		<i>Stipagrostis ciliata</i>	D
<i>Enneapogon scaber</i>		<i>Stipagrostis obtusa</i>	D
<i>Eragrostis nindensis</i>		<i>Stipagrostis uniplumis</i>	
<i>Schmidtia kalahariensis</i>	d	<i>Tragus berteronianus</i>	

Forbs

<i>Acanthopsis hoffmannseggiana</i>	
<i>Aizoon canariense</i>	
<i>Amaranthus praetermissus</i>	
<i>Aptosimum spinescens</i>	
<i>Arctotis leiocarpa</i>	
<i>Avonia albissima</i>	
<i>Barleria rigida</i>	
<i>Berkheya annectens</i>	
<i>Berkheya canescens</i>	
<i>Blepharis mitrata</i>	
<i>Cotula microglossa</i>	
<i>Dicoma capensis</i>	
<i>Foveolina albida</i>	
<i>Galenia africana</i>	
<i>Hermannia spinosa</i>	
<i>Hirpicium echinus</i>	
<i>Hoodia gordonii</i>	RD
<i>Limeum aethiopicum</i>	
<i>Lophiocarpus polystachyus</i>	
<i>Mesembryanthemum guerichianum</i>	
<i>Monechma incanum</i>	
<i>Monsonia parviflora</i>	
<i>Peliostomum leucorrhizum</i>	
<i>Polygala seminuda</i>	
<i>Senecio niveus</i>	
<i>Solanum capense</i>	
<i>Tephrosia dregeana</i>	
<i>Trianthema parvifolia</i>	
<i>Tribulus terrestris</i>	

G. Dry Drainage Lines (Spruits)

The drainage lines within the plains of the study area are quite rare. The plains in the northern parts of the farm Wortel, as well as the plains crossing the eastern part of the farm Rozybosch, have a dense network of small spruits draining northwards. These spruits are regarded as washes, as water will only flow after good rains, wheterafter they will dry up again. These washes are wide and sandy, and blend into the landscape, merging with the adjacent grassland vegetation. On Rozybosch, the spruits form a dense gully-like network on the granite / gneiss sheets. The vegetation is often somewhat heterogeneous and with denser shrubs (Image 11) or weeds, due to the disturbance of the periodic flooding.

Drainage lines are of conservation concern and regarded as sensitive ecosystems, due to the ecosystem processes linked to the provision and transport of water in the landscape.

Species of Conservation Concern / Red Data Species

According to Marsh *et al.* (2009) a total of 854 plant species have been recorded in the Khai Ma Local Municipality area. As many as 41 species are known to be endemic to the area and a further 20 are potentially endemic. Many of the most special plants can be found within the fine grained quartz patches – an area that typically contains a number of special dwarf succulents (Marsh *et al.* 2009).

The Bushmanland Inselbergs are a remarkable feature of this landscape. In total, this 31,400-hectare area includes 429 plant species, of which 67 are found only in this hotspot and 87 are Red List species (Marsh *et al.* 2009).

A Threatened Species and Species of Conservation Concern list was obtained from the POSA database on the SANBI website. Threatened species are those that are facing high risk of extinction, indicated by the categories Critically Endangered, Endangered and Vulnerable. Species of Conservation Concern include the Threatened Species, but additionally have the categories Near Threatened, Data Deficient, Critically Rare, Rare and Declining. This is in accordance with the new Red List for South African Plants (Raimondo *et al.* 2009).

Table 4: Species of Conservation Concern (SANBI website, Quarter degree square Grid 2918BB)

Family	Species	Status	Endemic
Amaryllidaceae	<i>Brunsvigia herrei</i> F.M.Leight. ex W.F.Barker	VU	No
Mesembryanthemaceae	<i>Lithops olivacea</i> L.Bolus	VU	Yes
Mesembryanthemaceae	<i>Conophytum limpidum</i> S.A.Hammer	NT	Yes
Apocynaceae	<i>Hoodia gordonii</i> (Masson) Sweet ex Decne.	DDD	No
Amaryllidaceae	<i>Brunsvigia namaquana</i> D.& U.Müll.-Doblies	DDT	No
Mesembryanthemaceae	<i>Drosanthemum godmaniae</i> L.Bolus	DDT	Yes
Mesembryanthemaceae	<i>Trichodiadema obliquum</i> L.Bolus	DDT	Yes
Crassulaceae	<i>Adromischus diabolicus</i> Toelken	Rare	Yes
Crassulaceae	<i>Crassula exilis</i> Harv. subsp. <i>exilis</i>	Rare	Yes
Eriospermaceae	<i>Eriospermum pusillum</i> P.L.Perry	Rare	Yes
Hyacinthaceae	<i>Lachenalia polypodantha</i> Schltr. ex W.F.Barker	Rare	Yes
Mesembryanthemaceae	<i>Cephalophyllum staminodosum</i> L.Bolus	Rare	Yes
Fabaceae	<i>Acacia erioloba</i> E.Mey.	Declining	No

In addition to the list above, *Aloe dichotoma* Masson (Vu) are also found within the area.

The majority of the threatened species and species of conservation concern may potentially occur on the rocky inselbergs and/or quartz plains.

The only protected tree which may occur within the area is *Acacia erioloba* (Camel Thorn). This tree may be present within the prospecting area on the sandy plains, but has not been observed during the site investigation. A further protected species is the halfmens *Pachypodium namaquanum*. The majority of succulent plants are classified as protected plant species.

It can be concluded that although no statutory conservation area exists within the distribution range of the identified vegetation type, very little of the area has been transformed. A local exception is the mine area close to Aggeneys, where mining infrastructure and mine dumps, and also residential areas, transformed some areas. The proposed prospecting area is situated in an area of biodiversity importance. The most important areas are the Inselbergs, including their quartz gravel foot slopes. The dry grassy plains are of relatively less biodiversity importance.

Although the proposed prospecting campaign will not result in a progressive loss of ecological sensitive and important habitat units or ecosystem functioning, the areas identified as being of high ecological sensitivity must be avoided and the proposed activities must be in accordance with the conservation policies of the relevant authorities.

1.1.7.7 Fauna

A. Mammals

The farms under application comprise largely of natural habitats, subject to relatively low stocking levels of livestock (sheep, goats and cattle) with the most disturbed areas occurring around farm houses and outbuildings, water points and access tracks.

The local occurrences of mammals are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of mammal species by evaluating the habitat types within the context of global distribution ranges.

From a mammal habitat perspective, two of the four major habitats identified above are very prominent on the study site, namely terrestrial and rupicolous (rock-dwelling) habitat. Very little arboreal and wetland-associated habitat occurs on the study site. Although not obvious in dry conditions, during periods of exceptional rainfall there are watercourses that flow, supporting a range of unusual biodiversity. Arboreal habitat is almost non-existent on the study site. A few *Acacia* species and other small trees and bushes occur scattered in the dunes. A few Quiver trees (*Aloe dichotoma*) occur on some of the mountain slopes.

Fifty six mammal species are expected to occur on the study site (Table 5). It should be noted that potential occurrences is interpreted as to be possible over a period of time as result of expansion and contractions of population densities and ranges which stimulate migration. All feral mammal species expected to occur on the study site (e.g. house mice, house rats, dogs and cats) were omitted from the assessment since these species normally associate with human settlements.

Mammals reliant on wetland and arboreal habitats were a priori omitted from the list of occurrences since these habitat-types are absent from the study site. As such a species richness of 56 species in an area with average habitat diversity and a low carrying capacity is high.

Table 5: Mammal diversity. The species deduced to occupy the site (Systematics and taxonomy as proposed by Bronner et.al [2003] and Skinner and Chimimba [2005])

	SCIENTIFIC NAME	ENGLISH NAME
*	<i>Macroscelides proboscideus</i>	Round-eared elephant shrew
√	<i>Elephantulus rupestris</i>	Western rock elephant shrew
√	<i>Orycteropus afer</i>	Aardvark
√	<i>Procavia capensis</i>	Rock dassie
√	<i>Lepus capensis</i>	Cape hare
√	<i>Lepus saxatilis</i>	Scrub hare
√	<i>Pronolagus rupestris</i>	Smith's red rock rabbit
√	<i>Hystrix africaeaustralis</i>	Cape porcupine

√	<i>Petromus typicus</i>	Dassie rat
√	<i>Pedetes capensis</i>	Springhare
√	<i>Xerus inaurus</i>	South African ground squirrel
?	<i>Graphiurus ocellatus</i>	Spectacled dormouse
*	<i>Rhabdomys pumilio</i>	Four-striped grass mouse
*	<i>Mus minutoides</i>	Pygmy mouse
*	<i>Aethomys namaquensis</i>	Namaqua rock mouse
√	<i>Parotomys brantsii</i>	Brant's whistling rat
√	<i>Parotomys littledalei</i>	Littledale's whistling rat
*	<i>Desmodillus auricularis</i>	Cape short-tailed gerbil
*	<i>Gerbillurus paeba</i>	Hairy-footed gerbil
*	<i>Gerbillurus vallinus</i>	Brush-tailed hairy-footed gerbil
DD*	<i>Gerbilliscus leucogaster</i>	Bushveld gerbil
*	<i>Gerbilliscus brantsii</i>	Highveld gerbil
?	<i>Saccostomus campestris</i>	Pouched mouse
*	<i>Malacothrix typicalis</i>	Gerbil mouse
*	<i>Petromyscus collinus</i>	Pygmy rock mouse
?	<i>Papio hamadryas</i>	Chacma baboon
DD*	<i>Crocidura cyanea</i>	Reddish-grey musk shrew
?	<i>Sauromys petrophilus</i>	Flat-headed free-tailed bat
*	<i>Tadarida aegyptiaca</i>	Egyptian free-tailed bat
?	<i>Cistugo seabrai</i>	Angolan hairy bat
*	<i>Neoromicia capensis</i>	Cape serotine bat
?	<i>Eptesicus hottentotus</i>	Long-tailed serotine bat
?	<i>Nycteris thebaica</i>	Egyptian slit-faced bat
?	<i>Rhinolophus fumigatus</i>	Rüppel's horseshoe bat
NT?	<i>Rhinolophus clivus</i>	Geoffroy's horseshoe bat
NT?	<i>Rhinolophus darlingi</i>	Darling's horseshoe bat
?	<i>Rhinolophus capensis</i>	Cape horseshoe bat
?	<i>Rhinolophus denti</i>	Dent's horseshoe bat
√	<i>Proteles cristatus</i>	Aardwolf
√	<i>Caracal caracal</i>	Caracal
√	<i>Felis silvestris</i>	African wild cat
?	<i>Felis nigripes</i>	Black-footed cat
*	<i>Genetta genetta</i>	Small-spotted genet
*	<i>Suricata suricatta</i>	Suricate
√	<i>Cynictis penicillata</i>	Yellow mongoose
?	<i>Galerella sanguinea</i>	Slender mongoose
?	<i>Galerella pulverulenta</i>	Cape grey mongoose
√	<i>Otocyon megalotis</i>	Bat-eared fox
√	<i>Vulpes chama</i>	Cape fox
√	<i>Canis mesomelas</i>	Black-backed jackal
NT?	<i>Mellivora capensis</i>	Honey badger
*	<i>Ictonyx striatus</i>	Striped polecat
√	<i>Oryx gazella</i>	Gemsbok
√	<i>Antidorcas marsupialis</i>	Springbok
	<i>Raphicerus campestris</i>	Steenbok
√	<i>Oreotragus oreotragus</i>	Klipspringer

√ *Definitely present or have a high probability to occur;*

* *Medium probability to occur based on ecological and distributional parameters;*

? *Low probability to occur based on ecological and distributional parameters.*

Red Data species rankings as defined in Friedmann and Daly's S.A. Red Data Book / IUCN (World Conservation Union) (2004) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, LR/cd = Lower risk conservation dependent, LR/nt = Lower Risk near threatened, DD = Data Deficient. All other species are deemed of Least Concern.

All Red Data species listed in Table 5 as Critically Endangered, Rare, Near Threatened or Data Deficient are discerning species and became endangered as result of the deterioration of their preferred habitats. No other Red Data or sensitive species are deemed present on the site, since the site falls outside the distributional ranges of some species, or does not offer suitable habitat(s).

Four pertinent matters emerge from the list of mammals compiled during the site visit and the subsequent desktop study:

- (a) the species assemblage is typical of a western semi-arid region (particularly species such as the elephants shrew species, the ground squirrel, the spectacled dormouse, the various gerbil species, the dassie rat, whistling rats, the black-footed cat, the bat-eared fox, the Cape fox.);
- (b) the species richness of 56 is typical of an extensive area such as the property (5000 ha) and of adjoining areas, with a near-natural degree of connectivity;
- (c) land-use practices and civilization pressures are geared to low-key grazing with a focus on concomitant floral conservation to benefit year-round grazing, which are conducive to species richness; and
- (d) field observations suggested that population levels were low during the site visit. Population fluctuations are not uncommon, and often have a domino effect (for instance when prey population densities decrease in numbers, this will have an adverse effect on carnivore and raptor numbers).

The rest of the species richness is made up from common and robust mammals with wide distributional ranges such as aardvarks, springhares, four-striped grass mouse, porcupines, the caracal, the genet, the two mongoose species, the black-backed jackal etc.

The role of insectivorous bats in an ecosystem is often under-estimated, whereas their susceptibility to reigning environmental conditions is under-appreciated. Bats are sensitive to adverse daytime environmental conditions and predation, and suitable daytime roosting sites are of cardinal importance. Especially the mountains have many boulders and rock faces forming many overhangs and deep crevices suitable for daytime roosts.

The proposed drilling campaign is temporary in nature and will result in the disturbance of relatively small surface areas and disturbed areas will be rehabilitated. The proposed prospecting activities will therefore not result in a progressive loss of ecological sensitive and important habitat units, ecosystem function e.g. reduction in water quality, loss of faunal habitat, and of loss/displacement of threatened or protected fauna. The project will therefore not affect mammals which may occur on site in a significant manner.

Taking cognisance of the above, the main conservation objectives for mammals on the site are to avoid the mountains and their gravel skirts and the drainage lines, including the untransformed adjacent grassy plains.

C. Herpetofauna

From a herpetological habitat perspective, the identified terrestrial and rupicolous (rock-dwelling) habitats are of significance. Man-made rupicolous habitat exists in the form of homesteads and its surrounding outbuildings, built dams and worker accommodation. These man-made habitats are often islands in the sea of terrestrial habitat and provides excellent artificial habitat for many rupicolous reptile species. In addition, connectivity across the area is fair and real opportunities for migration exist.

The Northern Cape is renowned for its biodiversity and the herpetofauna is no exception to the rule. It is especially true for reptiles in general and lizards in particular. Based on the habitat available on site, a variety of reptile and some amphibian species are expected to occupy the prospecting area. Very few trees occur on the study site, which provided habitat for arboreal (tree-living) herpetofauna. As a result arboreal species like the Kalahari tree skink are excluded from the species list (Table 6).

Table 6: Reptile and Amphibian species diversity deduced to be present on site Systematic arrangement and nomenclature according to Branch (1998), Alexander and Marais (2007), Minter, et.al (2004) & Du Preez and Carruthers (2009)

	SCIENTIFIC NAME	ENGLISH NAME
	CLASS: REPTILIA	REPTILES
	Order: TESTUDINES	TORTOISES & TERRAPINS
	Family: Testudinidae	Tortoises
√	<i>Psammobates tentorius verraxii</i>	Karoo Tent Tortoise
	Order: SQUAMATA	SCALE-BEARING REPTILES
	Suborder: LACERTILIA	LIZARDS
	Family: Gekkonidae	Geckos
√	<i>Chondrodactylus angulifer</i>	Giant Ground Gecko
*	<i>Goggia lineate</i>	Striped Dwarf Leaf-toed Gecko
?	<i>Goggia rupicola</i>	Namaqualand Dwarf Leaf-toed Gecko
?	<i>Lygodactylus bradfieldi</i>	Bradfield's Dwarf Gecko
√	<i>Chondrodactylus bibronii</i>	Bibron's Tubercled or Thick-toed Gecko
?	<i>Pachydactylus labialis</i>	Western Cape Thick-toed or Western Cape Gecko
?	<i>Pachydactylus capensis</i>	Cape Thick-toed or Cape Gecko
√	<i>Pachydactylus namaquensis</i>	Marico Thick-toed Gecko
?	<i>Pachydactylus namaquensis</i>	Namaqua Thick-toed Gecko
?	<i>Pachydactylus rugosus</i>	Rough Thick-toed Gecko
√	<i>Ptenopus garrulus</i>	Barking Gecko
	Family: Agamidae	Agamas
?	<i>Agama aculeata</i>	Ground Agama
√	<i>Agama anchietae</i>	Anchieta's Agama
√	<i>Agama atra</i>	Southern Rock Agama
	Family: Chamaeleonidae	Chameleons
√	<i>Chamaeleo namaquensis</i>	Namaqua Chameleon
	Family: Scincidae	Skinks
√	<i>Acontias lineatus</i>	Striped Legless Skink
?	<i>Acontias gracilicauda namaquensis</i>	Thin-tailed Legless Skink
√	<i>Trachylepis capensis</i>	Cape Skink
√	<i>Trachylepis occidentalis</i>	Western Three-striped Skink
√	<i>Trachylepis sulcata</i>	Western Rock Skink
	Family: Lacertidae	Old World Lizards or Lacertids
√	<i>Meroles suborbitalis</i>	Spotted Desert Lizard
?	<i>Pedioplanis laticeps</i>	Cape Sand Lizard
√	<i>Pedioplanis lineocellata</i>	Spotted Sand Lizard
√	<i>Pedioplanis namaquensis</i>	Namaqua Sand Lizard
*	<i>Pedioplanis inornata</i>	Plain Sand Lizard
*	<i>Nucras tessellata</i>	Western Sandveld Lizard
	Family: Gerrhosauridae	Plated Lizards
?	<i>Cordylus subtessellatus</i>	Dwarf Plated lizard
?Vu	<i>Gerhosaorus typicus</i>	Namaqua Plated Lizard
	Family: Cordyidae	
*	<i>Cordylus polyzonus</i>	Karoo Girdled Lizard
?	<i>Platysaurus broadleyi</i>	Augrabies or Broadley's Flat Lizard
	Family: Varanidae	Monitors
√	<i>Varanus albigularis</i>	Rock Monitor
	Suborder: SERPENTES	SNAKES
	Family: Typhlopidae	Blind Snakes
*	<i>Rhinotyphlops lalandei</i>	Delalande's Beaked Blind Snake
*	<i>Rhinotyphlops schinzi</i>	Schinzi's Beaked Blind Snake
	Family: Leptotyphlopidae	Thread Snakes
*	<i>Leptotyphlops occidentalis</i>	Namaqua Worm or Western Thread Snake
	Family: Colubridae	Typical Snakes
√	<i>Lamprophis capensis</i>	Brown House Snake
?	<i>Lamprophis guttatus</i>	Spotted House Snake
?Vu	<i>Lamprophis fiskii</i>	Fisk's House Snake
√	<i>Pseudaspis cana</i>	Mole Snake
?	<i>Prosymna bivittata</i>	Two-striped Shovel-snout
√	<i>Prosymna frontalis</i>	South-western Shovel-snout

√	<i>Dipsina multimaculata</i>	Dwarf Beaked Snake
√	<i>Psammophis notostictus</i>	Karoo Whip or Sand Snake
√	<i>Psammophis trinasalis</i>	Kalahari Sand Snake
√	<i>Psammophis leightoni namibensis</i>	Namib Sand Snake
?	<i>Psammophis crucifer</i>	Crossed Whip Snake
√	<i>Dasypeltis scabra</i>	Common or Rhombic Egg Eater
√	<i>Telescopus beetzii</i>	Beetz's Tiger Snake
	Family: Elapidae	Cobras, Mambas and Others
√	<i>Aspidelaps lubricus</i>	Coral Shield Cobra
√	<i>Naja nivea</i>	Cape Cobra
√	<i>Naja nigricollis</i>	Black-necked Spitting Cobra
	Family: Viperidae	Adders
√	<i>Bitis caudalis</i>	Horned Adder
√	<i>Bitis arietans</i>	Puff Adder
?	<i>Bitis xeropaga</i>	Desert Mountain Adder
?	<i>Bitis cornuta</i>	Many-horned Adder
	CLASS: AMPHIBIA	AMPHIBIANS
	Order: ANURA	FROGS
	Family: Pipidae	Clawed Frogs
?	<i>Xenopus laevis</i>	Common Platanna
	Family: Bufonidae	Toads
?	<i>Vandijkophrynus garipeensis</i>	Karoo Toad
*	<i>Vandijkophrynus robinsoni</i>	Paradise Toad
	Family: Microhylidae	Rubber Frogs
?	<i>Phrynomantis annectens</i>	Marled Rubber Frog
	Family: Brevceptidae	Rain Frogs
?	<i>Breviceps namaquensis</i>	Namaqua Rain Frog
	Family: Pyxicephalidae	
?	<i>Amietia fuscigula</i>	Cape River Frog
* Vu	<i>Strongylopus springbokensis</i>	Namaqua Stream Frog
?	<i>Cocosternum boettgeri</i>	Boettger's Caco or Common Caco
*	<i>Cocosternum namaquense</i>	Namaqua Caco
*	<i>Tomopterna delalandii</i>	Cape Sand Frog
?	<i>Tomopterna tandyi</i>	Tandy's Sand Frog

√ Definitely there or have a high probability of occurring;

* Medium probability of occurring based on ecological and distributional parameters;

? Low probability of occurring based on ecological and distributional parameters.

Red Data species rankings as defined in Branch, 'The Conservation Status of South Africa's threatened Reptiles': 89 – 103. In: G.H.Verdoorn & J. le Roux (editors), 'The State of Southern Africa's Species (2002) and Minter, *et. al*, Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland (2004) are indicated in the first column: CR= Critically Endangered, En = Endangered, Vu = Vulnerable, NT = Near Threatened, DD = Data Deficient. All other species are deemed of Least Concern.

Red Data Listed Reptiles

The study site area falls outside the natural range of the speckled padloper, Namaqua day Gecko, Lawrence's girdled lizard, Armadillo girdled lizard, Lomi's blind legless skink, Namaqua dwarf adder and the Southern African python.

The Namaqua plated lizard inhabits dry sandy areas and rocky hillsides (McLachlan 1988), which is abundantly present on the study site. This species has been recorded from Springbok (McLachlan 1988). Although the possibility is very small that this species may occur on the study site, it may potentially be present.

Very few Fisk's house snake specimens are ever collected and little is known of its biology. There is a specimen collected from Steinkopf in the Ditsong National Museum of Natural History (Transvaal Museum) (Broadley 1990). It is very difficult to confirm whether this cryptic snake is present on any study site, but it is highly unlikely that it occurs on this particular study site.

Red Data Listed Amphibians

The study site falls outside the natural range of giant bullfrogs, desert rain frog and the Karoo caco. It is unlikely that these species will occur on the prospecting area.

The Namaqua stream frog occurs in areas which receive annual rainfall of < 60mm. In this arid environment, these frogs are restricted to the proximity of springs, seps, small permanent and non-permanent streams and artificial impoundments (Channing 2004). The study site contains some of these water sources and the fact that a fragmented sub-population has been recorded at the nearby Gamsberg, makes the occurrence of this frog species on the study site a possibility. As a result, it is important that the drainage lines must be avoided and remain unaffected.

As indicated previously, the proposed drilling campaign is temporary in nature and will result in the disturbance of relatively small surface areas and disturbed areas will be rehabilitated. The proposed prospecting activities will therefore not result in a progressive loss of ecological sensitive and important habitat units, ecosystem function e.g. reduction in water quality, loss of faunal habitat, and of loss/displacement of threatened or protected fauna. The project will therefore not affect reptiles and amphibians which may utilise the site in a significant manner.

Taking cognisance of the above, the main conservation objectives for herpetofauna are to avoid the mountains and their gravel skirts and the drainage lines, including the untransformed adjacent grassy plains.

C. Birds

Based on the habitats identified on site, a wide variety of bird species occurs, and is expected to occur on the prospecting area. Table 7 shows the bird species expected to occur on and around the prospecting area:

Table 7: Birds species expected to occur on and around the site

Common English Name	Scientific Name	Status Codes (see below)		
		RD	S	E
Common Ostrich	<i>Struthio camelus</i>			
Maccoa Duck	<i>Oxyura maccoa</i>			
Egyptian Goose	<i>Alopochen aegyptiaca</i>			
South African Shelduck	<i>Tadorna cana</i>			
Spur-winged Goose	<i>Plectropterus gambensis</i>			
Cape Teal	<i>Anas capensis</i>			
Yellow-billed Duck	<i>Anas undulata</i>			
Cape Shoveler	<i>Anas smithii</i>			
Red-billed Teal	<i>Anas erythrorhyncha</i>			
Southern Pochard	<i>Netta erythrophthalma</i>			
Acacia Pied Barbet	<i>Tricholaema leucomelas</i>			
African Hoopoe	<i>Upupa africana</i>			
Swallow-tailed Bee-eater	<i>Merops hirundineus</i>			
European Bee-eater	<i>Merops apiaster</i>		B/NBM	
White-backed Mousebird	<i>Colius colius</i>			
Red-faced Mousebird	<i>Urocolius indicus</i>			
Burchell's Coucal	<i>Centropus burchellii</i>			
Alpine Swift	<i>Tachymarpis melba</i>		BM	
Common Swift	<i>Apus apus</i>		NBM	
Bradfield's Swift	<i>Apus bradfieldi</i>			
Little Swift	<i>Apus affinis</i>			

White-rumped Swift	<i>Apus caffer</i>		BM	
Barn Owl	<i>Tyto alba</i>			
Cape Eagle-Owl	<i>Bubo capensis</i>			
Spotted Eagle-Owl	<i>Bubo africanus</i>			
Freckled Nightjar	<i>Caprimulgus tristigma</i>			
Rufous-cheeked Nightjar	<i>Caprimulgus rufigena</i>		BM	
Rock Dove	<i>Columba livia</i>			
Speckled Pigeon	<i>Columba guinea</i>			
Laughing Dove	<i>Streptopelia senegalensis</i>			
Cape Turtle-Dove	<i>Streptopelia capicola</i>			
Namaqua Dove	<i>Oena capensis</i>			
Ludwig's Bustard	<i>Neotis ludwigii</i>	Vul		
Kori Bustard	<i>Ardeotis kori</i>	Vul		
Karoo Korhaan	<i>Eupodotis vigorsii</i>			
African Rail	<i>Rallus caerulescens</i>			
Red-knobbed coot	<i>Fulica cristata</i>			
Namaqua Sandgrouse	<i>Pterocles namaqua</i>			
Double-banded Sandgrouse	<i>Pterocles bicinctus</i>			
Marsh Sandpiper	<i>Tringa stagnatilis</i>		NBM	
Common Greenshank	<i>Tringa nebularia</i>		NBM	
Wood Sandpiper	<i>Tringa glareola</i>		NBM	
Common Sandpiper	<i>Actitis hypoleucos</i>		NBM	
Ruddy Turnstone	<i>Arenaria interpres</i>		NBM	
Little Stint	<i>Calidris minuta</i>		NB	
Curlew Sandpiper	<i>Calidris ferruginea</i>		NBM	
Ruff	<i>Philomachus pugnax</i>		NBM	
Spotted Thick-knee	<i>Burhinus capensis</i>			
Black-winged Stilt	<i>Himantopus himantopus</i>			
Pied Avocet	<i>Recurvirostra avosetta</i>			
Common Ringed Plover	<i>Charadrius hiaticula</i>		NBM	
Kittlitz's Plover	<i>Charadrius pecuarius</i>			
Three-banded Plover	<i>Charadrius tricollaris</i>			
Chestnut-banded Plover	<i>Charadrius pallidus</i>	NT		
Blacksmith Lapwing	<i>Vanellus armatus</i>			
Crowned Lapwing	<i>Vanellus coronatus</i>			
Double-banded Courser	<i>Rhinoptilus africanus</i>			
Burchell's Courser	<i>Cursorius rufus</i>			
White-winged Tern	<i>Chlidonias leucopterus</i>		NBM	
Black-shouldered Kite	<i>Elanus caeruleus</i>			
Yellow-billed Kite	<i>Milvus aegyptius</i>			
Black-chested Snake-Eagle	<i>Circaetus pectoralis</i>			
Black Harrier	<i>Circus maurus</i>	NT		(*)
Southern Pale Chanting Goshawk	<i>Melierax canorus</i>			
Gabar Goshawk	<i>Melierax gabar</i>			
Steppe Buzzard	<i>Buteo buteo</i>		NBM	
Jackal Buzzard	<i>Buteo rufofuscus</i>			(*)
Verreaux's Eagle	<i>Aquila verreauxii</i>			

Martial Eagle	<i>Polemaetus bellicosus</i>	Vul		
Secretarybird	<i>Sagittarius serpentarius</i>	Vul		
Pygmy Falcon	<i>Polihierax semitorquatus</i>			
Rock Kestrel	<i>Falco rupicolus</i>			
Greater Kestrel	<i>Falco rupicoloides</i>			
Red-necked Falcon	<i>Falco chicquera</i>			
Lanner Falcon	<i>Falco biarmicus</i>	NT		
Little Grebe	<i>Tachybaptus ruficollis</i>			
Yellow-billed Egret	<i>Egretta intermedia</i>			
Grey Heron	<i>Ardea cinerea</i>			
Black-headed Heron	<i>Ardea melanocephala</i>			
Cattle Egret	<i>Bubulcus ibis</i>			
Little Bittern	<i>Ixobrychus minutus</i>			
Bokmakierie	<i>Telophorus zeylonus</i>			
Pirit Batis	<i>Batis pririt</i>			
Cape Crow	<i>Corvus capensis</i>			
Pied crow	<i>Corvus albus</i>			
Red-backed Shrike	<i>Lanius collurio</i>		NBM	
Lesser Grey Shrike	<i>Lanius minor</i>		NBM	
Common Fiscal	<i>Lanius collaris</i>			
Cape Penduline-Tit	<i>Anthoscopus minutus</i>			
Ashy Tit	<i>Parus cinerascens</i>			
Grey Tit	<i>Parus afer</i>			(*)
Brown-throated Martin	<i>Riparia paludicola</i>			
Barn Swallow	<i>Hirundo rustica</i>		NBM	
White-throated Swallow	<i>Hirundo albigularis</i>		BM	
Greater Striped Swallow	<i>Cecropis cucullata</i>		BM	
Rock Martin	<i>Hirundo fuligula</i>			
Common House-Martin	<i>Delichon urbicum</i>		NBM	
African Red-eyed Bulbul	<i>Pycnonotus nigricans</i>			
Fairy Flycatcher	<i>Stenostira scita</i>			(*)
Yellow-bellied Eremomela	<i>Eremomela icteropygialis</i>			
Karoo Eremomela	<i>Eremomela gregalis</i>			(*)
Lesser Swamp-Warbler	<i>Acrocephalus gracilirostris</i>			
Layard's Tit-Babblers	<i>Sylvia layardi</i>			(*)
Orange River White-eye	<i>Zosterops pallidus</i>			
Grey-backed Cisticola	<i>Cisticola subruficapilla</i>			
Zitting Cisticola	<i>Cisticola juncidis</i>			
Tawny-flanked Prinia	<i>Prinia subflava</i>			
Karoo Prinia	<i>Prinia maculosa</i>			(*)
Namaqua Warbler	<i>Phragmacia substriata</i>			(*)
Rufous-eared Warbler	<i>Malcorus pectoralis</i>			
Cinnamon-breasted Warbler	<i>Euryptila subcinnamomea</i>			(*)
Cape Clapper Lark	<i>Mirafra apiata</i>			(*)
Sabota Lark	<i>Calendulauda sabota</i>			
Fawn-coloured Lark	<i>Calendulauda africanoides</i>			
Red Lark	<i>Calendulauda burra</i>	Vul		*

Karoo Lark	<i>Calendulauda albescens</i>			(*)
Spike-heeled Lark	<i>Chersomanes albofasciata</i>			
Karoo Long-billed Lark	<i>Certhilauda subcoronata</i>			
Black-eared Sparrowlark	<i>Eremopterix australis</i>			(*)
Grey-backed Sparrowlark	<i>Eremopterix verticalis</i>			
Red-capped Lark	<i>Calandrella cinerea</i>			
Stark's Lark	<i>Spizocorys starki</i>			
Pink-billed Lark	<i>Spizocorys conirostris</i>			
Sclater's Lark	<i>Spizocorys sclateri</i>	NT		(*)
Large-billed Lark	<i>Galerida magnirostris</i>			(*)
Short-toed Rock-Thrush	<i>Monticola brevipes</i>			
Karoo Thrush	<i>Turdus smithi</i>			(*)
Chat Flycatcher	<i>Bradornis infuscatus</i>			
Spotted flycatcher	<i>Muscicapa striata</i>		NBM	
Cape Robin-Chat	<i>Cossypha caffra</i>			
Karoo Scrub-Robin	<i>Erythropygia coryphoeus</i>			
Mountain Wheatear	<i>Oenanthe monticola</i>			
Capped Wheatear	<i>Oenanthe pileata</i>			
Sickle-winged Chat	<i>Cercomela sinuata</i>			(*)
Karoo Chat	<i>Cercomela schlegelii</i>			
Tractrac Chat	<i>Cercomela tractrac</i>			
Familiar Chat	<i>Cercomela familiaris</i>			
Ant-eating Chat	<i>Myrmecocichla formicivora</i>			
Pale-winged Starling	<i>Onychognathus nabouroup</i>			
Cape Glossy Starling	<i>Lamprotornis nitens</i>			
Wattled Starling	<i>Creatophora cinerea</i>			
Common Starling	<i>Sturnus vulgaris</i>		I	
Malachite Sunbird	<i>Nectarinia famosa</i>			
Southern Double-collared Sunbird	<i>Cinnyris chalybeus</i>			(*)
Dusky Sunbird	<i>Cinnyris fuscus</i>			
Scaly-feathered Finch	<i>Sporopipes squamifrons</i>			
Sociable Weaver	<i>Philetairus socius</i>			
Southern Masked-Weaver	<i>Ploceus velatus</i>			
Red-billed Quelea	<i>Quelea quelea</i>			
Southern Red Bishop	<i>Euplectes orix</i>			
Red-headed Finch	<i>Amadina erythrocephala</i>			
Common Waxbill	<i>Estrilda astrild</i>			
Pin-tailed Whydah	<i>Vidua macroura</i>			
House Sparrow	<i>Passer domesticus</i>		I	
Cape Sparrow	<i>Passer melanurus</i>			
Southern Grey-headed Sparrow	<i>Passer diffusus</i>			
African Pied Wagtail	<i>Motacilla aguimp</i>			
Cape Wagtail	<i>Motacilla capensis</i>			
African Rock Pipit	<i>Anthus crenatus</i>			(*)?
African Pipit	<i>Anthus cinnamomeus</i>			
Long-billed Pipit	<i>Anthus similis</i>			
Black-headed Canary	<i>Serinus alario</i>			(*)

Black-throated Canary	<i>Crithagra atrogularis</i>			
Yellow Canary	<i>Crithagra flaviventris</i>			
White-throated Canary	<i>Crithagra albogularis</i>			
Lark-like Bunting	<i>Emberiza impetuani</i>			
Cape Bunting	<i>Emberiza capensis</i>			

Red Status	Status in south Africa (S)	Endemism in South Africa (E)
T = Threatened	BM = breeding migrant	Endemism in South Africa (E) (not southern Africa as in field guides)
NT = Near-Threatened	NBM = non-breeding migrant	
Vul = Vulnerable	V = vagrant	* = endemic
E = Endangered	I = introduced	
CE = Critically Endangered	R = rare	(*) = near endemic (i.e. ~70% or more of population in RSA)
RE = Regionally Extinct	PRB = probable rare breeder	B* = breeding endemic
§ = Refer to footnote	RB = rare breeder	B(*) = breeding near endemic
	RV = rare visitor	W* = winter endemic
Red Status is from <i>The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland, Barnes (2001).</i>		

Nine species of international and/or national conservation concern (Red Data species, IUCN/Birdlife International 2011, Barnes 2000), ranging from Near Threatened to Vulnerable, are considered as possible to occur on site. Most of these threatened species fall into a few obvious categories by habitat preference (Table 8) and their likelihood of occurrence on site (Table 9).

Table 8: List of threatened species that will possibly make use of the habitats on and around the site, showing their preferred habitat types. Note that one species may have more than one habitat preference

Threatened Status	Species	Preferred Habitat Type(s)			
		Grassy plains	Red sand/dunes	Bare washes	Rocky mountains & gravel
Near Threatened	Chestnut-banded Plover			X	
	Black Harrier	X	X		
	Lanner Falcon	X	X	X	X
Vulnerable	Sclater's Lark				X
	Ludwig's Bustard	X	X	X	
	Kori Bustard	X	X	X	
	Martial Eagle	X	X	X	
	Secretarybird	X	X	X	
	Red Lark	X	X		
TOTALS	9	7	7	6	2

Table 9: The expected frequency of occurrence of threatened bird species on and around the site

Threatened Status	Species	Probability of occurrence on site			
		Regular resident	Frequent visitor	Erratic visitor	Infrequent vagrant
Near Threatened	Chestnut-banded Plover			X	
	Black Harrier			X	
	Lanner Falcon		X		
	Sclater's Lark			X	
Vulnerable	Ludwig's Bustard	X			
	Kori Bustard			X	
	Martial Eagle		X		
	Secretarybird			X	
	Red Lark	X			
TOTALS	9	2	2	5	0

Based on the analysis above, the most important habitats to conserve for threatened bird species are the grassy plains and the red sand/dunes, with the bare washes also important at the times when they are productive after rains. However, the grassy plains form part of extensive similar habitat in the area, while the red dunes are more restricted but also much more productive, for livestock and birds alike, including the **Red Lark** that is a restricted-range endemic to Bushmanland. The bare washes (for **Chestnut-banded Plover**) and gravel fields (for **Sclater's Lark**) are only really productive after good rains, while the mountains have nest sites for the **Lanner Falcon** when good rains attract large numbers of nomadic insect- and seed-eating birds.

Two Vulnerable species are expected to be regular breeding residents (**Ludwig's Bustard** and **Red Lark**). The Vulnerable **Martial Eagle** and **Secretary Bird**, and the Near Threatened **Lanner Falcon** are expected to be regular visitors to the area, when their prey animals are abundant, but while no sufficiently large trees were seen as likely nest sites for the Eagle or Secretary bird, the large south-facing cliffs could well support nesting ledges for the falcon, as they apparently do for Verreaux's Eagle.

The remaining four threatened species are expected to be erratic visitors when high rainfall creates productive conditions (plant cover, seeds, insects, small vertebrates). Some are resident species in the general area of the Northern Cape whose ephemeral habitats on the property are also only likely to become suitable after good rains, the **Chestnut-banded Plover** visiting and possibly feeding and breeding in/around the more saline pans and **Sclater's Lark** using large grass seeds on the few chalky gravel patches. The **Kori Bustard** generally prefers higher rainfall areas with more ground cover and productivity, so although they do sometimes visit the area it seems unlikely that they breed there. Finally, the Black Harrier is expected only as an erratic, non-breeding winter visitor to the area from the Western Cape, again most likely when good rains have produced abundant small animals.

As indicated previously, the proposed drilling campaign is temporary in nature and will result in the disturbance of relatively small surface areas and disturbed areas will be rehabilitated. The proposed prospecting activities will therefore not result in a progressive loss of ecological sensitive and important habitat units, ecosystem function e.g. reduction in water quality, loss of faunal habitat, and of loss/displacement of threatened or protected fauna. The project will therefore not affect bird species which may utilise the site in a significant manner.

Taking cognisance of the above, the main conservation objectives for birds are to avoid the sand dunes, mountains and their gravel skirts, as well as the drainage lines, including the untransformed adjacent grassy plains.

1.1.7.8 Regional Planning: Critical Biodiversity Areas (CBAs) in the Namakwa District Municipality and the Mining and Biodiversity Guideline

Figure 8, enclosed in Addendum A, shows the CBAs in the Namakwa District Municipality. CBAs are terrestrial (T) and aquatic (A) features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services (Namakwa District

Biodiversity Sector Plan, 2008). The purpose of CBAs is to indicate spatially the location of critical or important areas for biodiversity in the landscape. The legend can be clarified as follows:

CBA 1: Natural landscapes:

- Ecosystems and species fully intact and undisturbed
- These are areas with high irreplaceability or low flexibility in terms of meeting biodiversity pattern targets. If the biodiversity features targeted in these areas are lost then targets will not be met.
- These are landscape that are at or past their limits of acceptable change

CBA 2: Near-natural landscapes:

- Ecosystems and species largely intact and undisturbed
- Areas with intermediate irreplaceability or some flexibility in terms of area required to meet biodiversity targets. There are options for loss of some components of biodiversity in these landscapes without compromising our ability to achieve targets.
- These are landscapes that are approaching but have not passed their limits of acceptable change

Ecological Support Areas (ESA):

Functional landscapes:

- Ecosystems moderately to significantly disturbed, but still able to maintain basic functionality.
- Individual species or other biodiversity indicators may be severely disturbed or reduced.
- These are areas with low irreplaceability with respect to biodiversity pattern targets only. Figure 8 shows that Aggeneys is surrounded by CBAs and ESAs. Within the proposed prospecting area, the Aggeneys Gravel Vygiveld is considered to be CBA1, while the Bushmanland Inselberg Shrubland and the Bushmanland Sandy Grassland are considered to be CBA2. ESA areas are found in the north-eastern part of the site, between mountains (on site) and extensive dunes to the east (outside the site).

The Mining and Biodiversity Guideline (MBG) (2012) describes the principles, tools and information that should inform the consideration of biodiversity in the mining life cycle (reconnaissance to mine closure) to support the sustainable use of the country's mineral resources. The MBG guideline identifies biodiversity priority areas that are important for conserving a representative sample of ecosystems and species, for maintaining ecological processes, or for the provision of ecosystem services.

Figure 9 (Addendum A) shows that:-

- (a) There are no statutory protected conservation areas situated in proximity to the site;
- (b) There is a National Freshwater Ecosystem Priority Area (NFEPA) located south of the site;
- (c) The site contains areas considered as Critical Biodiversity Areas (CBA_T1 & T2) and Ecological Support Areas (ESA_T) (Namakwa District Biodiversity Sector Plan, 2008); and
- (d) The site includes areas of moderate, high and highest biodiversity importance, suggesting a moderate to highest risk to potential future mining in terms of the MBG (2012).

Although the site is situated within an area characterised by areas classified as of moderate to highest biodiversity importance, the nature and scale of the proposed prospecting activities is such that it can not be considered as a threat to biodiversity. Proper planning and the implementation of management measures, though the implementation of this EMP will prevent and alleviate potential impacts on biodiversity. However, buffer areas around drainage areas must be observed. No prospecting may occur within 30 m from identified drainage lines.

1.1.7.9 Noise

There are currently no sources of noise pollution present on site and the ambient noise levels are within the project area are anticipated to be representative of a rural farming district. The only noise sensitive sites / areas are the interspaced farmhouses and associated structures, where

they are situated in proximity to proposed drill sites. Due to the nature of the proposed prospecting activities, it is not anticipated that the project will introduce excessive noise levels.

1.1.7.10 Air Quality

The site is situated primarily in a livestock farming area, with no ploughing being undertaken. There are currently no sources of air pollution present on site and the ambient air quality is generally considered as good. It is not anticipated that the proposed prospecting activities will introduce excessive pollution, in the form of dust, to the surrounding area. The main potential sources of air pollution in the area are expected to include dust generated on gravel roads, domestic fuel burning and veld fires. Neighbouring farmsteads (in proximity to proposed drill holes) are considered sensitive air quality receptors.

1.1.7.11 Cultural Heritage Resources

Cultural Resources are all non-physical and physical man-made occurrences, as well as natural occurrences associated with human activity. These include all sites, structure and artefacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development. Graves and cemeteries are included.

From the site visit, it is evident that some of the residential structures and outbuildings may have potential heritage value, in that they may be older than 60 years. The former residence (now used as a storage facility) on the farm Rozynbosch dates from 1911. There are small family graveyards located close to the homesteads on Rozynbosch and the Remainder of the Farm Wortel. Apart from the latter, the affected landowners indicated that they are not aware of the presence of any features which may require protection in terms of the relevant legislation. Nevertheless, this does not mean that heritage sites do not occur on the site. In fact, as it is known that the San and the Nama roamed in the Northern Cape for many years, the chances of finding artefacts and sites linked thereto is reasonably high. It is almost impossible to predict where open air sites may be found, but these would usually be in walking distance of a water source. Closed sites are normally found at geographical features such as overhangs, caves and rock shelters. The diagrams of the farms indicate hills and water sources (albeit seasonal), where such sites may potentially be expected.

All cultural resources older than 60 years are regarded as potential places of cultural and heritage interest. It is suggested that all structures are avoided during prospecting, and that a buffer area of at least 50 m is applied around residences and outbuildings, graves / graveyards, and any other man-made features on the farms.

1.2 The specific environmental features on the site applied for which may require protection, remediation, management or avoidance

Based on the assessment of the environment as presented in Section 1 above, the following environmental features on site require appropriate action to minimise environmental risks.

- (a) Existing residences and outbuildings, family grave yards and built infrastructure

A 100 m buffer is required around residences and water supply infrastructure. No prospecting may occur within buffer areas.
- (b) Ecologically sensitive areas
 - The drainage lines have high ecological importance and conservation value. A buffer zone of 30 from the outer edge of the riparian zone must be applied around these features. No prospecting may occur within the identified buffer zone.
 - Broadly identified ecosystems which require special consideration include the Bushmanland Sandy Grassland, Eastern Gariiep Rocky Desert, Aggeneys Gravel Vygieveld and Sandy Granite Vygieveld areas. Although these areas do not present a fatal flaw in terms of the proposed prospecting activities, prospecting (making drill holes) must be avoided as far as possible in these areas. Where this is impossible, the affected area must be

kept to a minimum. The first phases of prospecting must, as far as possible, occur outside of these areas. The enforcement of a buffer surrounding these areas is not appropriate, because the habitat surrounding these plains is not suitable for the vegetation specific to these areas. ***Pachypodium namaquanum(halfmens)*** occurs within the Eastern Gariep Rocky Desert mapping unit on Portion 1 Wortel 42. Due to the protected status of this plant, this area is considered a no-go area and a buffer area of 100 m is suggested.

- Although not considered as a sensitive vegetation unit, the Bushmanland Sandy Grassland provides important habitat for Red Listed bird species. Although the occurrence of these species within this habitat does not present a fatal flaw in terms of the proposed prospecting activities, drilling in this area must be limited as far as possible.

Where sensitive ecosystems can not be avoided, the management measures as proposed in this EMP must be implemented to ensure that impacts are mitigated and minimised.

1.3 Map showing the spatial locality of all environmental, cultural / heritage and current land use features identified on site

Refer to Addendum A, Figure 7.

1.4 Confirmation that the description of the environment has been compiled with the participation of the community, the landowner and interested and affected parties

Interested and Affected Parties (I&APs), including the landowners, were informed about the proposed prospecting activities by way of site notices and posters, notice in a local newspaper (the Plattenlander), telecommunication, letters (fax, e-mail and post where necessary) and the provision of an Information Document, containing the following:

- A baseline description of the environment;
- A list of pre-identified anticipated impacts which may occur as a result of the proposed prospecting activities.

I&APs have been invited and encouraged to comment on the list of identified potential impacts which may arise as a result of the proposed activities, and to provide input in terms of anticipated additional impacts which they think should be addressed in the environmental impact assessment process and compilation of the Environmental Management Plan (EMP).

The landowners were consulted in person, on 23, 25 and 26 June 14. The landowners participated in the compilation of the description of the environment, by way of structured interview. It was agreed that the application area is located within an arid, water scarce area, and that the land is used for livestock farming (sheep, goats and cattle). Due to the arid nature of the environment, vegetation is sensitive to disturbance and recovers slowly once disturbed, affecting grazing capacity. Therefore, driving in the veld must be avoided as far as possible. It was mentioned that the areas which were previously disturbed by prospecting as undertaken by BMM, have rehabilitated successfully over time, compared to those disturbances caused by other companies.

This EMP will be available to the landowners and other registered I&APs for comment from 1 – 29 August 2014. Final comments and responses to comments will be submitted to the DMR as and when they occur, within the next month.

Supporting information pertaining to stakeholder consultation is provided in Addendum E.

2 REGULATION 52 (2) (b): Assessment of the potential impacts of the proposed prospecting operation on the environment, socio- economic conditions and cultural heritage

2.1 Description of the proposed prospecting operation

The area to be prospected is within ore trucking distance of Black Mountain Mining's existing concentrator plant at Aggeneys. Black Mountain Mining (BMM) at Aggeneys / Gamsberg is currently the only operating mine in the district. The inferred tectono-stratigraphic setting of the prospect area is considered favourable for hosting zinc-copper-lead-silver mineralization similar to that currently being exploited at the Black Mountain Mine.

BMM proposes to prospect for the following minerals on the abovementioned properties:

Ferrous & base metals:

- Copper Ore Cu
- Zinc Ore Zn
- Lead Ore Pb
- Iron Ore Fe
- Manganese Ore Mn
- All associated metals and minerals

Precious metals

- Gold Ore Au
- Silver Ore Ag
- All associated metals and minerals

2.1.1 The main prospecting activities (e.g. access roads, topsoil storage sites and any other basic prospecting design features)

The establishment of a site camp is required. The site camp will typically consist of caravans (one - two), a parking area, an area designated for cooking and a mobile ablution facility. No construction is required for the establishment of the site camp, and the area utilised for a camp site will be approximately 15m x 15m.

Between two and eight persons will be present on site at any given time, and one drill will be operated.

The prospecting programme will require approximately 5000 litres of water per day. Water will be transported to the site with a water car, from the premises of the existing Aggeneys Mine.

Vehicles will use the existing gravel roads and two-track roads transecting the farms as far as possible. Where roads do not exist, the proposed drill sites will be accessed via veld. Generally, vegetation cover is low and it is anticipated that vegetation clearance, in order to access individual drill sites, will not be required. However, there will be a very small number of frequently used tracks created by multiple/repeated use during prospecting. Driving through veld contained in designated sensitive areas must be avoided as far as possible.

The location of the drill sites will be GPS located and pegged. These sites are inspected and photographed prior to any disturbance. There is no need for the removal of topsoil and the construction of drill pads is not necessary. There is therefore also no need for the establishment of topsoil storage areas. The average time spent on drilling a RAB hole is approximately 1 hour, while it may take up to a month to drill a diamond drill hole.

Strong control will be exercised over oil usage. Impervious sheeting (plastic lining) will be laid underneath the rig to catch any spills and the contaminated soil removed to an approved disposal site at the Aggeneys Mine.

The excavation of a sump will not be required. Sludge will be pumped to a tank and removed to an approved disposal site at the Aggeneys Mine.

A diesel bowser will be used for rig refuelling. Spillage will be prevented as far as possible and cleaned up in the event that it occurs. Vehicle maintenance will occur off-site.

It is envisaged that the proposed prospecting will be conducted in nine phases over a period of five years. The proposed prospecting programme is summarised in Table 10. The different phases and timeframes envisaged are dependent on the results obtained during the preceding phases of such prospecting. The proposals set out in this EMP are therefore made on the basis that results obtained during the preceding phases may necessitate reasonable changes and adaptations to such proposals, which will be reported as prescribed.

The proposed prospecting programme is described in the sections below and involves both non-invasive and invasive prospecting methods. Initially, prospecting activities will be non-invasive and restricted to a desktop study which will include a literature survey, plus aerial photograph and satellite image interpretation, ground validation of targets, geophysical surveys, interpretation and modelling of data. Subsequent phases will be of the invasive type, and entails the drilling of boreholes to confirm continuity of mineralisation and potential deposit size.

Table 10: Prospecting Plan and Schedule

Phase	Activity	Skill(s) required	Timeframe	Outcome	Timeframe for outcome	What technical expert will sign off on the outcome?
	(what are the activities that are planned to achieve optimal prospecting)	(refers to the competent personnel that will be employed to achieve the required results)	(in months) for the activity)	(What is the expected deliverable, e.g. Geological report, analytical results, feasibility study, etc.)	(deadline for the expected outcome to be delivered)	(e.g. geologist, mining engineer, surveyor, economist, etc)
1	Non-Invasive Prospecting Desktop Study: Literature Survey / Review	Geologist	Month 1-12	Initial geological targeting report supported by historical records and existing data	Month 12	Geologist
2	Non-Invasive Prospecting Geological Field Mapping	Geologist & field crew	Month 6-12	Detailed geological targeting report accompanied by maps & plans of ground truthing of initial geological targeting.	Month 12	Geologist
3	Non-Invasive Prospecting Semi-regional Ground Geophysical Survey	Geophysicist / Geologist / field crew	Month 12-24	Survey report detailing possible targets for further exploration, report supported by maps, plans & cross sections	Month 24	Geophysicist
4	Invasive Prospecting Exploration Boreholes (10 RAB holes - 150 m each, totaling 1500 m and 2 DD holes 400m each totaling 800 m) RAB holes spaced 40m apart on lines spaced 100m apart. DD holes spaced 200m apart.	Geologist / drill rig team / field crew / laboratory technicians	Month 24-34	Borehole cored data & RAB data: lithological logs, geophysical down hole surveys, assay results for mineralized intercepts.	Month 34	Geologist
5	Non-Invasive Prospecting Compilation, interpretation and modeling of data	Geologist / Geophysicist	Month 34-36	Modelling of data. Interpretation and 3D modeling of potential deposit. Generation & ranking of mineralised targets for further exploration work	Month 36	Geologist
6	Non-Invasive Prospecting Detailed Ground Geophysical Survey on individual positively mineralized targets to define possible extent	Geophysicist / Geologist / field crew	Month 36-42	Survey report detailing individual targets. Plans for drill hole intersections supported by cross sections	Month 42	Geophysicist
7	Invasive Prospecting Boreholes to confirm continuity of mineralization & potential deposit	Geologist / drill rig team / field crew / laboratory technicians	Month 42-48	Widely spaced borehole cored data: lithological logs, geophysical down hole	Month 48	Geologist

	size (5 DD holes - 400 m, totaling 2000 m) Holes spaced 60m apart on lines spaced 200m apart.			surveys, assay results for mineralized intercepts, metallurgical test work Risk assessment study to advance to next phase		
8	Invasive Prospecting Resource definition drilling (10 DD holes - 400 m each totaling 4000 m) Holes spaced 60m apart on lines 100m apart.	Geologist / drill rig team / field crew / laboratory technicians	Month 48-60	Closely spaced borehole cored data: lithological logs, geophysical down hole surveys, assay results for mineralized intercepts, metallurgical test work Resource estimation work producing an Inferred Mineral Resource	Month 60	Geologist
9	Non-Invasive Prospecting Analytical Desktop Pre-Feasibility Study	Economic Geologist / Mining Geologist	Month 54-60	Geological & Pre-feasibility reports, maps & plans Risk assessment study to determine if a full feasibility is warranted	Month 60	Mine Engineer / Economic Geologist (professionally qualified persons)

A. DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES

These activities do not disturb the land where prospecting will take place (e.g. aerial photography, desktop studies, aeromagnetic surveys, etc).

Phase 1: Desktop study

Phase 1 includes the following:

- Compilation of historical exploration data with the aim of developing a working plan of the prospecting area on a suitable scale (1:5,000 or 1:10,000).
- Analysis of existing data and maps to further understand prospecting area structure & geology
- Initial targeting and ranking of prospective areas

Phase 2: Geological field mapping

The field mapping will be focused on potentially prospective areas (Bushmanland Group rocks) to improve understanding of the structure & geology in order to define targets for ground based geophysics as well as to be able to interpret geophysical results. Geological mapping will be on a scale suitable for the observed geological variability and will be conducted by an in-house well-trained and highly experienced geologist.

During the geological field mapping activity soil and litho-sampling along with analysis (XRF and/or assaying) may be conducted to determine prospective horizons.

Phase 3: Semi-Regional Geophysical Survey (ground based)

The primary ground-based geophysical technique that will be employed will be time-domain electromagnetics (TDEM) utilizing a new state-of-the-art SQUID electromagnetic sensor. Existing airborne EM and aeromagnetic coverage will guide the ground follow-up strategy. Additional techniques, such as controlled source audio magnetotellurics (CSAMT) and direct current resistivity / induced polarization, might be employed over prospective targets.

B. DESCRIPTION OF PLANNED INVASIVE ACTIVITIES

These activities result in land disturbances e.g. sampling, drilling, etc.

(a) Drilling

The targeting of all drilling activities will be dependent on the results obtained during the preceding phases of prospecting, namely the geological mapping and geophysical surveying and as such it is currently not possible to include a finalized surface plan showing the intended location, extent and depth of boreholes to be completed.

Diamond drilling will be of the standard BQ or NQ size. Down hole surveys will be done every 50m in each hole. Core will be marked, logged, photographed and sampled according to the standard of the applicant's logging and sampling procedures.

Down the hole geophysical surveying will take place upon completion of the exploratory boreholes along with Ground EM surveys to determine positions of conductors.

Rehabilitation of drill sites will be done in accordance with the provision of this EMP.

Percussion Rotary Air Blast (RAB) or Reverse Circulation (RC) drilling may be carried out for pre-collaring of diamond drill boreholes or for obtaining samples if significant depth of cover is encountered over particular targets.

- (b) **Assaying**
Rock chip / soil samples will be sent to a laboratory of the applicant's choice to be crushed, split, pulverized and assayed. Samples from core will be split using a core cutter before being sent to the laboratory for analysis.
- (c) **Metallurgical Test Work**
Metallurgical test work would start during phase 7 of the prospecting work programme. These tests will be done by and in consultation with a preferred and accredited Laboratory of the applicant's choice.
- (d) **Phase 4: Boreholes**
The initial planned invasive exploration activities will consist of diamond drill boreholes drilled to appropriate depths to target any anomalies identified during Phases 2 & 3 of the non-invasive portion of the prospecting work plan. The work will consist of:
- Access and drill site preparation
 - Diamond core drilling
 - Sampling and assaying
 - Quality assurance and quality control programs
 - Down hole geophysics
 - Rehabilitation of drill sites
 - Recording & Integration of data
- (e) **Phase 7: Boreholes**
This phase of boreholes would determine the continuity of mineralization & potential deposit size. The work will consist of:
- Access and drill site preparation
 - Widely spaced diamond drilling and analyses to confirm grade / tonnage potential
 - Sampling and assaying
 - Quality assurance and quality control programs
 - Metallurgical test work
 - Rehabilitation of drill sites
 - Recording & Integration of data
- (f) **Phase 8: Boreholes**
This phase of boreholes would provide enough information to be able to calculate an inferred resource. The work would consist of:
- Access and drill site preparation
 - Close spaced infill diamond drilling and analyses to determine actual grade / tonnage
 - Sampling and assaying
 - Quality assurance and quality control programs
 - Metallurgical test work
 - Geotechnical drilling program
 - Rehabilitation of drill sites
 - Recording & Integration of dataC.

DESCRIPTION OF PRE-/FEASIBILITY STUDIES

(a) Phase 5: Compilation, interpretation and modelling of data

This phase will focus on compiling all the data gathered to date along with 3D modelling of any mineralized intersections. Any positively mineralized targets will be ranked. Should Phase 5 confirm mineralization with economic potential then that target will advance to Phase 6.

(b) Phase 9: Desktop Pre-Feasibility Study

This phase is designed to utilize the inferred resource to determine and would include:

- Closely spaced diamond drilling (Phase 8)
- 3D-modelling of the mineralized ore body
- Resource estimation, which will determine whether the resource is feasible for mining.
- A risk assessment to calculate if a full feasibility study is warranted
- Risk assessment photography, desktop studies, aeromagnetic surveys, etc.

2.1.2 Plan of the main activities with dimensions

A standard phased approach to all prospecting activities will be implemented and each prospecting activity will be undertaken on a scheduled timeline. Boreholes will be drilled one at a time, because the exact location of drill holes will be determined as the drilling campaign progresses. Locations are determined based on the results obtained at previous holes. Refer to Figure 7 (Addendum A) for the plan illustrating the proposed preliminary locations of the drill holes during the first phase of drilling (phase four of the prospecting programme, year 3).

Table 11 summarises the proposed drilling activities during invasive prospecting.

Table 11: Proposed prospecting activities and dimensions

Phase	Activity	Amount	Dimensions estimate	Duration
4	Establish site camp	1	15 m x 15 m	10 months
	RAB holes	10	150 m deep 20 cm diameter Drill sites 10 x 10 m each Holes spaced 40 m apart on lines spaced 100m apart.	
	DD holes	2	400 m deep 12.26 cm diameter at the surface Drill site 12 m x 12 m DD holes spaced 200m apart. Total disturbed surface area: 0.1513 ha	
7	DD holes	5	400 m deep 12.26 cm diameter at the surface Drill sites 12 m x 12 m each Holes spaced 60 m apart on lines spaced 200 m apart. Total disturbed surface area: 0.072 ha	6 months
8	DD holes	10	400 m deep 12.26 cm diameter at the surface Drill sites 12 m x 12 m each Holes spaced 60 m apart on lines spaced 100 m apart. Total disturbed surface area: 0.144 ha	6 months
Total		27	Surface area disturbed by drilling: 3448 m² (0.3448 ha) Surface area disturbed by site camp: 15m x 15m = 225 m² (0.0225 ha) Total disturbed area: 3673 m² or 0.3673 ha	22 months

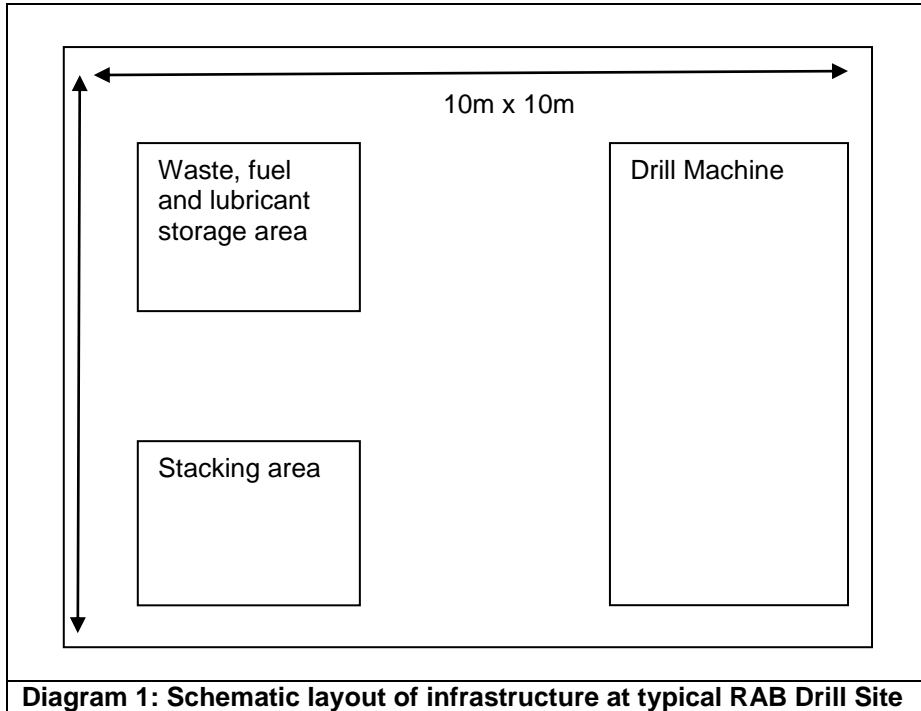


Diagram 1: Schematic layout of infrastructure at typical RAB Drill Site

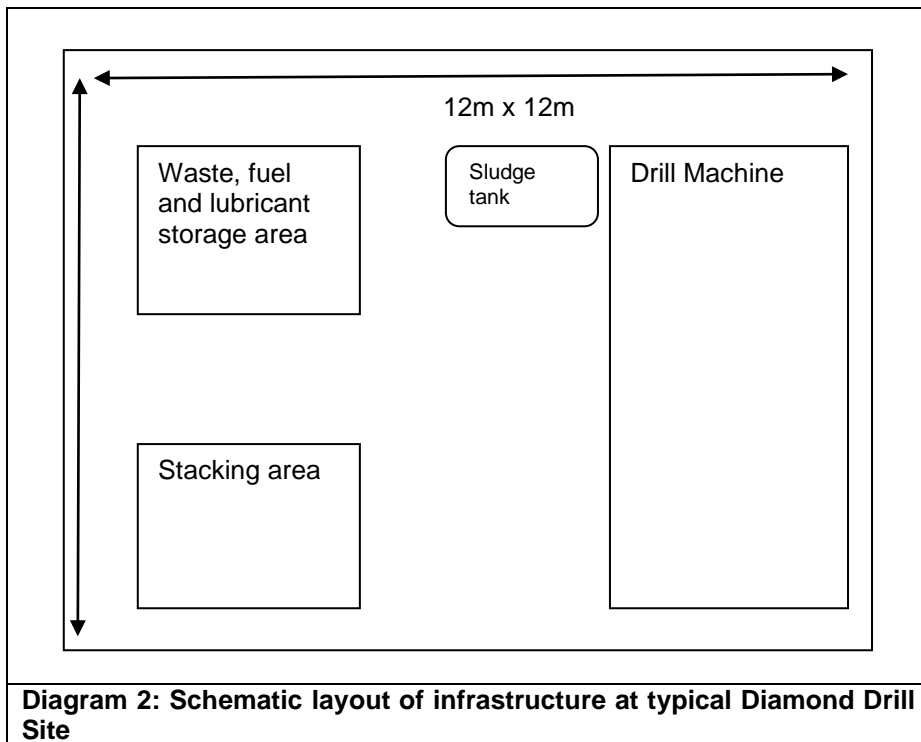
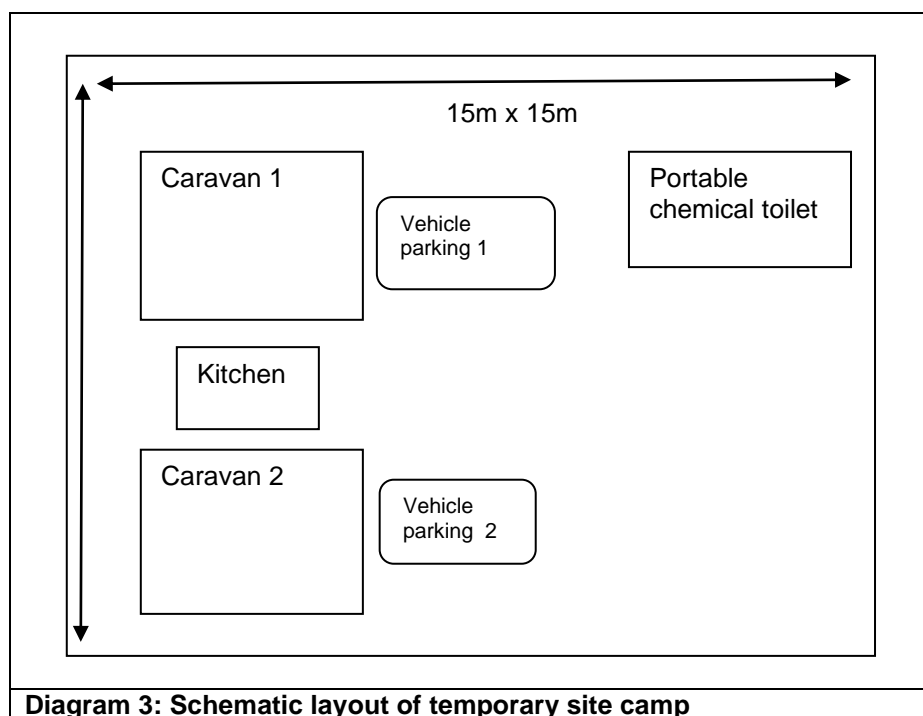


Diagram 2: Schematic layout of infrastructure at typical Diamond Drill Site



2.1.3 Description of construction, operational, and decommissioning phases

This EMP addresses the following phases of the development:

2.1.3.1 Planning Phase

The planning phase is the ideal opportunity to incorporate pro-active measures to ensure that environmental impacts are avoided and mitigated from the outset. Proper planning during this phase can ensure that the likelihood of certain impacts taking place is minimised.

The planning phase entails further consultation with the landowners, and should include not only compensation and access arrangements, but details on how and when the landowners will be kept informed of prospecting activities, throughout the duration of the project. In particular access points into the veld, to reach drill locations, will be discussed and agreed with the landowners, prior to commencement of the prospecting campaign.

2.1.3.2 Construction Phase

There will be no construction involved in this programme. No camp site construction and/or the construction of concrete drill pads or infrastructure are required, as described in the sections above.

2.1.3.3 Operational Phase

The bulk of the impacts occurring during this phase will have immediate effect (e.g. damage to vegetation and potential pollution (i.e. litter, spillages etc.)). If the site is monitored on a continual basis during this phase, it is possible to identify these impacts as they occur. These impacts will be mitigated through the contingency plans identified in this EMP.

The required monitoring programmes as per the commitments of the EMP will be initiated during the operational phase.

Should any future additional in-fill drilling be required, the application will prepare and submit a revised PWP and EMP to the DMR for inspection and approval, prior to undertaking such activities, as per regulatory requirement.

The operational phase entails the following:

Farm Access

- a) Access gates will always be left in their original open or closed positions.
- b) No fences will be cut without the permission of the landowner. Cut fencing will be restored immediately after the passage of vehicles.

Drilling Site Establishment

- a) Delineate borehole locations in consultation with landowner, taking into consideration residences, potential heritage sites and environmental sensitive areas. Sites will be practically selected based on geological information Borehole sites will be GPS located and marked with pegs, which are to be removed.
- b) Access the drill sites using existing access tracks. Where roads / tracks do not exist, the proposed drill site will be accessed by driving in the veld. No road construction and/or vegetation clearance at drill sites is planned, due to the nature of the vegetation. There is therefore also no need for the establishment of topsoil storage areas
- c) Screen positions of access tracks and drill sites for the presence of red and/or orange listed plant species,
- d) Demarcate required drill sites using temporary fencing. No drill pads will be cleared. BMM will remove some vegetation to reduce the tripping hazard & ensure the safety of the drill workers No sumps are to be excavated, sludge will be collected in a sludge tank, removed and disposed of at an authorised facility at Aggeneys Mine.
- e) Establish equipment within the demarcated drill site. Drip trays and plastic lining will be placed under the rig to contain spillages.
- f) Establish temporary drill camp, consisting of caravans, and mobile chemical toilet, in an enclosed area and meeting minimum Mine Health and Safety Standards, in consultation with the landowner.
- g) Set-up temporary fuel and oil / lubricant storage areas. The volumes of hazardous substances used will be recorded and documented.
- h) Source potable water from the surface owner on a compensated basis, or off-site from the Aggeneys Mine.

Drilling – Operational Phase

- a) An independent and experienced drilling contractor will be used to complete the drilling in accordance with industry best practice and in compliance with the Mine Health and Safety Act.
- b) Servicing of vehicles and/or machinery will not occur on site. If emergency repair is required in the field, drip trays will be used to collect oils and fluids. PVC sheeting will be placed under any machinery/containers that have the potential to develop an oil leak.
- c) Drill bore holes as described in Table 10.
- d) Collect sludge in a sludge tank and dispose of sludge as required, at an authorised facility at Aggeneys Mine
- e) Stack and prepare samples for storage at an off-site facility.
- f) Case and cap boreholes
- g) Collect general waste in a suitable container and dispose of as required at an authorised facility at Aggeneys Mine.
- h) Empty portable chemical toilets as required - using an approved contractor
- i) No fires will be permitted.

Waste Disposal

- j) Contents of drip trays and linings will be bagged / stored in containers, removed off-site and disposed of at an authorised facility at Aggeneys Mine
- k) Any spill onto the ground will be cleaned up immediately and consigned to the appropriate facility at Aggeneys Mine.
- l) All litter & refuse will be removed from site on a regular basis.
- m) Mobile sanitation units are to be supplied and maintained by an authorised and licensed contractor.

2.1.3.4 Decommissioning Phase

Once drilling at each individual location is completed, the borehole is capped and sealed with markers being placed at the collars of completed holes (refer to Image 14 for an example of sealed borehole in Addendum D). No foreign material will be introduced into the hole. The location of the holes is recorded by GPS, mapped and photographed.

Decommissioning activities typically comprises of the following activities:

- a) Remove drip trays and plastic lining
- b) Remove oils and lubricants from plastic lining and drip trays and store until disposal to authorised disposal facility at Aggeneys Mine
- c) Remove chemical toilet, and drill rig from the site
- d) Dispose of any general waste to a permitted landfill site
- e) Remove temporary fencing
- f) Rehabilitate disturbed areas including drill sites or access track/s (if established)
- g) Monitor and maintain rehabilitated area

Rehabilitation activities entail the ripping of compressed soil areas, occurring along access tracks as well as at drill sites. Exposed areas will be scarified, re-profiled and re-vegetated where necessary, with a commercially available seed mix, common to the area.

Drill sites are rehabilitated immediately upon completion of each drill hole, thereby reducing the potential cumulative effects of impacts. Natural habitat will be repaired concurrently with the drilling campaign, during the operational phase. This will result in the restoration of the affected resource to its original state.

Progress with rehabilitation is monitored bi-annually for a period of 2 – 3 years after completion of the prospecting activities, as per legal requirement. Photographs of the access routes and drill sites are to be taken before and after rehabilitation and kept on record for the Director: Mineral Development.

In the event that rehabilitation is not successful, corrective action must be taken. This may include bringing in additional topsoil, reseeding and mulching, depending on the reasons for the failure of the prior re-vegetation methods.

Monitoring and closure

Regular monitoring of all the environmental management measures shall be done by the holder of the prospecting right to ensure that the provisions of the EMP are adhered to.

Compliance with the EMP will be ensured by:

- a) Ongoing monitoring of the EMP.
- b) Conducting and submitting to the Director: Mineral Development annual performance assessments of the EMP.
- c) Submit a final EMP performance assessment immediately prior to the application for closure.

The Environmental Officer (EO) will produce quarterly internal reports, documenting compliance to the EMP. These reports will be used in the performance assessment reports which will adhere to the regulations.

The final performance assessment report shall contain the following:-

- a) Show that the requirements of relevant legislation have been complied with.
- b) Show that the objectives as described in the EMP have been met.
- c) Show that all latent environmental impacts resulting from the operation have been identified and the risks thereof have been identified and quantified and arrangements for the management of those risks have been finalised.
- d) Give details as to the environmental rehabilitation done on the property and also include a map showing the location of:
 - Access roads and routes used.
 - Drilling sites.

All the proposed management actions are included in sections of this EMP. As part of implementing the management actions, method statements should be prepared by the contractor and/or sub-contractor. These method statements should specify how they will manage potential environmental impacts in line with the requirements of the EMP, and how they will practically ensure that the objectives of the EMP are achieved.

2.1.4 Listed activities (in terms of the NEMA EIA regulations)

N/A.

2.2 Identification of potential impacts

2.2.1 Potential impacts per activity

The main anticipated impacts may occur as a result of the following activities:

Drilling Site Establishment (Operational Phase)

- Delineate borehole locations in consultation with landowner, taking into consideration residences, potential heritage sites and environmental sensitive areas. Borehole sites will be GPS located and pegged with a steel spring wire PVC flag.
- Access the drill sites using existing access tracks. Where roads / tracks do not exist, the proposed drill site will be accessed by driving in the veld. No road construction and/or vegetation clearance is planned.
- Demarcate required drill sites using temporary fencing. No drill pads will be cleared. No topsoil will be stripped or removed. No sumps are required.
- Establish equipment within the demarcated drill site. Drip trays and plastic lining will be placed under the rig to contain spillages.
- Establish temporary drill camp, consisting of caravans, and mobile chemical toilet, in an enclosed area and meeting minimum Mine Health and Safety Standards, in consultation with the landowner.
- Set-up temporary fuel and lubricant storage areas.
- Source potable water from the surface owner on a compensated basis, or off-site from the Aggeneys Mine.

Drilling – Operational Phase

- Drill bore holes as described in Table .
- Collect sludge in a sludge tank and dispose of sludge as required, at an authorised facility at Aggeneys Mine
- Stack and prepare samples for storage at an off-site facility.
- Case and cap boreholes

- Collect general waste in a suitable container and dispose of as required at an authorised facility at Aggeneys Mine.
- Empty portable chemical toilets as required - using an approved contractor

Rehabilitation and closure of each drill site – (Closure Phase)

- Remove drip trays and plastic lining
- Remove oils and lubricants from plastic lining and drip trays and store until disposal to authorised disposal facility at Aggeneys Mine
- Move chemical toilet, and drill rig from the site
- Dispose of any general waste to a permitted landfill site
- Remove temporary fencing
- Rehabilitate disturbed areas including drill sites or access track/s (if established)
- Monitor and maintain rehabilitated area

The main impacts associated with the abovementioned activities, requiring management and rehabilitation are:

- Localised soil compaction, affecting ability of soil to host vegetation and resulting in erosion and siltation of water resources (small scale);
- Localised damage to and/or removal of vegetation, affecting ecosystem integrity (small scale)
- Temporary displacement of fauna and potential impacts on biodiversity (small scale);
- Potential pollution resulting from spills of hydro-carbons and litter;
- Dust generation; and
- Noise generation.

Although the site is situated in an area classified as of high biodiversity importance, the nature of the exploration campaign is temporary and such that it will not have a significant impact on the environment, provided the implementation of management and rehabilitation measures. The exploration campaign will aim to avoid activities which may result in adverse impacts as far as possible. Likewise, areas identified to be environmentally sensitive, will be avoided where possible. Where required, impacts will be minimised through scaling down, relocating or redesigning the exploration campaign as appropriate.

Table 12 presents the potential impacts which may result from the proposed prospecting activities.

2.2.2 Potential cumulative impacts

The potential cumulative impacts (if post operational mitigation measures are not complied with) at the site are related to unsuccessful rehabilitation of drill sites and access tracks which can lead to erosion and proliferation of invader species and weeds over time. Alien infestations may lead to the degradation of the habitat.

The cumulative contribution of dust and noise, resulting in air and noise pollution, to that already existing in the area, will be limited to the site and temporary in nature.

As stated previously, prospecting activities have been undertaken by other companies on site, as well as in the surrounding area. The potential cumulative impact of prospecting activities in the area on veld condition, may, over time, affect carrying capacity of the land. Grazing must be sustained in the long term to ensure sufficient yield, so that farmers can continue to earn a living on the land.

However, due to the small scale and the temporary nature of the prospecting activities, cumulative impacts associated with the prospecting activities are not considered to be significant.

Table 12: Identified potential impacts resulting from proposed prospecting activities

CONSTRUCTION PHASE		
There will be no construction involved in this programme. No camp site and/or the construction of drill pads or infrastructure are required, as indicated in sections 2.1.1 and 2.2.2.		
OPERATIONAL PHASE		
ACTIVITY	IDENTIFIED IMPACT	DESCRIPTION OF IMPACT
Movement of vehicles on existing public gravel roads	Increased traffic volumes	An increase of vehicles on the roads will lead to an increase in traffic in the area, resulting in increased risks for accidents due to possible human error and/or driver fatigue. It may therefore potentially present itself as a hazard to wildlife and livestock.
	Air quality deterioration	Excess dust generated by additional vehicles utilising access roads. Dust generation through the use of existing access tracks is expected to be negligible due to the small scale of the project. Air pollution from vehicle emissions and drill rig is expected to be negligible due to the small scale of the project.
Presence and movement of people and vehicles in the veld, on predetermined access tracks and drilling activities	Localised soil compaction	Soils will be compacted by the frequent movement of vehicles over them, contributing to the degradation of the environment. The compaction of soil may: i). Affect the ability of the substrate to host vegetation, therefore impacting on i) biodiversity (i.e.. the number and variety of plant and animal species occurring naturally in the area); and ii) the agricultural potential of the land in terms of providing sufficient grazing to livestock; and ii). Result in the formation of erosion gullies over time, as a result of stormwater calving out compacted areas during rain events. Wind erosion may expedite the process of gully formation; iii). Erosion processes may result in the sedimentation and associated degradation of drainage lines. Exposed surfaces must be kept to a minimum
	Localised damage to and/or destruction of vegetation (small scale)	Vegetation may be damaged and/or destroyed by the frequent movement of vehicles & personnel over them, and as a result of activity on and surrounding drill sites. This may result in: i). The degradation and/or loss of ecologically sensitive or important vegetation units; ii). The loss and/or displacement of threatened or protected flora, impacting on biodiversity; iii). The loss of grazing available to livestock and wildlife occurring naturally in the area.

	Potential disturbance, displacement and killing of fauna (small scale)	The presence of vehicles and people on site may disturb wildlife and livestock occurring in the area. Staff will have to be vigilant. In particular, faunal species such as reptiles (tortoises, snakes) and ground-living birds may be affected.
	Pollution	<p>Pollution of soil and surface and ground water resources may occur as a result of:</p> <ul style="list-style-type: none"> i). Potential spillage of hydrocarbon substances such as diesel and/or oil and lubricants; ii). Litter; and iii). Ablution. <p>Surface water, in the form of storm water, could become contaminated with hydrocarbon materials should they leak or should they not be properly contained. These contaminants may be transported by stormwater sheetwash during rainfall events and find their way into larger drainage lines.</p>
	Disturbance and/or destruction of structures of cultural/heritage importance and/or graveyards / graves	<p>Prospecting activities could result in possible damage to/destruction of unidentified heritage resources if these resources are not identified prior to prospecting activities taking place.</p> <p>Care will be taken to avoid all visible structures, monuments and graveyards which may occur on site.</p> <p>Should any graves, other than those located in formal graveyards, be identified during fieldwork, these will be reported to the landowner, SAHRA and the local police. Prospecting activities will be moved to avoid them.</p>
	Impact on the landowners	<ul style="list-style-type: none"> i). Uncertainty in terms of the particulars of daily prospecting activities on the farms – the whereabouts of the vehicles and crew; ii). Potential disturbance of daily farming practices (gates left open, fences being cut etc.); iii). Loss of livestock (animals ingesting foreign substances such as plastic/theft) iv). Snares which are being set to control predators will have to be removed, thereby increasing risk of attack to livestock v). Damage to existing infrastructure (homestead, fences, roads, water supply infrastructure) vi). Reckless driving and speeding, resulting in veld damage, impacting on grazing capacity, as well as startling livestock vii). Loss of livelihood, as a result of soil disturbances and the destruction of vegetation and unsuccessful rehabilitation viii). Noise, causing disturbance to residents, livestock and grazing regimes ix). Visitors trespassing and overnighing on the farms

	Noise pollution	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb residents and may potentially result in disturbance and/or displacement of livestock and animals occurring naturally in the area. Increased noise levels may also temporarily affect the sense of place of the area.
DECOMMISSIONING PHASE		
As drill sites will be surveyed and rehabilitated during the operational phase, it is not anticipated that post-closure of drill sites will be a material item. Monitoring of rehabilitation will continue after completion of prospecting activities the establishment of vegetation is satisfactory. A comprehensive photographic record will be available, demonstrating progress towards restoring land to its original condition. The proposed rehabilitation plan and associated monitoring programmes will form part of the EMP compliance reporting programme.		
Drill Sites: Removal of infrastructure Clean up Facilitating the re-establishment of vegetation	Soil and water contamination Soil erosion Introduction of invader species	Contamination of soils and water as a result of hydrocarbon spillages Introduction of invader species.
Rehabilitation of access tracks	Soil erosion Introduction of invader species	Erosion of the rehabilitated area. Invader species might be introduced into the area during the re-vegetation process.

2.2.3 Potential impact on heritage resources

From the site visit, it is evident that some of the residential structures and outbuildings may have potential heritage value, in that they may be older than 60 years. The former residence (now used as a storage facility) on the farm Rozybosch dates from 1911. There are small family graveyards located close to the homesteads on Rozybosch and the Remainder of the Farm Wortel. Apart from the latter, the affected landowners indicated that they are not aware of the presence of any features which may require protection in terms of the relevant legislation. Nevertheless, this does not mean that heritage sites do not occur on the site. In fact, as it is known that the San and the Nama roamed in the Northern Cape for many years, the chances of finding artefacts and sites linked thereto is reasonably high. It is almost impossible to predict where open air sites may be found, but these would usually be in walking distance of a water source. Closed sites are normally found at geographical features such as overhangs, caves and rock shelters. The diagrams of the farms indicate hills and water sources (albeit seasonal), where such sites may potentially be expected.

All cultural resources older than 60 years are regarded as potential places of cultural and heritage interest. It is suggested that all structures are avoided during prospecting, and that a buffer area of at least 50 m is applied around residences and outbuildings, graves / graveyards, and any other man-made features on the farms.

Should any evidence of archaeological sites or graves, artefacts or other heritage resources be found during the proposed operation, work will be stopped and SAHRA and an accredited archaeologist will be alerted immediately.

The South African Heritage Resources Agency (SAHRA) has been consulted, however has not yet provided comment on the application.

2.2.4 Potential impacts on communities, individuals or competing land uses in close proximity

(If no such impacts are identified this must be specifically stated together with a clear explanation why this is not the case.)

There are no communities located in proximity to the site. The existing Aggeneys Mine and town are located approximately 10 km south of the site. The proposed prospecting activities will not have adverse impacts on the community of Aggeneys. Pofadder is located approximately 80 km from the site.

The area is characterised by a farming community and the land under application is used for agricultural purposes. Current activities include livestock farming (sheep and goats / cattle) and associated grazing.

To date, no comments have been received from the community subsequent to placing notification of the proposed prospecting activities on site, as well as at conspicuous places at the local shopping centres of Pofadder, Aggeneys and Springbok.

The concerned land for prospecting is privately owned. The dominant land-use is the ranching of small stock. The proposed method of prospecting will have very limited impacts on the farms where drilling will be undertaken, as well as on the farms situated adjacent to the prospecting area. The application has been discussed with the landowners during the week of 23 June 2014. To date, none of the affected landowners have objected to the proposed prospecting activities.

The landowners were asked whether they expect that the proposed prospecting activities would affect surrounding properties. It was indicated that the temporary nature and scale of the proposed operations are such that the socio-economic conditions of

other persons will not be directly affected by the proposed activities. However, cognisance must be taken of the use of access roads transecting adjacent farms.

Although proposed prospecting activities may potentially result in the degradation of natural veld, it was indicated by the landowners, whose properties have previously been subjected to drilling by BMM, that disturbances caused by BMM have been rehabilitated successfully. If prospecting occurs, care must be taken to minimise veld damage, and that rehabilitation is done to the satisfaction of both the DMR and affected landowners.

The scale and extent of the drilling work envisaged is expected not to be excessively intrusive to the activities of surface owners. However, should the permit be granted, suitable arrangements must be made with landowners to ensure minimal disruption and uncertainty regarding the nature of activities on the affected farms, during prospecting operations.

To date, the following key issues have been raised by landowners and BMM undertake to ensure compliance with these requests:

- a) No prospecting activities are to be undertaken within at least 100 m of water supply infrastructure and homesteads
- b) Existing roads must be used as far as practically possible and speed limits must be observed. Damage to veld must be minimised.
- c) Gates must be left as they are found, i.e. closed if it was found closed, and leave open if it was found open.
- d) Noise may disturb livestock and grazing regimes may have to be adapted / changed.
- e) The establishment of site camp/s must be discussed and agreed with the landowners prior to commencement of activities.
- f) The contractor responsible for drilling must be introduced to the landowners and agreements, conduct and *modus operandi* must be discussed. The landowners must be kept informed of the whereabouts and activities of contractors and proposed activities must be mutually agreed, in advance.
- g) Only authorised personnel as part of the exploration / drilling team will be allowed on the property. Visitors will not be allowed.

2.2.5 Confirmation that the list of potential impacts has been compiled with the participation of the landowner and interested and affected parties

Interested and Affected Parties (I&APs) were informed about the proposed prospecting activities by way of site notices, notification in a local newspaper (the Plattelander), telecommunication, letters (fax, e-mail and post where necessary) and the provision of an Information Document, containing the following:

- a) A baseline description of the environment;
- b) A list of pre-identified anticipated impacts which may occur as a result of the proposed prospecting activities.

I&APs have been invited and encouraged to comment on the list of identified potential impacts which may arise as a result of the proposed activities, and to provide input in terms of anticipated additional impacts which they think should be addressed in the environmental impact assessment process and compilation of the Environmental Management Plan (EMP).

This EMP is based on data gathered during site specific investigations and information obtained from the landowners during discussions. Identified key stakeholders and registered I&APs are provided opportunity to review and comment on the information as provided in the EMP.

The list of stakeholders contacted and relevant correspondence is provided in Appendix E – Updated Consultation Report.

2.2.6 Confirmation of specialist report appended

N/A.

3 REGULATION 52 (2) (c): Summary of the assessment of the significance of the potential impacts and the proposed mitigation measures to minimise adverse impacts

3.1 Assessment of the significance of the potential impacts

Impact Assessment Criteria

The environment is a combination of the physical, biological, social and economic aspects of our surroundings. Any analysis of the impacts on the environment must therefore take into account any potential change, positive or negative, on the biophysical and socio-economic environment, which may result from the proposed actions. Project activities are linked to changes in the environment. Not all changes are considered to be impacts. The level of change determines the significance of a change, which is assessed in terms of spatial extent, duration, probability and intensity. This informs the assessment if the changes are significant impacts, or not.

The aim of this assessment is to determine whether the proposed prospecting activities are likely to cause significant environmental impacts. To determine the significance, impacts shall be evaluated on the parameters of duration, intensity and probability from which the significance of the impact will be derived. In terms of the Significance Assessment Methodology, the significance of an impact is calculated from the probability, extent, duration and intensity. A detailed description of the methodology follows.

Extent

A value ascribed to the physical extent which the impact manifests itself:

EXTENT	DESCRIPTION	RATING
SLE	The impact will be limited to the site	1
LAE	The impact will be limited to the local area	2
RE	The impact will be limited to the region	3
NE	The impact will be on a national scale	4
IE	The impact will occur on an international scale	5

Duration

Duration is assessed and a factor awarded in accordance with the following:

DURATION	DETAIL	DESCRIPTION	RATING
VST	Very Short Term	0 – 1 Year	1
ST	Short Term	>1 – 5 Years	2
MT	Medium Term	>5 – 15 Years	3
LT	Long Term	Impact will only cease after the operational life of the activity has ended, either because of natural process or by human intervention.	4
PT	Permanent	Mitigation, either by natural process or by human intervention, will not occur in such a way or in such a time span that the impact can be considered transient.	5

Severity

Describes the severity of the impact on the environment and is quantified on a scale of 0 -10:

SEVERITY	DETAIL	DESCRIPTION	RATING
SS	Small	Will have no effect on the environment	0
MIS	Minor	Will not result in an impact on processes	2
LOS	Low	Will cause a slight impact on processes	4
MDS	Moderate	Will result in processes continuing but in a modified way	6
HIS	High	Will result in processes being altered to the extent that they temporarily cease	8
VHS	Very High	Will result in a complete destruction of patterns and permanent cessation of processes	10

Probability

Probability describes the likelihood of the impact actually occurring, and is rated as follows:

PROBABILITY	DETAIL	DESCRIPTION	RATING
VIP	Very Improbable	Unlikely that the impact will occur	1
IP	Improbable	Low possibility of the impact occurring due to design or history	2
PP	Probable	Distinct possibility that the impact will occur	3
HP	Highly Probable	Most likely that the impact will occur	4
DP	Definite	Impact will occur regardless of any preventative measures	5

3.1.1 Criteria of assigning significance to potential impacts

In order to assess the significance of the impacts as identified for the proposed prospecting activities, a Significance Rating is calculated by multiplying an allocated Severity Rating with an allocated Probability Rating. The significance rating should influence the development project as described below:

Significance (S) is calculated from the probability, extent, duration and intensity:

$$S = (E+D+I)*P$$

Where: S = Significance weighting, E = Extent, D = Duration, I = Intensity / Severity, P = Probability

SIGNIFICANCE	DETAIL	DESCRIPTION	RATING
LS	Low Significance	<ul style="list-style-type: none"> Positive and negative impacts of low significance should have no significant influence on the proposed development project. 	< 30
MS	Medium Significance	<ul style="list-style-type: none"> Positive impact: Should weigh towards a decision to continue ; Negative impact: Should be mitigated before project can be approved. 	30 – 60
HS	High Significance	<ul style="list-style-type: none"> Positive impact: Should weigh towards a decision to continue, should be enhanced in final design. Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be performed to reduce significance to at least a medium significance rating. 	> 60

3.1.2 Potential impacts of each main activity in each phase, corresponding significance assessment (without proposed mitigation)

Table 13 presents the significance of the impacts which may result from the proposed activities, without the implementation of mitigation measures

3.1.3 Assessment of potential cumulative impacts

The potential cumulative impacts (if post operational mitigation measures are not complied with) at the site are related to unsuccessful rehabilitation of drill sites and access tracks which can lead to erosion and proliferation of invader species and weeds over time. Alien infestations may lead to the degradation of the habitat.

The cumulative contribution of dust and noise, resulting in air and noise pollution, to that already existing in the area, will be limited to the site and temporary in nature.

Prospecting activities have been undertaken by other companies on site, as well as in the surrounding area. The potential cumulative impact of prospecting activities in the area on veld condition, may, over time, affect the carrying capacity of the land. Grazing must be sustained in the long term to ensure sufficient yield, so that landowners can continue to earn a living on these lands.

Refer to Table 14: Assessment of potential cumulative impacts.

Table 13: Identified impacts and corresponding significance assessment, without mitigation

CONSTRUCTION PHASE								
There will be no construction involved in this programme.								
OPERATIONAL PHASE								
ACTIVITY	IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION					
			Extent	Duration	Severity	Probability	Significance Rating	Significance
1. Site access via public roads and presence of vehicles on site								
Movement of vehicles on public roads and presence of vehicles on site	Increased traffic volumes regionally	An increase of vehicles on public roads will lead to an increase in traffic in the area, resulting in increased risks for accidents due to possible human error and/or driver fatigue. It may therefore potentially present itself as a hazard to wildlife and livestock.	2	2	0	5	20	Low
2. Creation of tracks, establishment of site camp/s and preparation of drill sites								
(a) Creation of on-site access tracks (b) Establishment of site camp/s (c) Preparation of drill sites (ad hoc as required)	Soil compaction and loss of topsoil	Soils will be compacted by the frequent movement of vehicles over them, contributing to the degradation of the environment. The compaction of soil may: i). Affect the ability of the substrate to host vegetation, therefore impacting on i) biodiversity (i.e. the number and variety of plant and animal species occurring naturally in the area); and ii) the agricultural potential of the land in terms of providing sufficient grazing; and ii). Result in the formation of erosion gullies over time, as a result of stormwater calving out compacted areas during rain events. iii). Erosion processes may result in the sedimentation and associated degradation of drainage lines. Topsoil, to be used during rehabilitation, could be lost should it not be properly stored. Exposed surfaces must be kept	1	2	4	5	35	Medium

		to a minimum.						
	Damage to and/or destruction of vegetation	Vegetation may be damaged and/or destroyed and/or collected by the crew. This may result in: i). The degradation and/or loss of ecologically sensitive or important vegetation units; ii). The loss and/or displacement of threatened or protected flora, impacting on biodiversity; iii). The loss of habitat and grazing pastures available to wildlife and livestock	1	2	6	5	45	Medium
	Potential disturbance, displacement and killing of fauna	The presence of vehicles and people on site may disturb wildlife occurring in the area. Staff will have to be vigilant. In particular, faunal species such as tortoises, snakes and ground-living birds may be affected.	1	2	4	5	35	Medium
	Pollution	Pollution of soil, surface and ground water resources may occur as a result of: i). Potential spillage of hydrocarbon substances such as diesel and/or oil and lubricants; ii). Sedimentation, resulting from erosion; iii). Litter; and iv). Ablution.	2	2	4	4	32	Medium
	Disturbance and/or destruction of structures of cultural/heritage importance and/or graveyards / graves	Care will be taken to avoid all visible structures, monuments and graves which may be encountered on site during exploration activities. Should any graves be identified during fieldwork, these will be reported to the landowner, SAHRA and the local police and prospecting activities will be moved to avoid them.	1	5	10	1	16	Low
	Impact on the landowner	i). Degradation of the environment; ii). Site access and presence of exploration team causing	1	2	6	4	36	Medium

		<p>disturbance to residents and farming activities.</p> <p>iii). Uncertainty in terms of the particulars of daily prospecting activities on the farm – the whereabouts of the vehicles and crew;</p> <p>iv). Potential disturbance of daily farming practices (gates left open, fences being cut etc.);</p> <p>v). Loss of livestock (animals ingesting foreign substances such as plastic etc.)</p> <p>vi). Damage to existing infrastructure (homestead, fences, roads, eater supply infrastructure)</p> <p>vii). Reckless driving and speeding, resulting in veld damage and startling livestock</p> <p>viii). Noise, causing disturbance to residents, livestock and grazing regimes</p> <p>ix). Visitors trespassing and overnighting on the farm</p>						
	Air pollution through dust generation	Excess dust generated by additional vehicles utilising access roads, resulting in deterioration of local air quality	2	2	0	5	20	Low
	Noise pollution	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb the landowner and may potentially result in disturbance and/or displacement of livestock and wildlife. Increased noise levels may also temporarily affect the sense of place of the area.	2	2	0	5	20	Low
3. Drilling								
Diamond Core and RAB Drilling	Soil contamination	The soil could be contaminated by hydrocarbon spillages and sludge (at Diamond Core drill sites only).	1	2	4	4	28	Low
	Surface water pollution	Surface water, in the form of storm water, could become contaminated with hydrocarbon materials should they leak or should they not be properly	2	2	4	4	32	Medium

		contained. These contaminants may be transported by stormwater sheet wash during rainfall events and find their way into larger water courses, i.e. the non-perennial drainage lines. Sedimentation of drainage lines may occur as a result of erosion.						
	Groundwater pollution	Pollution of groundwater resource may occur as a result of uncontained spillages and improper storage of hydrocarbons and contaminated materials.	2	2	4	4	32	Medium
	Waste Management	Collection, storage and appropriate disposal of wastes generated on site, such as litter and effluent (ablution facility) could result in pollution if not properly managed.	1	2	4	3	21	Low
	Noise pollution	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb the landowner. Noise may potentially result in disturbance and/or displacement of livestock and wildlife. Increased noise levels may also temporarily affect the sense of place of the area.	2	2	0	5	20	Low
4. Health and Safety								
Personnel working on site without PPE and under unsafe, uncontrolled conditions.	Injury / death	Personnel working on site without PPE and under unsafe, uncontrolled conditions, where emergency response procedures do not exist, may result in injuries to personnel and in extreme cases, death.	1	2	8	3	33	Medium
Presence of workforce and hydrocarbon substances on site	Potential ignition of fires	Fire can cause destruction of surrounding vegetation, and possible injury / death to personnel.	2	2	8	3	36	Medium
DECOMMISSIONING PHASE								
As drill sites will be surveyed and rehabilitated as the drilling campaign progresses, it is not anticipated that post-closure of drill sites will be a material item. Monitoring of rehabilitation will continue after completion of prospecting activities until the establishment of vegetation is satisfactory. A comprehensive photographic record will be available, demonstrating progress towards restoring land to its original condition. The proposed rehabilitation plan and associated monitoring programmes will form part of the EMP compliance reporting programme. Drill sites and access tracks will be rehabilitated.								
Rehabilitation of drill sites and access tracks Removal of infrastructure	Soil and water contamination	Contamination of soils and water as a result of hydrocarbon spillages Introduction of invader species.	1	2	4	4	28	Low

Clean up Facilitating the re- establishment of vegetation	Soil erosion	Erosion of the rehabilitated area.	1	2	4	4	28	Low
	Introduction of invader species	Invader species might be introduced into the area during the re-vegetation process.	2	5	6	2	26	Low
Presence of personnel on site	Health and Safety	Injury and/or death in extreme cases	1	2	8	3	33	Medium
		Risk of fire	2	3	6	3	33	Medium

Table 14: Assessment of potential cumulative impacts (if mitigation measures are not complied with)

Potential Cumulative Impact	Description	Significance Pre-mitigation					
		Extent	Duration	Severity	Probability	Significance Rating	Significance
Traffic increase	The proposed project will contribute to temporary, minimal increase in traffic in the area. Due to the size of the proposed operation, the cumulative effect of additional vehicles on the roads will be negligible.	2	2	2	4	24	Low
Impact on Biodiversity (Soil, Vegetation and Fauna)	Potential cumulative impacts (if post operational mitigation measures are not complied with) at the site resulting from unsuccessful rehabilitation may lead to erosion and proliferation of invader species and weeds over time. Alien infestations may lead to the degradation of the habitat and affect regional biodiversity. The total area to be disturbed amounts to approximately 1 ha whilst the size of the site is 8 302 ha. Provided that the disturbed areas will be rehabilitated and monitored until rehabilitation is satisfactory, the relative contribution of the project to potential loss of biodiversity is minimal.	2	4	6	4	48	Medium
Soil, surface and groundwater pollution	Potential cumulative impacts may occur as a result of uncontrolled / mismanaged spillages of materials containing hydrocarbons, finding their way into water resources, affecting the regional hydrology. The volumes of hydrocarbons used on site does not compare to the high volumes of substances used at existing mining operations. If spills occur, these will be cleaned up immediately. Water pollution which may occur as a result of the proposed project, compared to pollution which may result from various other activities across the region, including mining and agriculture, will be negligible.	2	2	4	4	32	Medium
Air pollution	Due to the inherent nature of the proposed prospecting activities, the project will not contribute significantly to excess dust generation in the area. The cumulative contribution of dust, resulting in air pollution, will be limited to the site and temporary in nature	2	2	2	4	24	Low
Noise pollution	The cumulative contribution of noise, resulting in increased	2	2	2	4	24	Medium

	noise levels / disturbance in the area, to that already existing in the area, will be limited to the site and temporary in nature							
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3.2 Proposed mitigation measures to minimise adverse impacts

3.2.1 List of actions, activities, or processes that have sufficiently significant impacts to require mitigation

The main anticipated impacts will occur as a result of the following actions and/or activities:

- (a) The creation of access tracks;
- (b) The establishment of temporary site camp/s; and
- (c) Preparation of drill sites, 12m x 12m for Diamond Core Drilling and 10m x 10m for RAB Drilling.

The main impacts associated with the abovementioned activities, requiring management and/or rehabilitation are:

- (a) Soil compaction, affecting ability of soil to host vegetation and resulting in erosion and siltation of water resources;
- (b) Damage to vegetation, resulting in habitat destruction, temporary displacement of fauna and potential impacts on biodiversity;
- (c) Potential soil, surface and ground water pollution resulting from spills of hydro-carbons, sewage and litter;
- (d) Dust generation; and
- (e) Noise generation.

3.2.2 Concomitant list of appropriate technical or management options

(Chosen to modify, remedy, control or stop any action, activity, or process which will cause significant impacts on the environment, socio-economic conditions and historical and cultural aspects as identified. Attach detail of each technical or management option as appendices)

The proposed prospecting activities will be undertaken as per the detail in this Environmental Management Plan. The site activities will be monitored against the recommendations here within and the Department of Mineral Resources will be provided with the required annual compliance reports, as per the requirements in the MPRDA.

The onsite geologist supervising the prospecting activities will implement the EMP and monitor the progress of implementation. It is the responsibility of the on-site geologist that the EMP is implemented and sound environmental management occurs throughout the duration of the project. The ultimate responsibility lies with the applicant.

Table 15 provides a list of appropriate management options chosen to remedy identified significant impacts on the environment.

Table 15: Proposed mitigation measures

CONSTRUCTION PHASE				
There will be no construction involved in this programme.				
OPERATIONAL PHASE				
ACTIVITY	IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION	PROPOSED MITIGATION
1. Site access via public roads and presence of vehicles on site				
Presence of additional vehicles in the area	Regional increase in traffic volumes	An increase of vehicles will lead to an increase in traffic in the area, resulting in increased risks for accidents due to possible human error and/or driver fatigue. It may therefore potentially present itself as a hazard to wildlife and livestock.	Low	<ul style="list-style-type: none"> The number of trips to the site, from the premises of the Aggeneys Mine, must be well planned and coordinated, and the frequency of trips and number of vehicles used must be limited as far as possible; The speed limit as imposed on the public roads shall be observed at all times.
	Increased traffic volumes on site	An increase in the number of vehicles present on site may temporarily affect the sense of place of the area and may present itself as a hazard to wildlife.	Low	<ul style="list-style-type: none"> The number of vehicles present on site must be limited to the minimum. Only one drill rig to be present on site at any given time. All vehicles within the prospecting area are not to exceed a maximum speed limit of 40 km/h. Ensure that the necessary signage and traffic measures are implemented for safe and convenient access to the site. Measures must also be put in place to ensure that these roads and any access points do not get built up with mud or sand.
2. Creation of access tracks, establishment of site camp/s and preparation of drill sites				
(a) Creation of on-site access tracks (b) Establishment of site camp/s (c) Preparation of drill sites	Soil compaction and loss of topsoil	Soils will be compacted by the frequent movement of vehicles over them, contributing to the degradation of the environment. The compaction of soil may: <ul style="list-style-type: none"> i). Affect the ability of the substrate to host vegetation, therefore impacting on i) biodiversity (i.e. the number and variety of plant and animal species occurring naturally in the area); and ii) the agricultural potential of the land in terms of providing sufficient grazing; and 	Medium	<ul style="list-style-type: none"> Cognisance must be taken of the site sensitivity map and prospecting activities, i.e. access tracks and siting of drill sites must be adjusted accordingly. The use of roads or tracks is to be kept to a minimum to avoid unnecessary compaction, loss of soil and vegetation. Where soil storage is required, topsoil is to be removed, retained and stored separately. Ensure that excavated and stockpiled soil material

		<p>ii). Result in the formation of erosion gullies over time, as a result of stormwater calving out compacted areas during rain events.</p> <p>iii). Erosion processes may result in the sedimentation and associated degradation of drainage lines.</p> <p>Topsoil, to be used during rehabilitation, could be lost should it not be properly stored. Exposed surfaces must be kept to a minimum.</p>		<p>is stored and bermed on the higher lying areas as appropriate and not in any storm water run-off channels or any other areas where it is likely to cause erosion or where water would naturally accumulate.</p> <ul style="list-style-type: none"> • Exposed areas should be suitably top soiled and vegetated as soon as is possible after prospecting. • All areas susceptible to erosion shall be protected with suitable erosion control measures from the onset of the project. • Storm water must be managed so as to reduce potential silt loads in storm water run-off. Measures must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion.
	<p>Damage to and/or destruction of vegetation</p>	<p>Vegetation may be damaged and/or destructed and/or collected by the crew. This may result in:</p> <p>i). The degradation and/or loss of ecologically sensitive or important vegetation units;</p> <p>ii). The loss and/or displacement of threatened or protected flora, impacting on biodiversity;</p> <p>iii). The loss of habitat and grazing pastures available to wildlife and livestock</p>	<p>Medium</p>	<ul style="list-style-type: none"> • Cognisance must be taken of the site sensitivity map and prospecting activities, i.e. access tracks and siting of drill sites must be adjusted accordingly. • Directly affected areas must be screened for the presence Red Data Listed specie, which may not be damaged or removed from site. However, where absolutely necessary, the required permission and permits shall be obtained from Provincial Nature Conservation prior, for the removal of these species if necessary, prior to commencement of works. • Vehicles are to utilise existing roads and tracks where they are available. • Proposed new tracks, with the purpose of accessing drill sites, must be kept to a minimum and agreed on by the land owner. • Should the clearance of vegetation be required, this must be kept to absolute minimum. • Vegetation that does not need to be cleared should be considered as “no-go” areas for contactors and

				<p>machinery.</p> <ul style="list-style-type: none"> • No indigenous tree or shrub shall be felled, lopped, cut or pruned until it has been clearly marked for this purpose. • No plant material may be collected and removed from site. • No invasive species of trees and shrubs may be introduced to the project. • No open fires shall be allowed on site under any circumstance (The Forest Act, 1984 (Act No. 122 of 1984).
	Potential disturbance, displacement and killing of fauna	The presence of vehicles and people on site may disturb wildlife occurring in the area. Staff will have to be vigilant. In particular, faunal species such as tortoises, snakes and ground-living birds may be affected.	Medium	<ul style="list-style-type: none"> • Staff / contractors operating on site have to be vigilant in terms of spotting animals utilising the site. • Drill sites shall be fenced to prevent animals from accessing drill sites. • Litter is prohibited. General waste will be collected and contained. Ensure that no litter, refuse, wastes or rubbish generated on the premises be placed, dumped or deposited on site and/or on adjacent/surrounding. General waste must be removed from site and disposed of at the premises of the Aggeneys Mine. • No faunal species may unnecessarily be handled, killed, hunted or harassed during the prospecting period. • The applicant / contractor shall take notice of the penalties associated with the needless destruction of wildlife, as set out in the Animals Protection Act (Act 71 of 1962) sec. 2
	Pollution	<p>Pollution of soil, surface and ground water resources may occur as a result of:</p> <ol style="list-style-type: none"> Potential spillage of hydrocarbon substances such as diesel and/or oil and lubricants; Sedimentation, resulting from erosion; 	Medium	<ul style="list-style-type: none"> • No storage of soil is to take place within 32 m from the outer boundary of the temporary zone of a wetland / pan, and 30 m from the outer edge of the riparian zone of a drainage line. • Exposed surfaces must be kept to a minimum and

		<p>iii). Litter; and iv). Ablution.</p>		<p>soil, where stockpiled, must be managed appropriately to prevent erosion and sedimentation of water courses</p> <ul style="list-style-type: none"> • Storm water must be managed so as to reduce potential silt loads in storm water run-off. Measures must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion.
	<p>Disturbance and/or destruction of structures of cultural/heritage importance and/or graveyards / graves</p>	<p>Care will be taken to avoid all visible structures, monuments and graves which may be encountered on site during exploration activities. Should any graves be identified during fieldwork, these will be reported to the landowner, SAHRA and the local police and prospecting activities will be moved to avoid them.</p>	<p>Low</p>	<ul style="list-style-type: none"> • The site must be inspected for the actual occurrence of heritage resources, by a suitably qualified, registered practitioner, prior to commencement of prospecting activities, if directed to do so by SAHRA, Should any archaeological artefacts or graves be exposed during prospecting, work on the area where these were found, shall cease immediately and the reported to heritage specialist, so that an investigation and evaluation of the finds can be made. • Under no circumstances shall archaeological artefacts be removed, destroyed or interfered with. • Any archaeological sites exposed during prospecting may not be disturbed prior to authorisation by the South African Heritage Resources Agency.
	<p>Impact on the landowner</p>	<ul style="list-style-type: none"> • Degradation of the environment; • Site access and presence of exploration team causing disturbance to residents and farming activities. • Uncertainty in terms of the particulars of daily prospecting activities on the farm – the whereabouts of the vehicles and crew; • Potential disturbance of daily farming practices (gates left open, fences being cut etc.); 	<p>Medium</p>	<ul style="list-style-type: none"> • Noise levels must be kept to a minimum to prevent disturbance. • The landowner must be consulted in terms of formalising compensation, access arrangements, location of access routes, site camp/s and arrangements in terms of daily modus operandi and liability in terms of damage / losses. Written agreement must be obtained prior to commencement of activities.

		<ul style="list-style-type: none"> • Loss of livestock (animals ingesting foreign substances such as plastic etc.) • Damage to existing infrastructure (homestead, fences, roads, eater supply infrastructure) • Reckless driving and speeding, resulting in veld damage and startling livestock • Noise, causing disturbance to residents, livestock and grazing regimes • Visitors trespassing and overnighing on the farm 		
	Air pollution through dust generation	Excess dust generated by additional vehicles utilising access roads	Low	<ul style="list-style-type: none"> • All vehicles within the prospecting area are not to exceed a maximum speed limit of 40 km/h.
	Noise pollution	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb the landowner and may potentially result in disturbance and/or displacement of livestock and wildlife. Increased noise levels may also temporarily affect the sense of place of the area. .	Low	<ul style="list-style-type: none"> • Personnel must be trained to operational procedures that reduce the occurrence and magnitude of individual noise events. On-site personnel should endeavour to limit unnecessary noise, especially employee loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc.
3. Drilling				
Diamond Core and RAB Drilling	Soil contamination	The soil could be contaminated by hydrocarbon spillages	Low	<ul style="list-style-type: none"> • Vehicle maintenance will occur off-site. • Hydrocarbon materials utilised on site are to be stored correctly, in a bunded area on an impermeable surface, to prevent soil contamination. The quantity of these materials is to be kept to a minimum. • The integrity of tanks used for the collection of sludge must be inspected frequently. • Drip trays should be placed under the rigs to collect all spillages. • Spill kits must be kept at drill sites and personnel must be trained to utilise them.

	<p>Surface water pollution</p>	<p>Surface water, in the form of storm water, could become contaminated with hydrocarbon materials should they leak or should they not be properly contained. These contaminants may be transported by stormwater sheet wash during rainfall events and find their way into larger water courses, i.e. the non-perennial drainage lines. Sedimentation of drainage lines may occur as a result of erosion.</p>	<p>Medium</p>	<ul style="list-style-type: none"> • No storage of soil is to take place within 32 m from the outer boundary of the temporary zone of a wetland / pan, and 30 m from the outer edge of the riparian zone of a drainage line. • It is essential that no disturbance of the associated riparian vegetation takes place. • Hydrocarbon materials utilised on site are to be stored correctly, in suitable containers and in a bunded area on an impermeable surface. The quantity of these materials is to be kept to a minimum. • The contractor / on-site project geologist shall be in possession of an emergency spill kit that must be complete and available on site at all times. • Drill areas shall be monitored continuously for spills and any spills shall be contained, cleaned and re-mediated immediately. • Leaking containers shall be repaired or removed from site. • Vehicles and machinery shall be maintained in good working order, to reduce the probability of leakage of fuels and lubricants. Drip trays must be made readily available in the event of leakage / spillage occurring. • Exposed surfaces must be kept to a minimum and soil, where stockpiled, must be managed appropriately to prevent erosion and sedimentation of water courses • To prevent the deterioration of surface and/or ground water quality, the adequate ablution facilities must be provided. Portable chemical toilets are to be provided. These are to be supplied and maintained by an authorised and licensed contractor. • Storm water must be managed so as to reduce potential silt loads in storm water run-off. Measures
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				<p>must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion.</p>
	Groundwater pollution	Pollution of groundwater resource may occur as a result of uncontained spillages and improper storage of hydrocarbons and contaminated materials.	Medium	<ul style="list-style-type: none"> • All hydrocarbon material must be stored on hard surfaces within bund walls. The bund walls must have capacity to hold 110% of the stored hydrocarbons. • An emergency spill kit must be in place at drill sties to curb all spillages that may results in water pollution. • Drip trays must be placed under the drill rigs to contain any spillages.
	Waste Management	Collection, storage and appropriate disposal of wastes generated on site, such as litter and effluent (ablution facility) could result in pollution if not properly managed.	Low	<ul style="list-style-type: none"> • General waste receptacles with lids are to be provided at trench / drill sites, volumes permitting. • Ensure that no litter, refuse, wastes or rubbish generated on the premises be placed, dumped or deposited on site and/or on adjacent/surrounding. • Waste will be collected and removed from site on a daily basis, to be disposed of at the premises of the Aggeneys Mine, from where it will be disposed of at a licensed facility. • Hydrocarbon contaminated soil and materials should be appropriately and be disposed in a permitted land fill site. Records of disposed wastes and materials should be kept on site for inspection when required by the authorities. • The sludge tank must be managed appropriately and sludge must be kept in a manner that will not cause environmental deterioration.
	Noise pollution	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb the adjacent landowner during the winter months (the farm is not permanently occupied).	Low	<ul style="list-style-type: none"> • The drilling contractor should be and remain aware of the potential annoyance that the running of a drill rig may pose on the immediate environment and maintain the equipment properly and ensure that the equipment is in proper running condition.

		Noise may potentially result in disturbance and/or displacement of wildlife. Increased noise levels may also temporarily affect the sense of place of the area.		<ul style="list-style-type: none"> Personnel must be trained to operational procedures that reduce the occurrence and magnitude of individual noise events. On-site personnel should endeavour to limit unnecessary noise, especially employee loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc.
4. Health and Safety				
Personnel working on site without PPE and under unsafe, uncontrolled conditions.	Injury / death	Personnel working on site without PPE and under unsafe, uncontrolled conditions, where emergency response procedures do not exist, may result in injuries to personnel and in extreme cases, death.	Medium	<ul style="list-style-type: none"> The contractor must comply with the standards set out in the OHS Act. Workers must be provided with appropriate Personal Protection Equipment (PPE). An emergency response plan for the planned prospecting activities should be in place. A formal Induction training to all employees and visitors on site should be provided. Attendees of the training should sign a register confirming that they attended the training. A refresher course should be conducted at least quarterly depending on the duration of the exploration process. The workers right to refuse to work in unsafe and unhealthy environment must be respected. The first aid component must be in place and have a trained first aid personnel on site. All work to be carried out under strict supervision and according to best practice. Material stockpiles or stacks must be stable and well secured to prevent collapse of the stockpile and possible injury to workers or local residents. Workers to be provided with suitable ablution facilities. Workers must be supplied with hearing protection if noise levels exceed 85 decibels. Workers are not allowed to drink alcohol on site. A record of incidents should be kept on site.

Presence of workforce and hydrocarbon substances on site	Potential ignition of fires	Fire can cause destruction of surrounding vegetation, and possible injury / death to personnel.	Medium	<ul style="list-style-type: none"> • Hold regular fire prevention talks. • Regular reminders to the staff of fire prevention • No fires may be made on site at any time or for any purpose whatsoever • Ensure adequate fire fighting equipment on site and in all major working areas and train workers on how to use it. • Ensure that all workers on site know the proper procedure in case of a fire incidence on site. • Smoking is not permitted
DECOMMISSIONING PHASE				
As drill sites will be surveyed and rehabilitated during the operational phase, it is not anticipated that post-closure of drill sites will be a material item. Monitoring of rehabilitation will continue after completion of prospecting activities until the establishment of vegetation is satisfactory. A comprehensive photographic record will be available, demonstrating progress towards restoring land to its original condition. The proposed rehabilitation plan and associated monitoring programmes will form part of the EMP compliance reporting programme. Trenches, drill pads and the access road will be rehabilitated as described below				
<ul style="list-style-type: none"> • Rehabilitation of drill sites and access tracks • Removal of infrastructure • Clean up • Facilitating the re-establishment of vegetation 	Soil and water contamination	Contamination of soils and water as a result of hydrocarbon spillages	Low	<ul style="list-style-type: none"> • An emergency spill kit must be in place site to curb all spillages that may results in water pollution.
	Soil erosion	Erosion of the rehabilitated area.	Low	<ul style="list-style-type: none"> • The rehabilitated drill sites must be sloped to be similar to that of the surrounding area and where signs of erosion are seen additional erosion control measures should be implemented.
	Introduction of invader species	Invader species might be introduced into the area during the re-vegetation process.	Low	<ul style="list-style-type: none"> • Indigenous seeds that are easily accessible at a reasonable cost must be purchased. • The area must be inspected quarterly to ensure that affected areas are kept free of weeds and invader species. Should these be present, it should be removed and disposed of appropriately, as per the advice of the EO.
Presence of personnel on site	Health and Safety	Injury and/or death in extreme cases	Medium	<p>A Health and safety Method Statements addressing the issues below should be compiled:</p> <ul style="list-style-type: none"> • The contractor must comply with the standards set out in the OHS Act. • Workers must be provided with appropriate

				<p>Personal Protection Equipment (PPE).</p> <ul style="list-style-type: none"> • Respect workers' right to refuse to work in unsafe and unhealthy environment. • Provide first aid component and have a trained first aid personnel on site. • All work to be carried out under strict supervision and according to best practice. • Where present, material stockpiles or stacks must be stable and well secured to prevent collapse of the stockpile and possible injury to workers or local residents. • Workers to be provided with suitable ablution facilities. • Workers must be supplied with hearing protection if noise levels exceed 85 decibels. • Workers are not allowed to drink alcohol on site. • Keep record of injuries on site.
		Risk of fire	Medium	<ul style="list-style-type: none"> • Hold regular fire prevention talks. • Regular reminders to the staff of fire prevention • All fires should be put out immediately after use • Ensure adequate fire fighting equipment on site and in all major working areas and train workers on how to use it. • Ensure that all workers on site know the proper procedure in case of a fire incidence on site. • Smoking is not permitted in those areas considered a fire hazard

3.2.3 Review the significance of the identified impacts after bringing the proposed mitigation measures into consideration

Refer to the comprehensive Impact Assessment Table provided below (Table 16). In summary, based on the assessment methodology described previously, all identified potential impacts have low significance after bringing the proposed mitigation measures into consideration.

Table 16: Significance of impacts after bringing proposed mitigation measures into consideration

CONSTRUCTION PHASE															
There will be no construction involved in this programme. No camp site and/or the construction of concrete drill pads or infrastructure are required, as indicated in sections 2.1.1 and 2.2.2.															
OPERATIONAL PHASE															
ACTIVITY	IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE PRE-MITIGATION						SIGNIFICANCE POST-MITIGATION						
			Ext.	Dur.	Sev.	Prob	S. Rating	Sig	Ext.	Dur.	Sev.	Prob	S. Rating	Sig	
1. Site access via public roads and presence of vehicles on site															
Movement of vehicles on public roads and presence of vehicles on site	Increased traffic volumes regionally	An increase of vehicles on public roads will lead to an increase in traffic in the area, resulting in increased risks for accidents due to possible human error and/or driver fatigue. It may therefore potentially present itself as a hazard to wildlife and livestock.	2	2	0	5	20	Low	2	2	2	3	18	Low	
2. Creation of tracks, establishment of site camp/s and preparation of drill sites															
(a) Creation of on-site access tracks	Soil compaction and loss of topsoil	Soils will be compacted by the frequent movement of vehicles over them, contributing to the degradation of the environment. The compaction of soil may: i). Affect the ability of the substrate to host vegetation, therefore impacting on i) biodiversity (i.e. the number and variety of	1	2	4	5	35	Medium	1	2	4	3	21	Low	
(b) Establishment of site camp/s															
(c) Preparation of drill sites															

		<p>plant and animal species occurring naturally in the area); and ii) the agricultural potential of the land in terms of providing sufficient grazing; and</p> <p>ii). Result in the formation of erosion gullies over time, as a result of stormwater calving out compacted areas during rain events.</p> <p>iii). Erosion processes may result in the sedimentation and associated degradation of drainage lines.</p> <p>Topsoil, to be used during rehabilitation, could be lost should it not be properly stored. Exposed surfaces must be kept to a minimum.</p>													
	Damage to and/or destruction of vegetation	<p>Vegetation may be damaged and/or destroyed and/or collected by the crew. This may result in:</p> <p>i). The degradation and/or loss of ecologically sensitive or important vegetation units;</p> <p>ii). The loss and/or displacement of threatened or protected flora, impacting on biodiversity;</p> <p>iii). The loss of habitat and grazing pastures available to wildlife and livestock</p>	1	2	6	5	45	Medium	1	2	4	4	28	Low	
	Potential disturbance,	The presence of vehicles	1	2	4	5	35	Medium	1	2	2	4	20	Low	

	displacement and killing of fauna	and people on site may disturb wildlife occurring in the area. Staff will have to be vigilant. In particular, faunal species such as tortoises, snakes and ground-living birds may be affected.													
	Pollution	<p>Pollution of soil, surface and ground water resources may occur as a result of:</p> <p>i). Potential spillage of hydrocarbon substances such as diesel and/or oil and lubricants;</p> <p>ii). Sedimentation, resulting from erosion;</p> <p>iii). Litter; and</p> <p>iv). Ablution.</p>	2	2	4	4	32	Medium	2	2	2	3	24	Low	
	Disturbance and/or destruction of structures of cultural/heritage importance and/or graveyards / graves	<p>Care will be taken to avoid all visible structures, monuments and graves which may be encountered on site during exploration activities.</p> <p>Should any graves be identified during fieldwork, these will be reported to the landowner, SAHRA and the local police and prospecting activities will be moved to avoid them.</p>	1	5	10	1	16	Low	1	5	2	1	8	Low	
	Impact on the landowner	<ul style="list-style-type: none"> Degradation of the environment; Site access and presence of exploration team causing disturbance to residents and farming activities. Uncertainty in terms of 	1	2	6	4	36	Medium	1	2	4	3	21	Low	

		<p>the particulars of daily prospecting activities on the farm – the whereabouts of the vehicles and crew;</p> <ul style="list-style-type: none"> • Potential disturbance of daily farming practices (gates left open, fences being cut etc.); • Loss of livestock (animals ingesting foreign substances such as plastic etc.) • Damage to existing infrastructure (homestead, fences, roads, eater supply infrastructure) • Reckless driving and speeding, resulting in veld damage and startling livestock • Noise, causing disturbance to residents, livestock and grazing regimes • Visitors trespassing and overnighting on the farm 																
	Air pollution through dust generation	Excess dust generated by additional vehicles utilising access roads, resulting in deterioration of local air quality	2	2	0	5	20	Medium	1	2	0	3	9	Low				
	Noise pollution	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb the landowner and may potentially result in disturbance and/or displacement of livestock	2	2	0	5	20	Medium	1	2	0	3	9	Low				

		and wildlife. Increased noise levels may also temporarily affect the sense of place of the area.													
3. Drilling															
Diamond Core and RAB Drilling	Soil contamination	The soil could be contaminated by hydrocarbon spillages and sludge (at Diamond Core drill sites only).	1	2	4	4	28	Low	1	2	2	3	15	Low	
	Surface water pollution	Surface water, in the form of storm water, could become contaminated with hydrocarbon materials should they leak or should they not be properly contained. These contaminants may be transported by stormwater sheet wash during rainfall events and find their way into larger water courses, i.e. the non-perennial drainage lines. Sedimentation of drainage lines may occur as a result of erosion.	2	2	4	4	32	Medium	2	2	2	2	12	Low	
	Groundwater pollution	Pollution of groundwater resource may occur as a result of uncontained spillages and improper storage of hydrocarbons and contaminated materials.	2	2	4	4	32	Medium	2	2	2	2	12	Low	
	Waste Management	Collection, storage and appropriate disposal of wastes generated on site, such as litter and effluent (ablution facility) could result in pollution if not properly managed.	1	2	4	3	21	Low	1	2	2	2	10	Low	
	Noise pollution	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb	2	2	0	5	20	Low	1	2	0	3	9	Low	

		the landowner. Noise may potentially result in disturbance and/or displacement of livestock and wildlife. Increased noise levels may also temporarily affect the sense of place of the area.													
4. Health and Safety															
Personnel working on site without PPE and under unsafe, uncontrolled conditions.	Injury / death	Personnel working on site without PPE and under unsafe, uncontrolled conditions, where emergency response procedures do not exist, may result in injuries to personnel and in extreme cases, death.	1	2	8	3	33	Medium	1	2	4	2	14	Low	
Presence of workforce and hydrocarbon substances on site	Potential ignition of fires	Fire can cause destruction of surrounding vegetation, and possible injury / death to personnel.	2	2	8	3	36	Medium	1	2	4	2	14	Low	
DECOMMISSIONING PHASE															
As drill sites will be surveyed and rehabilitated during the operational phase, it is not anticipated that post-closure of drill sites will be a material item. Monitoring of rehabilitation will continue after completion of prospecting activities until the establishment of vegetation is satisfactory. A comprehensive photographic record will be available, demonstrating progress towards restoring land to its original condition. The proposed rehabilitation plan and associated monitoring programmes will form part of the EMP compliance reporting programme. Trenches, drill pads and the access road will be rehabilitated as described below															
Rehabilitation of drill sites and access tracks	Soil and water contamination	Contamination of soils and water as a result of hydrocarbon spillages	1	2	4	4	28	Low	1	2	2	3	15	Low	
Clean up of infrastructure	Soil erosion	Erosion of the rehabilitated area.	1	2	4	4	28	Low	1	2	2	3	15	Low	
Facilitating the re-establishment of vegetation	Introduction of invader species	Invader species might be introduced into the area during the re-vegetation process.	2	5	6	2	26	Low	1	1	2	3	12	Low	
Presence of personnel on site	Health and Safety	Injury and/or death in extreme cases	1	2	8	3	33	Medium	1	2	2	2	10	Low	
		Risk of fire	2	3	6	3	33	Medium	1	2	2	2	10	Low	

4 REGULATION 52 (2) (d): Financial provision The applicant is required to-

4.1 Plans for quantum calculation purposes

(Show the location and aerial extent of the aforesaid main prospecting actions, activities, or processes, for each of the construction operational and closure phases of the operation).

A standard phased approach to all prospecting activities will be implemented and each prospecting activity will be undertaken on a scheduled timeline. Boreholes will be drilled one at a time, because the exact location of drill holes will be determined as the drilling campaign progresses. Locations are determined based on the results obtained at previous holes. Figure 7 (Addendum A) shows the proposed preliminary locations of the proposed twelve drill holes during the first phase of drilling (phase four of the prospecting programme, in year 3).

The construction of infrastructure is not required. Temporary drill camp/s consisting of caravans, a parking area, a kitchen area and a mobile chemical toilet, in an enclosed area and meeting minimum Mine Health and Safety Standards will be established once drilling commences. Drill sites will be accessed using existing access tracks. Where tracks do not exist, drill sites will be accessed by driving in the veld. There will therefore be a very small number of frequently used tracks created by multiple/repeated use during prospecting.

Twenty one boreholes may be drilled, affecting an area of 0.3448 ha. Prospecting activities will unfold progressively, based on the outcomes of preceding phases / drilling.

Activities requiring rehabilitation (closure) will be predetermined access tracks, site camps and drill sites. The actual extent and location of access routes will be discussed and agreed with the landowner prior to commencement of prospecting.

4.2 Alignment of rehabilitation with the closure objectives

(Describe and ensure that the rehabilitation plan is compatible with the closure objectives determined in accordance with the baseline study as prescribed).

The objective of closure is to return the land to a condition that is as close to its original condition as technically possible while ensuring safe conditions for people and animals. This entails appropriate concurrent rehabilitation of drill holes as well as the minimisation of disturbance to the environment during associated activities.

Sound environmental management, which leaves the prospecting areas in a condition acceptable to the landowner and Director: Mineral Development is committed to in this EMP.

Table 17: Alignment of rehabilitation and closure objectives

Activity	Impact	Closure objective	Rehabilitation Plan
Creation of access tracks, drill camp establishment and positioning of drill rigs.	Soil compaction and trampling of vegetation	To reinstate the environment (topography and vegetation) to pre-exploration conditions	<p>The generation of disturbed surface areas will first and foremost be limited and avoided as far as possible.</p> <p>Rehabilitation of disturbed areas will be undertaken progressively and immediately upon completion of each drill hole. Upon completion, the borehole is capped and sealed, with markers being placed at the collars of completed holes. The location of the holes is recorded by GPS, mapped and photographed.</p> <p>Rehabilitation of cleared areas will take the form of:-</p> <ul style="list-style-type: none"> • Removing all possible wastes and foreign objects; • The scraping, ripping, backfilling and levelling and/or re-profiling of affected areas, as may be required • The seeding and initial watering of the seeded area, if necessary; and • Limiting the access of grazing animals as far as possible at disturbed areas. <p>Progress with rehabilitation will be monitored bi-annually for a period of 2 – 3 years after completion of the prospecting activities. Photographs will be taken for comparison to those taken of the affected areas prior to the commencement of prospecting.</p> <p>In the event that rehabilitation is not successful, corrective action will be taken. This may include bringing in additional topsoil, reseeding and mulching, depending on the reasons for the failure of the prior re-vegetation methods.</p>
Drilling	Pollution through the uncontrolled releases of grease / sludge / (hydrocarbon substances)	To ensure an environment free of pollutants	<ul style="list-style-type: none"> • Removing all possible wastes and foreign objects remaining on site subsequent to drilling. • All polluted surfaces or soil will be treated immediately and successful rehabilitation shall be proven. • All incidents shall be recorded and reported.

4.3 Quantum calculations

(Provide a calculation of the quantum of the financial provision required to manage and rehabilitate the environment, in accordance with the guideline prescribed in terms of regulation 54 (1) in respect of each of the phases referred to).

Key assumptions

The following key assumptions were made during the quantum calculation:

- The exploration campaign will take the shape of 10 RAB and 17 Diamond Core (DC) drilled boreholes, totalling twenty seven boreholes affecting an area of 0.3488 ha.

- Drill sites will be accessed using existing access tracks. Where tracks do not exist, drill sites will be accessed by driving in the veld. There will be a very small number of frequently used tracks created by multiple/repeated use during prospecting.
- A temporary drill camp with a surface area of approximately 15m x 15 m will be established.
- All maintenance and repairs will be done off-site at formal service centres.
- All fuel, greases and other liquids required for the drilling will be transported to, and later removed from site in a manner that leaves no waste or spillage behind. Waste disposal for contaminated sludge and greases will take place at existing authorised facilities at the Aggeneys Mine.
- Potable water will be sourced off-site and carried in the drill vehicles.
- There will be a person responsible for logging Environment, Health & Safety incidents for ensuring that all staff and contractors have been familiarised with the standard operating procedures that arise from the EMP.

Summary of Impacts

The main anticipated impacts (after mitigating measures as set out in the EMP) are localised soil compaction and vegetation damage at the drill camp, along access tracks and at the drill sites. A total surface area of 1 ha may require rehabilitation. There is also a limited potential for spills of hydro-carbons.

Costs of Rehabilitation after drilling

The costs of rehabilitation after drilling is calculated based on proven experience with rehabilitation activities associated with similar prospecting activities.

The financial provision is provided in Table 18. The quantum of the financial provision required to manage and rehabilitate the environment takes the drilling and rehabilitation of twenty one borehole sites, the site camp and access tracks into account.

Frequently used access tracks will branch off the existing access roads / tracks over a length of approximately 7.5 km. Due to the nature of the soils it is assumed that at worst 20% of these track areas would require rehabilitation. At a track width of 5 meters (due to frequent use) this would amount to an approximate surface area of 0.75 hectare. This provision would also be sufficient to cover *ad hoc* impacts that may occur due to localised soil conditions and/or accidents on less frequently used tracks. This rehabilitation would take the form of limited manual raking to open and flatten the surface area and very limited, targeted seeding of plants.

The sq.m. master rate applied by the DMR in 2013 for general surface rehabilitation and grassing is R 87 200 / ha. Adjusted according to the Consumer Price Index (STATSSA March 2014 at 6%) a rate of R92 432 / ha applies. At 7500 sq.m. This amounts to R 69 324.00.

In addition it is assumed that the establishment of temporary drill camps will disturbed an area of 900 sq.m which is likely to require rehabilitation which must be provided for at the same rate as above. This amounts to R 8 318.00 for the 0.09 ha disturbed.

The 27 drill holes will affect an area of 3448 sq.m (0.34 ha) creating a total liability of R 31 870.91.

These master rates cover the manual rehabilitation, the cost of procuring suitable seed, and its appropriate application to ensure germination. In addition, the DMR also requires a provision for 2 to 3 years of monitoring of impacted sites at a rate of R 11 600 / ha. Adjusted according to the Consumer Price Index (STATSSA March 2014 at 6%) a

rate of R 12 296 / ha applies. The total disturbed area amounts to 1.18 ha. Rounded up, provision is made for the monitoring of 1.5 ha over a 2 – 3 year period.

Thus the total provision to close out the impacts associated with the exploration campaign envisaged amount to R127 957.79.

Table 18: Quantum calculations

	Length (m)	Width (m)	Area sq.m	Amount	Total Area Sq.m	Area ha	Total disturbed surface area rounded up	DMR Master Rate / ha*	Amount required
General surface rehabilitation	1500.00	5.00	7500.00		7500.00	0.75		R 92 432.00	R 69 324.00
Site Camp (15 m x 15 m)	15.00	15.00	225.00	4.00	900.00	0.09		R 92 432.00	R 8 318.88
General surface rehabilitation at drill sites (27)	58.72	58.72	3448.04	27.00		0.34		R 92 432.00	R 31 870.91
TOTAL	1573.72	78.72	11173.04		8400.00	1.18	1.50	R 92 432.00	R 109 513.79
2- 3 years monitoring*							1.50	R 12 296.00	R 18 444.00
TOTAL REQUIRED									R 127 957.79

4.4 Undertaking to provide financial provision

(Indicate that the required amount will be provided should the right be granted).

Black Mountain Mining (PTY) LTD will provide the indicated financial provision of R 127,957.79 for rehabilitation of the site. The Prospecting Works Programme will be amended accordingly.

5 REGULATION 52 (2) (e): Planned monitoring and performance assessment of the environmental management plan

Due to the small scale and temporary nature of the proposed prospecting operations as well as the low significance of the identified impacts, no formal monitoring programmes are required. On-going and regular reporting on the progress of the implementation of the EMP will be done. In addition to this inspections and monitoring will be carried out on the implementation of the EMP, this includes the impacts on plant and animal life, soil and water resources.

Table 19 serves as a comprehensive on-site management plan. It contains identified environmental impacts and risks and proposes actions for the mitigation and management thereof. Responsible persons and timeframes for monitoring are also included.

5.1 List of identified impacts requiring monitoring programmes

Identified impacts requiring monitoring programmes include the following:

- (a) Traffic impacts;
- (b) Air pollution through the generation of dust;
- (c) Localised soil compaction, over access routes at site camps and at drill sites;
- (d) Damage to and/or removal vegetation;
- (e) Impacts on fauna
- (f) Pollution of soil and water resources
- (g) Impacts on heritage resources
- (h) Noise impacts
- (i) Impacts on the landowner

5.2 Functional requirements for monitoring programmes

Monitoring of the impacts which require monitoring programmes, as listed in 5.1 above, will be undertaken by the site manager or exploration geologist on a daily basis. The functional requirements for monitoring programmes are provided in Table 15 below.

As a general approach, BMM will ensure that the inspections and monitoring as outlined in Section 5.1 comprise the following:

- Inspections and monitoring will be conducted by suitably qualified personnel
- Results from the inspections and monitoring will be compiled into a report by a competent person on a regular basis
- Reports will be kept on record for the life of the prospecting activities.

5.3 Roles and responsibilities for the execution of monitoring programmes

The Site Manager (normally the Project Geologist) will be responsible for daily monitoring, culminating in weekly reports which will be filed in support of an overall monthly report, which is to be submitted to the BMM Environmental Office. Compliance with this EMP will be audited quarterly by the BMM Environmental Officer. The officer will be responsible for quarterly site inspections and reports, culminating in the compilation of the annual performance assessment report which is to be submitted to the DMR, as per legal requirement. The results of these inspections will be documented and kept on record for the life of the prospecting operation.

5.4 Committed time frames for monitoring and reporting

During prospecting operations, monitoring and reporting will take place as described in Section 5.3 above. Once the site has been rehabilitated, quarterly monitoring for a period of 2 to 3 years is typically allocated for areas disturbed by prospecting operations. This period may be reduced depending on the monitoring results.

Table 19: Action plans and schedule for each phase prospecting (Note that no construction activities are required)

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
PLANNING PHASE				
Consultation with the landowner	<p>To ensure the establishment of a transparent relationship</p> <p>To ensure that the landowner's concerns are addressed</p> <p>To ensure that cognisance is taken of the landowner's requirements in terms of planned daily operations</p>	Meeting with the landowner and formalising preliminary compensation, access arrangements, location of access routes and arrangements in terms of daily <i>modus operandi</i> , liability in terms of theft and loss of game. Written agreement must be reached. .	BBM (PTY) LTD	Before issue of the permit and continuously as agreed with the landowner going forward
Finalisation of location of proposed access routes	To ensure that appropriate access is provided to drill sites, whilst creating minimal disturbance to soil and vegetation	The location of access routes must be discussed and agreed with the landowner, and routes must be planned and developed taking cognisance of environmental sensitivities identified.	BBM (PTY) LTD / EO Landowner	Once-off, prior to commencement of prospecting
Appointment of contractors / subcontractors	To ensure that the contractor implements all the mitigation measures as described in this EMP.	This EMP must be made binding on the contractor / subcontractor.	BBM (PTY) LTD	Once-off
		All contractors and sub-contractors must have a copy of the EMP and a copy of the EMP must be kept on site during all phases of the project, for ease of reference.	BBM (PTY) LTD Contractor	Throughout the duration of the project
Appointment of Environmental Control Officer	<p>To ensure implementation and compliance monitoring of the EMP, by an independent party.</p> <p>The ECO will provide formal rapport to the DMR and the relevant Provincial Environmental Authority</p>	An Environmental Control Officer (ECO) must be appointed, with the purpose if independently monitoring compliance with the EMP		
		The EO must ensure that cognisance is taken of ecological site sensitivities. The identified areas of high ecological sensitivity must be avoided as far as possible. The area containing <i>Pachypodium namaquanum</i> is a no-go area and must be delineated as such. A 100 m buffer is suggested.	EO	Once-off
		Quarterly audit reports must be compiled for internal reporting purposes and submitted to the DMR and the relevant Provincial Environmental Authority. The appointed SM must submit monthly compliance reports to the ECO. If non-compliance has been found, it should be reported to the relevant government authorities within 5 working days.	EO	Quarterly
		Quarterly audit reports must inform the compilation and submission of the annual Performance Assessment Report which is to be submitted to the DMR in the	EO	Yearly

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		required format		
Appointment of Site Manager	To ensure daily implementation of the mitigation measures described in the EMP and compliance monitoring	A Site Manager (SM) must be appointed	BBM (PTY) LTD / Contractor	Once-off
		The site manager must monitor compliance with the EMP on a daily basis and produce weekly reports detailing performance and non-compliance. Weekly reports will inform the monthly compliance report which is to be submitted to the ECO.	SM	Daily inspection, weekly reports
		Monthly compliance reports and records of incidents must be submitted to the ECO.	SM	Monthly
Environmental training and awareness	To educate the workers on the correct environmental procedures	<p>Prior to the commencement of prospecting, all personnel must attend an environmental briefing / training session with regards to contents of the EMP.</p> <p>Staff should pertinently be informed about the occurrence of protected plant species and should receive a description and visual presentation of the species involved.</p>	BBM (PTY) LTD / Contractor / EO	Once-off, prior to commencement of prospecting
	Worker conduct	<p>No alcohol, drugs or weapons will be allowed on site or in the vehicles transporting staff to/from site</p> <p>Excessive noise and unsocial behaviour is prohibited.</p> <p>No trespassing is allowed on surrounding properties.</p> <p>Driving under the influence of alcohol is strictly forbidden.</p> <p>No smoking is permitted on site.</p> <p>No fires are permitted on site.</p> <p>No plant material or animals may be collected, harvested or removed from site, including firewood</p> <p>No bird or animal, including livestock may be hunted by any means, including the</p>	SM	Throughout duration of the project.

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		use of snares and traps.		
Health and Safety	Ensure safe working and healthy environment and prevention of injuries of the workers on site.	The contractor must comply with the standards set out in the Occupational Health and Safety Act (Act 85 of 1993).	SM	Prior to commencement of prospecting
	Prevention of fires on site	Workers must be provided with appropriate Personal Protection Equipment (PPE).		
		All work to be carried out under strict supervision and according to good practice.	SM	Daily
		Provide first aid equipment and have a qualified first aid practitioner on site.	SM	Daily
		Keep record of injuries on site and inform ECO of any incidents.	SM	Daily
		Ensure that the construction vehicles are under the control of competent personnel and are in proper working order. Ensure that only suitably qualified personnel use construction vehicles	SM	Daily
		Workers to be provided with suitable ablution facilities.	SM	Daily
		Workers must be supplied with hearing protection if noise levels exceed 85 decibels.	SM	Daily
		Hold regular fire prevention talks and remind staff of fire prevention	SM	Weekly
		Ensure adequate fire fighting equipment on site and in all major working areas and train workers on how to use it.	SM	Daily
		Ensure that all workers on site are aware of the emergency response procedure in case of a fire incidence on site.	SM	Monthly
		Smoking is not permitted in those areas considered a fire hazard	SM	Daily
Record of environmental incidents	To ensure that incidents are recorded and remedial action is taken to restore the environment to acceptable conditions.	The incidents must be handled appropriately and record be kept of all incidents.	SM and EO	Throughout the duration of the project
		Rehabilitation of areas affected by incidents must commence immediately after the incident occurring.		
	Immediate and appropriate	Records of all incidents must be provided to the BBM EO within 24 hours of the		

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
	response to environmental incidents. Prevention of recurrence of similar incidents.	incident occurring. Photos should be taken of the incident and a comprehensive record must be taken of the particulars of the incident and corrective and preventative actions taken and proposed. All incidents should be investigated in association with the BBM EO. The cause should be highlighted and training should be provided to staff to prevent recurrence of similar incidents. Non compliance and incidents must be reported to the authority within 48 hours.		
OPERATIONAL PHASE (SITE ACCESS AND DRILLING)				
Traffic	To ensure safe road / driving conditions	Clearly mark the site access points and access routes on site to be used by vehicles	SM	Once-off
		Keep record of accidents and inform BBM EO of any accidents on site.	SM	Daily
		Instruct all drivers to use the designated access points and routes.	SM	Once-off
		Speed limits on the public roads must be observed at all times.	SM	Daily
		Driving after sunset is prohibited.	SM	Daily
		Driver fatigue must be addressed through having a sufficient number of drivers available, taking turns to drive whenever necessary	SM	Daily
		Drivers must hold a valid driver's licence and be experienced with driving on gravel roads / areas requiring 4 x 4 and low range function	SM	Once-off
		All vehicles within the prospecting area are not to exceed a maximum speed limit of 40 km/h.	SM	Daily
		Ensure that the necessary signage and traffic measures are implemented for safe and convenient access to the site. Measures must also be put in place to ensure that these roads and any access points do not get built up with mud or sand	SM	Weekly

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
Dust generation / pollution	To avoid dust nuisance resulting from driving on gravel roads / access tracks To prevent dust nuisance resulting from drilling	All vehicles within the prospecting area are not to exceed a maximum speed limit of 40 km/h.	SM	Daily
		Trips to the site must be adequately planned, to prevent unnecessary utilisation of roads.	SM	Daily
		Where possible and/or necessary, dust should be suppressed.	SM	As and when required
Localised compaction of soil	To ensure minimal disturbance to land surface	Vehicles are to utilise existing tracks where they are available.	SM	Daily
		Exposed surfaces must be kept to a minimum through minimising the number and extent of access routes driven into the veld, so as to avoid unnecessary compaction and loss of soils and loss of vegetation.		
		Actual locations of access routes must be finalised with the input of the EO and discussed and agreed with the landowner prior to commencement of prospecting activities.		
		Driving may only occur on predetermined routes.		
		Land surrounding access routes and drill sites are considered no-go areas for contractors and vehicles.		
		Access routes may not cross or be located within the drainage lines and its associated 30m buffer. Access tracks may cross sensitive vegetation units where it is the only option of providing access. These crossings must be determined in consultation with the EO.		
		Exposed areas should be suitably top-soiled and vegetated as soon as is possible at each drill site and after prospecting. Rehabilitation of drill sites must occur immediately upon completion of drilling.		
		All areas susceptible to erosion must be protected with suitable erosion control measures from the onset of the project.		
		Storm water must be managed so as to reduce potential silt loads in storm water run-off. Measures must be implemented to distribute storm water as evenly as		

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		possible to avoid point sources of erosion.		
Damage to and/or removal vegetation	To prevent unnecessary removal of plants, resulting in loss of loss in habitat, biodiversity and soil erosion.	Vehicles are to utilise existing tracks where they are available. However damage to and the removal of vegetation will occur along access routes and at trench and drill locations. This must be kept to an absolute minimum.	SM / EO	Daily
		Predetermined access routes and trench / drill sites which are located within identified sensitive areas must be screened for the presence of protected plants and animals. Where these plants are encountered, it will be cordoned off and avoided. Where rerouting is not possible, the possibility to successfully relocating listed species to suitable habitat on site must be investigated. Where required, the necessary permission and permits shall be obtained from Provincial Nature Conservation The area containing <i>Pachypodium namaquanum</i> is a no-go area and must be delineated as such. An appropriate buffer must be determined and enforced.		
		Should new tracks be required these must be kept to a minimum and agreed upon by the land owner.		
		Areas outside of access routes and drill locations are considered no-go areas.		
		Rehabilitation of drill sites must occur immediately upon completion of drilling. Where reseeding or reintroduction of vegetation into the environment is required, this must be with locally indigenous species.		
		No invasive species may be introduced to the project. Invasion of alien species must be monitored. Invasive species must be removed by a method as identified by the EO.		
		No fires shall be allowed on site under any circumstance (The Forest Act, 1984 (Act No. 122 of 1984).		
		Impacts on fauna		
No faunal species may unnecessarily be handled, killed, hunted or harassed during the prospecting period.	SM		Daily	
The applicant / contractor shall take notice of the penalties associated with the needless destruction of wildlife, as set out in the Animals Protection Act (Act 71 of 1962) sec. 2	SM		Once-off	
Litter is prohibited. General waste will be collected and contained within vehicles. Ensure that no litter, refuse, wastes or rubbish generated on the premises be placed, dumped or deposited on site and/or on adjacent/surrounding. Waste must be removed from site and disposed of using the municipal system or system in place at local guesthouses.	SM		Daily	

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
Pollution	To keep the site free from pollution, resulting in environmental degradation	General waste will be collected and removed from site on a daily basis, to be disposed of at the premises of the Aggeneys Mine, from where it will be disposed of at a licensed facility. Ensure that no litter, refuse, wastes or rubbish generated on the premises be placed, dumped or deposited on site and/or on adjacent/surrounding.	SM	Daily
		Hydrocarbon materials utilised on site are to be stored correctly, in suitable containers on an impermeable surface. All hydrocarbon material must be stored on hard surfaces within bund walls. The bund walls must have capacity to hold 110% of the stored hydrocarbons The quantity of these materials brought onto site, on a daily basis, is to be kept to a minimum.		
		The sludge tank at DC drill pads must be inspected for leaks and the sludge must be kept and disposed of in a manner that will not cause environmental deterioration.		
		The on-site project geologist shall be in possession of an emergency spill kit that must be complete and available on site at all times.		
		Drill areas shall be monitored continuously for spills and any spills shall be contained, cleaned and re-mediated immediately.		
		Leaking containers shall be repaired or removed from site.		
		Vehicles and machinery shall be maintained in good working order, to reduce the probability of leakage of fuels and lubricants.		
		Drip trays must be made readily available in the event of leakage / spillage occurring.		
		Ablution will occur in portable ablution facility. This facility must be located outside of identified drainage lines and water courses.		
		Vehicles will be serviced off-site		
Impacts on Heritage Resources		All visible structures, monuments and graveyards occurring on site, must be avoided. A buffer area of 50 m is applicable. Under no circumstances shall archaeological artefacts or buildings older than 60 years be removed, destroyed or interfered with.	SM	Daily
		Any heritage and/or archaeological sites exposed during prospecting may not be		

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		<p>disturbed prior to authorisation by the South African Heritage Resources Agency.</p> <p>Should any graves, other than those located in graveyards, be identified during fieldwork, work will cease immediately and the finds reported to the landowner, SAHRA and the local police so that an investigation and evaluation of the finds can be made.</p> <p>Should any archaeological artefacts or historical structures be discovered or exposed during prospecting, work on the area where these occur, shall cease immediately and the reported to SAHRA and/or the heritage specialist.</p>		
Noise	To reduce the impact of noise associated with prospecting activities	<p>All construction machines will be equipped with appropriate noise reduction equipment and the vehicles should be roadworthy.</p> <p>Construction and the use of construction machinery should be limited between 07h00 and 18h00.</p> <p>All mechanical equipment should be in good working order</p> <p>Personnel must be trained to operational procedures that reduce the occurrence and magnitude of individual noise events. On-site personnel should endeavour to limit unnecessary noise, especially employee loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc.</p>	SM	Daily
Landowner	To ensure transparent relationship and amiable work conditions	Daily liaison with the landowner	SM	Daily
DECOMMISSIONING PHASE				
Note that since drill sites will be surveyed and rehabilitated during the operational phase, it is not anticipated that post-closure of drill sites will be a material item.				
Rehabilitation	To ensure that the landscape and vegetation is returned to its original state	<p>The status of rehabilitation undertaken at drill sites must be recorded and monitored.</p> <p>Access routes must be rehabilitated. This rehabilitation would take the form of limited manual raking to open and flatten the surface area and very limited, targeted seeding of indigenous plants.</p>	SM / EO	Daily at drill sites and at access routes once drilling has been finalised

ACTIVITY / IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		<p>A comprehensive photographic record must be kept, demonstrating progress towards restoring land to its original condition.</p> <p>The emergence of invasive alien species must be monitored on a quarterly basis. Invasive species must be removed by a method as identified by the EO.</p>		

6 REGULATION 52 (2) (f): Closure and environmental objectives

6.1 Rehabilitation plan

(Show the areas and aerial extent of the main prospecting activities, including the anticipated prospected area at the time of closure).

Activities requiring rehabilitation (closure) will be predetermined access tracks, drill camps and drill sites. Rehabilitation would mainly take the form of limited manual raking to open and flatten the surface area and very limited, targeted seeding of plants.

Refer to Figure 11 for the location of the proposed prospecting activities and Diagrams 1 - 3 for the conceptual layout of the drill- and camp sites.

The actual extent and location of access routes will be discussed and agreed with the landowner prior to commencement of prospecting. Plans for rehabilitation are based on the assumption that frequently used access tracks will branch off the existing access roads / tracks over a length of approximately 7.5 km. Due to the nature of the soils it is assumed that at worst 20% of these track areas would require rehabilitation. At a track width of 5 meters (due to frequent use) this would amount to an approximate surface area of 0.75 hectare.

In addition it is assumed that the establishment of temporary drill camps will disturb an area of 675 sq.m while the proposed 27 drill holes will affect an area of 3448 sq.m (0.3448 ha). The total disturbed area amounts to approximately 1.18 ha.

All rehabilitation referred to in this environmental management programme will be done concurrent to prospecting operations (MPRDA 38(1) (b) &(c)). This aims not only to minimise final rehabilitation cost during the decommissioning phase, but also to reduce the cumulative effect of impacts as soon as they are identified. The best practice method will be used.

Should the Director: Mineral Development deem the re-establishment of vegetation, where required, as unacceptably slow, the holder of the right may be required to correct this by soil analyses and reseeded.

6.2 Closure objectives and their extent of alignment to the pre-mining environment

The objective of closure is to return the environment back to its pre-prospecting condition as far as practically possible. The site will be inspected and photographed prior to disturbance. After each drill hole is completed, the site is photographed, rehabilitated, and monitored over a two – three year period. It is essential that photographs of the access routes and drill locations are taken before and after rehabilitation and kept on record for presentation to the Director: Mineral Development.

The areas requiring possible rehabilitation will be temporary camp sites, drill sites and predetermined access tracks, as described above. The affected farms are productive farm units and the land is used for grazing purposes. Affected areas will be restored to pre-prospecting conditions through the implementation of the proposed rehabilitation plan (Table 20).

Table 20: Closure objectives and alignment to pre-prospecting environment

Activity	Closure objective	Rehabilitation Plan
Creation of access tracks, excavation of trenches and clearing and preparation of drill pads and drill holes	To reinstate the environment (topography and vegetation) to pre-exploration conditions, i.e. natural veld in support of	Rehabilitation of trenches and drill pads, including boreholes, will be undertaken progressively and immediately upon completion of each drill hole and/or trench.

	game farming	<p>Upon completion, the borehole is capped and sealed, with markers being placed at the collars of completed holes. The location of the holes is recorded by GPS and mapped. The site is photographed.</p> <p>Rehabilitation of cleared areas will take the form of:-</p> <ul style="list-style-type: none"> • Removing and disposing of all possible wastes and foreign objects at appropriate identified facilities; • The scraping, ripping, backfilling and levelling and/or re-profiling of all cleared areas (i.e. access tracks, trenches and drill pads), to ready them for seeding; • The seeding and initial watering of the seeded area; and • Limiting the access of grazing animals as far as possible along this area. <p>Progress with rehabilitation will be monitored bi-annually for a period of 2 – 3 years after completion of the prospecting activities. Photographs will be taken for comparison to those taken of the affected areas prior to the commencement of prospecting.</p> <p>In the event that rehabilitation is not successful, corrective action will be taken. This may include bringing in additional topsoil, reseeding and mulching, depending on the reasons for the failure of the prior re-vegetation methods.</p>
Drilling	To ensure an environment free of pollutants	<ul style="list-style-type: none"> • Removing all possible wastes and foreign objects remaining on site subsequent to drilling. • Sumps (are DC drill sites) are to be dried out and lining and contaminated soil will be collected and disposed of in the skip located at the premises of the Aggeneys Mine • All polluted surfaces or soil, outside of sumps, will be treated immediately and successful rehabilitation shall be proven. <p>All incidents shall be recorded and reported.</p>

6.3 Confirmation of consultation

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

As part of the public consultation process, a background information document was distributed to interested and affected parties (IAPs) to inform IAPs about the project and the environmental assessment process being followed (Appendix A). In addition, notice of the proposed prospecting activities was published in a local newspaper (Die Plattelander) and posters (A2, A3 and A4) were placed at the local shops and post offices in Aggeneys, Pofadder and Springbok. The project was discussed with affected landowners on during the week of 23 June 14. Comments received from the landowners regarding closure is that affected areas must be appropriately rehabilitated.

This EMP is available to key stakeholders (i.e. registered I&APs, including the landowner, Department of Environment and Nature Conservation (DENC), The Department of Water Affairs (DWA) and the South African Heritage Resources Agency (SAHRA) and the Local Municipality) for comment until 29 August 2014. Further comments received in terms of closure will be provided to the DMR within the next month.

The list of the stakeholders contacted and relevant correspondence is provided in Appendix A.

7 REGULATION 52 (2) (g): Record of the public participation and the results thereof

7.1 Identification of interested and affected parties

(Provide the information referred to in the guideline)

Refer to Appendix A for a complete list of identified and contacted I&APs. Stakeholders have been categorised into the following groups: i) Landowners; ii) Adjacent landowners and iii) Key stakeholders, including government, NGOs etc.

7.2 The details of the engagement process

7.2.1 Description of the information provided to the community, landowners, and interested and affected parties

Refer to Addendum E for information documents which were provided to I&APs.

Landowners, adjacent landowners and pre-identified I&APs, as per the enclosed stakeholder database, were informed about the proposed prospecting project. All parties were provided with a letter of invitation to provide comment on the proposed project, as well as an Information Document (ID), providing information about the project, including details of the proposed prospecting project location, activities, potential environmental impacts and rehabilitation objectives.

Individual appointments were made with the landowners, who were consulted in person at their place of preference. The landowners were provided with a letter, informing them of the application, as well as an information pack including a map, identifying the affected properties, a summary of the proposed method of prospecting activities, the prospecting works programme, and a description of potential impacts which may occur as a result of prospecting activities, as well as plans for rehabilitation. A copy of DMR's letter of acceptance of the prospecting right application was also provided. A registration and comment sheet was included. The landowner consultation process was facilitated by way of structured interview, through the completion of a questionnaire. The language of choice during this consultation was Afrikaans.

Key stakeholders were contacted via registered mail, telephone, e-mail and fax, as appropriate. Likewise, key stakeholders were provided with a letter, information document, maps and comment/registration sheet.

7.2.2 List of which parties identified in 7.1 above that were in fact consulted, and which were not consulted

All I&APs as identified in the stakeholder database were contacted and invited to participate. All of the identified parties have been contacted; however, minimal input has been received. Comments received from I&APs were included in the Consultation Report, which was submitted to the DMR on 4 July 14 as per regulatory requirement.

Should further consultation occur subsequent to the submission of the EMP to the DMR, the results thereof will be forwarded for the attention of the Regional Manager within the next month.

The consultation process is ongoing, and comments on this EMP will be submitted to the DMR within the next month.

To date, the following stakeholders provided comment and/or input:

- a. The Landowners
- b. Commission on Restitution of Land Rights
- c. SAHRA

7.2.3 List of views raised by consulted parties regarding the existing cultural, socio-economic or biophysical environment

The South African Heritage Resources Association (SAHRA) provisionally indicated that due to the nature of the proposed activities and limited footprint of the project, an application for exemption may be considered. This will be decided on submission of the EMP for comment.

7.2.4 List of views raised by consulted parties on how their existing cultural, socio-economic or biophysical environment potentially will be impacted on by the proposed prospecting operation

The land under application is currently used for the ranching of small stock, mostly sheep, goats and some cattle. The farms have been subjected to previous prospecting and/or mining campaigns undertaken in the past, since the 1970s. In terms of prospecting undertaken by BMM, Mr. Van Niekerk indicated that he is satisfied with the way in which the areas affected by the previous drilling campaign had rehabilitated. There are small family cemeteries present on some of the farms. So far, the landowners do not object to the proposed activities at this time, as long as cognisance is taken of day-to-day farming operations and a mutually acceptable access agreement is entered into. Driving in the veld must be kept to a minimum to limit impacts on vegetation and erosion. Water is scarce and it is unlikely that current sources will supply the proposed campaign. Apart from the presence of the "halfmense" on Portion 1 Wortel 42, the landowners are not aware of the presence of any environmental sensitive features (drainage lines aside) or other graves or heritage features on their farms.

The day-to-day functioning of the farms may be affected by the proposed prospecting activities, however, it was indicated by most of the landowners that this can be managed effectively through the measures specified and agreed upon in the access

agreement, should the right be granted by the DMR. To date, the following key issues have been raised by landowners and BMM undertake to ensure compliance with these requests:

- a) No prospecting activities are to be undertaken within at least 100 m of water supply infrastructure and homesteads
- b) Existing roads must be used as far as practically possible and speed limits must be observed. Damage to veld must be minimised.
- c) Gates must be left as they are found, i.e. closed if it was found closed, and leave open if it was found open.
- d) Noise may disturb livestock and grazing regimes may have to be adapted / changed.
- e) The establishment of site camp/s must be discussed and agreed with the landowners prior to commencement of activities.
- f) The contractor responsible for drilling must be introduced to the landowners and agreements, conduct and *modus operandi* must be discussed. The landowners must be kept informed of the whereabouts and activities of contractors and proposed activities must be mutually agreed, in advance.
- g) Only authorised personnel as part of the exploration / drilling team will be allowed on the property. Visitors will not be allowed.

7.2.5 Other concerns raised by the aforesaid parties

No further concerns were raised.

7.2.6 Confirmation that minutes and records of the consultations are appended

Refer to Appendix A.

7.2.7 Information regarding objections received

To date, no objections have been received. This document is currently available to landowners for comment. Should there be additional comments or objection/s these will be forwarded to the DMR within the next month.

7.3 The manner in which the issues raised were addressed

The issues and comments which were raised were addressed on an individual basis, via contacting the relevant individuals who submitted them. The EMP has been finalised based on the input as received from I&APs.

8 SECTION 39 (3) (c) of the Act: Environmental awareness plan

8.1 Employee communication process

(Describe how the applicant intends to inform his or her employees of any environmental risk which may result from their work).

All employees working on site will be required to attend an environmental induction which will inform them of the environmental issues / risks and requirements prior to work commencing.

8.2 Description of solutions to risks

(Describe the manner in which the risk must be dealt with in order to avoid pollution or degradation of the environment).

During induction, all the identified mitigation and management measures, which are intended to avoid and/or minimise pollution and the degradation, will be discussed with personnel.

The general procedure in which a risk must be dealt with is summarised below:

- Applicable geologist must be notified of an incident upon discovery. In turn the geologist must notify the applicant. The applicant must notify the landowner
- Take photographs and samples as necessary to assist in investigation
- Comply with Section 30 of the National Environmental Management Act (107 of 1998) such that the applicant must immediately notify the Director General of the Department of Mineral Resources (DMR) and the regional Department of Water and Affairs (DWA) and any persons whose health may be affected of:
 - The nature of the incident;
 - Any risks posed to public health, safety and property;
 - The toxicity of the substances or by-products released by the incident; and
 - Any steps taken to avoid or minimise the effects of the incident on public health and the environment.
- The geologist in consultation with the applicant and landowner must as soon as is practical after the incident:
 - Take all reasonable measures to contain and minimise the effects of the incident including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
 - Undertake clean up procedures;
 - Remedy the effects of the incident; and
 - Assess the immediate and long term effects of the incident (environment and public health);
- Within 14 days the applicant must report to the landowner, the Director-General DMR and the regional DWA office such information as is available to enable an initial evaluation of the incident, including:
 - The nature of the incident;
 - The substances involved and an estimation of the quantity released;
 - The possible acute effects of the substances on the persons and the environment (including the data needed to assess these effects);
 - Initial measures taken to minimise the impacts;
 - Causes of the incident, whether direct or indirect, including equipment, technology, system or management failure; and
 - Measures taken to avoid a recurrence of the incident.

8.3 Environmental awareness training

(Describe the general environmental awareness training and training on dealing with emergency situations and remediation measures for such emergencies).

Training is essential for ensuring that the EMP provisions are implemented efficiently and effectively. Training needs should be identified and addressed before the project commences. On-site and project personnel must be empowered to understand and implement mitigation and/or management actions and monitoring activities, as provided for in Table 19.

It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard. In addition to these parties, general environmental awareness must be fostered among the workforce to encourage the implementation of environmentally sound practices. This ensures that environmental accidents are minimized and environmental compliance maximized. Environmental awareness could be fostered by induction course for all on-site personnel, before commencing work on site and refresher courses as and when required. Workers should also be alerted to particular environmental concerns associated with their tasks for the area/habitat in which they are working. Courses must be given by suitably qualified personnel and in a language and medium understood by workers/employees.

Emergency response training will be conducted as outlined in Table 21.

Table 21: Emergency Response Procedures

Emergency Situation	Response in addition to general procedures
Spillage of fuel, oil, lubricants and waste	<p>Where there is a risk of contamination to the land or water resources, BMM will:</p> <ul style="list-style-type: none"> • Notify the landowner and any downstream properties of the pollution incident. • Cut off the source of the spill • Contain the spill (e.g. construct temporary earth bund around source, use absorbent booms) • Collect / pump excess spillage liquids on the surface to temporary containers (e.g. drums, mobile tanker, etc.) for appropriate disposal. • Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed/repaired. • Collect samples of the polluted environment to assess the immediate risk posed by contamination and determine remediation requirements.
Veld fire	<ul style="list-style-type: none"> • Evacuate employees from areas at risk. • Notify downwind residents and industries of the danger. • Assist those in imminent danger/less able individuals to evacuate until danger has passed. • Provide emergency firefighting assistance with available trained personnel and equipment.
Uncovering of graves and heritage sites	<ul style="list-style-type: none"> • Personnel discovering the grave or site must inform the on-site geologist immediately and all operations must stop until the situation is resolved. • Any disturbance to be assessed in consultation with an appropriately qualified specialist. • If possible site to be restored and the drilling operation relocated. • If disturbance is required, prior to damaging or destroying any of the identified graves, permission for the exhumation and relocation of graves must be obtained from the relevant descendants (if known), the National Department of Health, the Provincial Department of Health, the Premier of the Province and the local police. • The exhumation process must comply with the requirements of the relevant Ordinance on Exhumations, and the Human Tissues Act, 65 of 1983.

9 SECTION 39 (4) (a) (iii) of the Act: Capacity to rehabilitate and manage negative impacts on the environment

9.1 The annual amount required to manage and rehabilitate the environment

(Provide a detailed explanation as to how the amount was derived)

The annual amount required to manage and rehabilitate the environment is presented in **Table 21**.

Table 21: Annual amount required to manage and rehabilitate the environment

	Total Provision	Year 1	Year 2	Year 3	Year 4	Year 5
General surface rehabilitation	R 109 513.79			R 27 378.45	R 54 756.90	R 27 378.45
2 - 3 years monitoring	R 18 444.00			R 4 611.00	R 9 222.00	R 4 611.00
TOTAL PROSPECTING DRILLING	R 127 957.79	R 0.00	R 0.00	R 31 989.45	R 63 978.90	R 31 989.45

9.2 Confirmation that the stated amount is correctly reflected in the Prospecting Work Programme as required

The amount required to manage and rehabilitate the environment has been reviewed and amended subsequent to the compilation of the PWP. The amount currently reflected in the PWP must therefore be amended to reflect the amount stated above.

10 REGULATION 52 (2) (h): Undertaking to execute the environmental management plan

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises EIA and EMP compiled in accordance with the guideline on the Department's official website and the directive in terms of sections 29 and 39 (5) in that regard, and the applicant undertakes to execute the Environmental management plan as proposed.

Full Names and Surname	David Edwin Payne
Identity Number	LT0073561 (Passport Number)

-END-

ADDENDUMS

ADDENDUM A: MAPS

ADDENDUM B: INFRASTRUCTURE & LAND USE PHOTOS

ADDENDUM C: SITE PHOTOS – VEGETATION UNITS

ADDENDUM D: PHOTOS OF SIMILAR PROSPECTING ACTIVITIES

ADDENDUM E: STAKEHOLDER CONSULTATION

APPENDIX A: MAPS

Figure 1: Section 2(2) Plan

Figure 2: Regional Locality

Figure 3: Existing roads / tracks and preliminary locations of proposed drill holes (Phase 4)

Figure 4: Regional Geology

Figure 5: Vegetation Units present on site according to VEGMAP (Mucina & Rutherford, 2006)

Figure 6: Vegetation Map

Figure 7: Environmental Sensitivity Map

Figure 8: Critical Biodiversity Areas (CBAs) in the Namakwa District Municipality. Note the presence of CBA1 north of Aggeneys, with CBA2 in the vicinity, while an Ecological Support Area (ESA) forms a corridor south of Aggeneys (Namakwa District Biodiversity Sector Plan, 2008)

Figure 9: Identified Biodiversity Priority Areas and associated risk to planned mining / prospecting activities in terms of the Mining and Biodiversity Guideline (MBG), 2012 and the Namakwa District Biodiversity Sector Plan, 2008

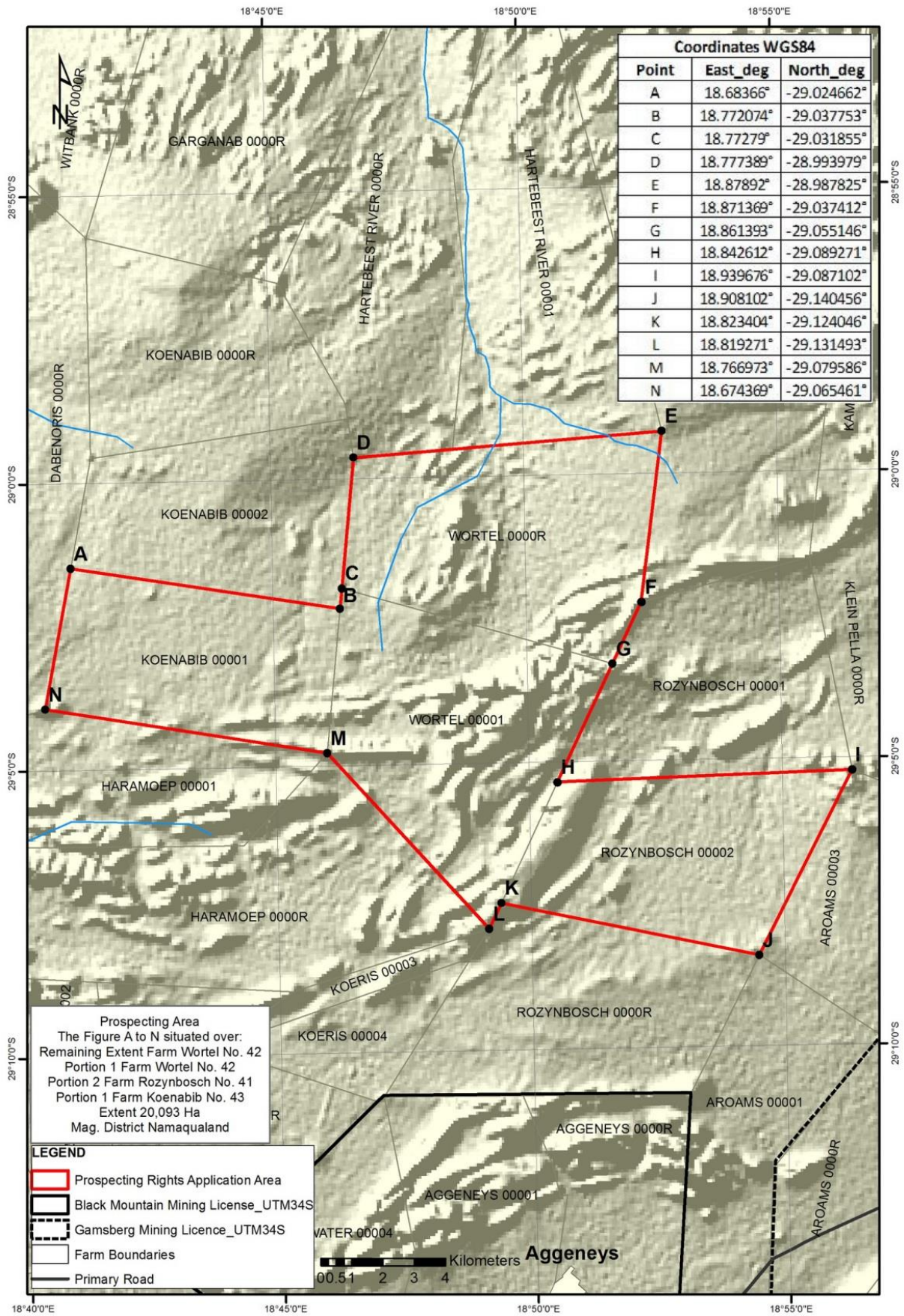


Figure 1: Section 2(2) Plan

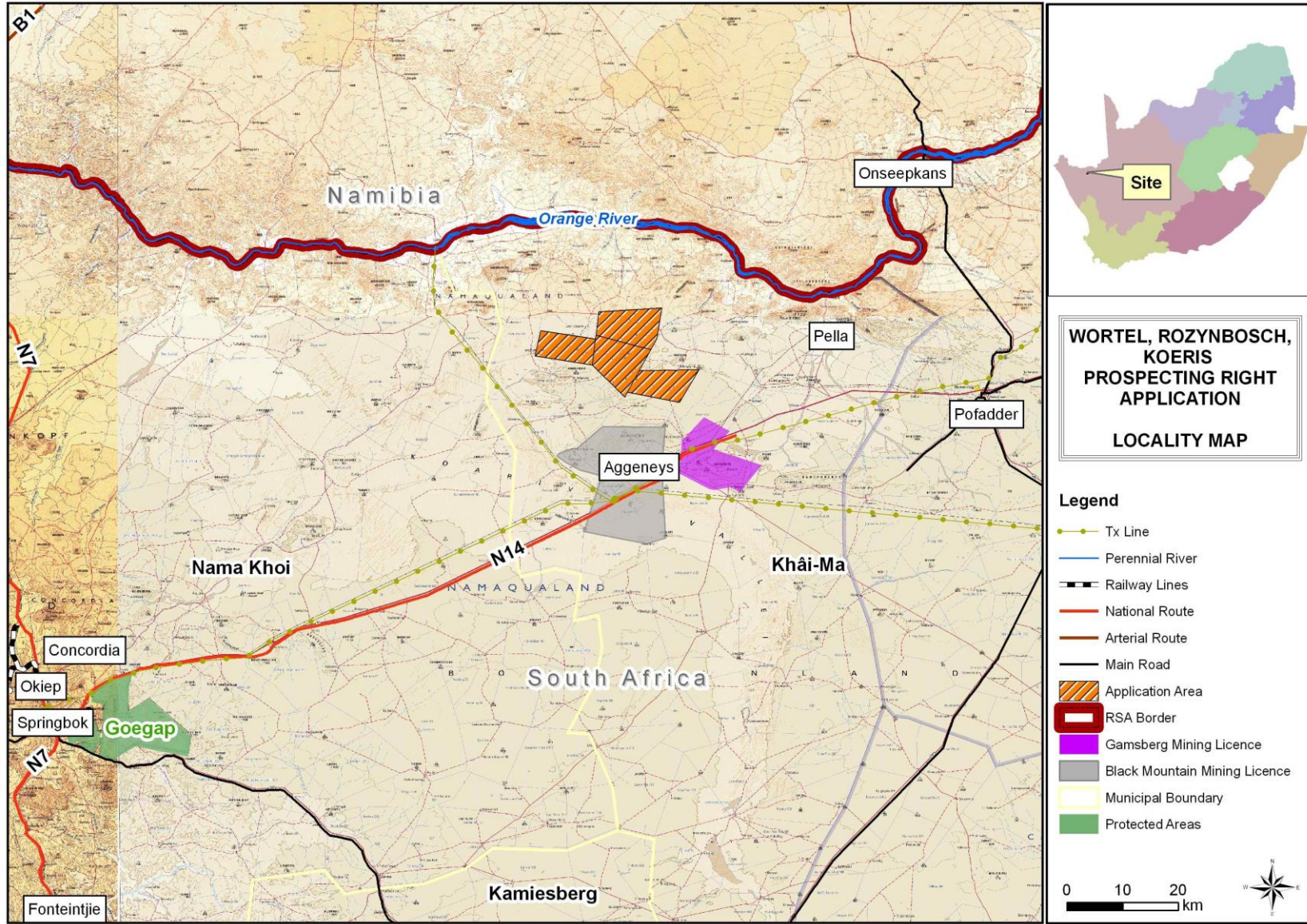


Figure 2: Regional Locality

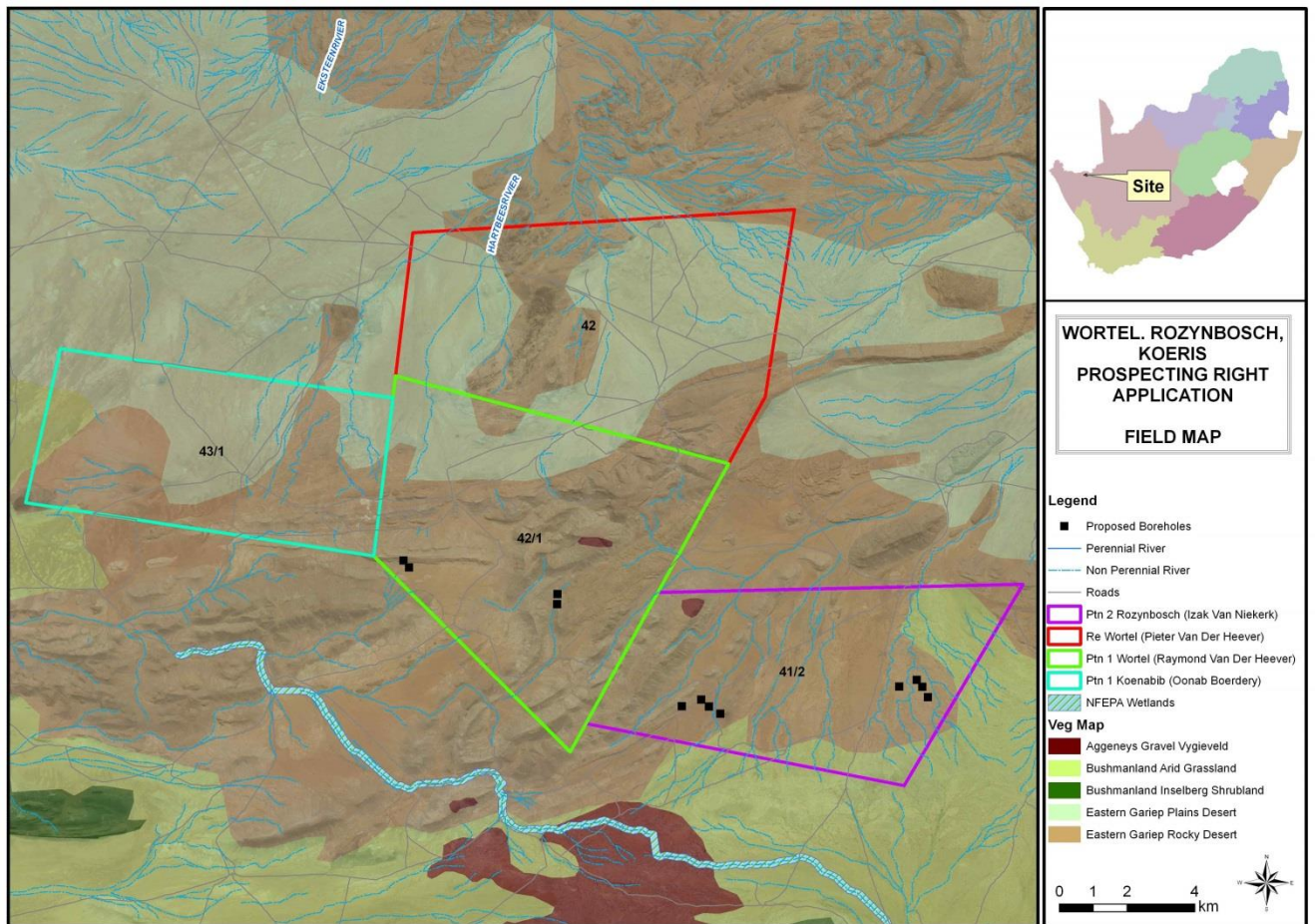


Figure 3: Existing roads / tracks and preliminary locations of proposed drill holes (Phase 4)

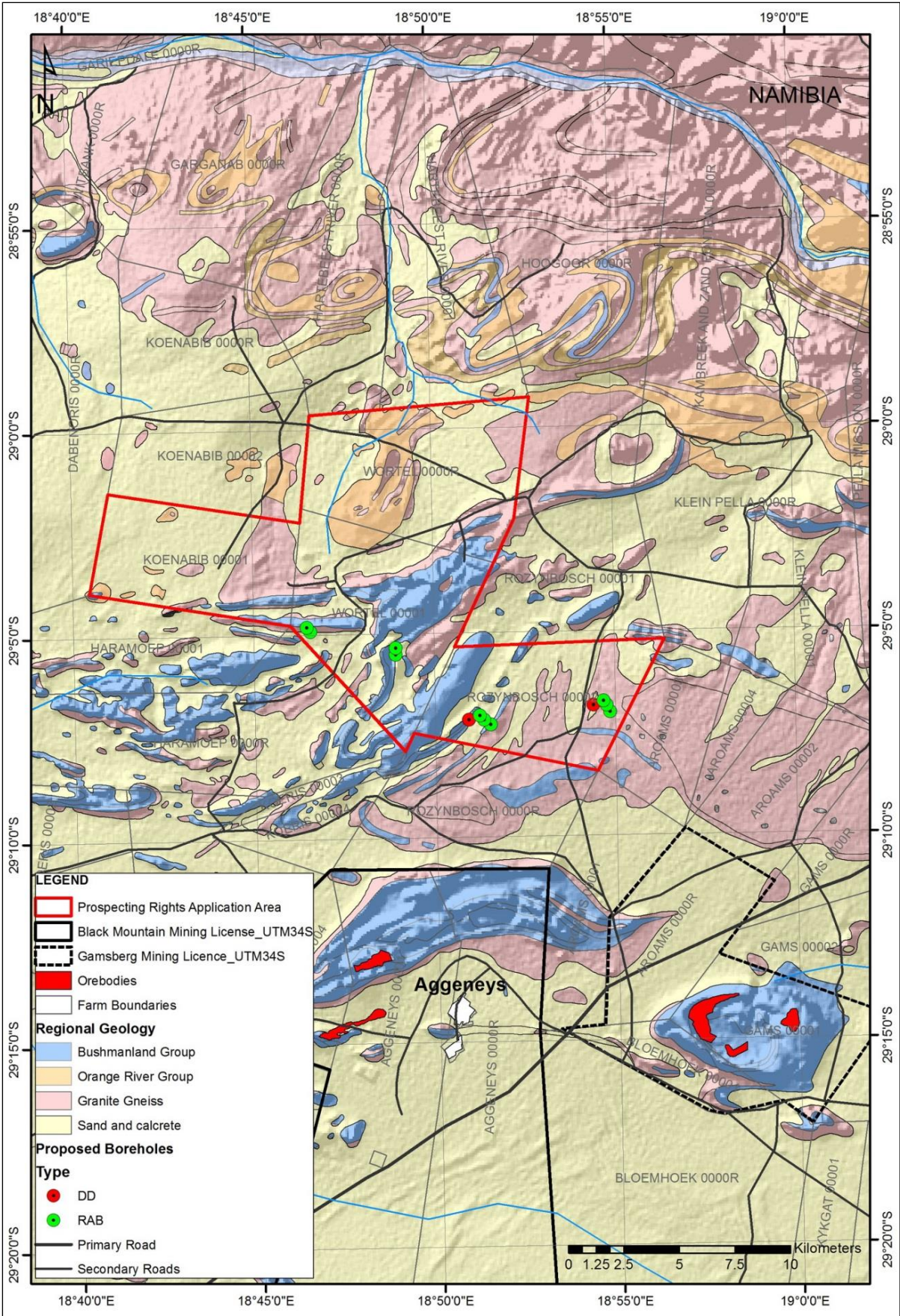


Figure 4: Regional geology

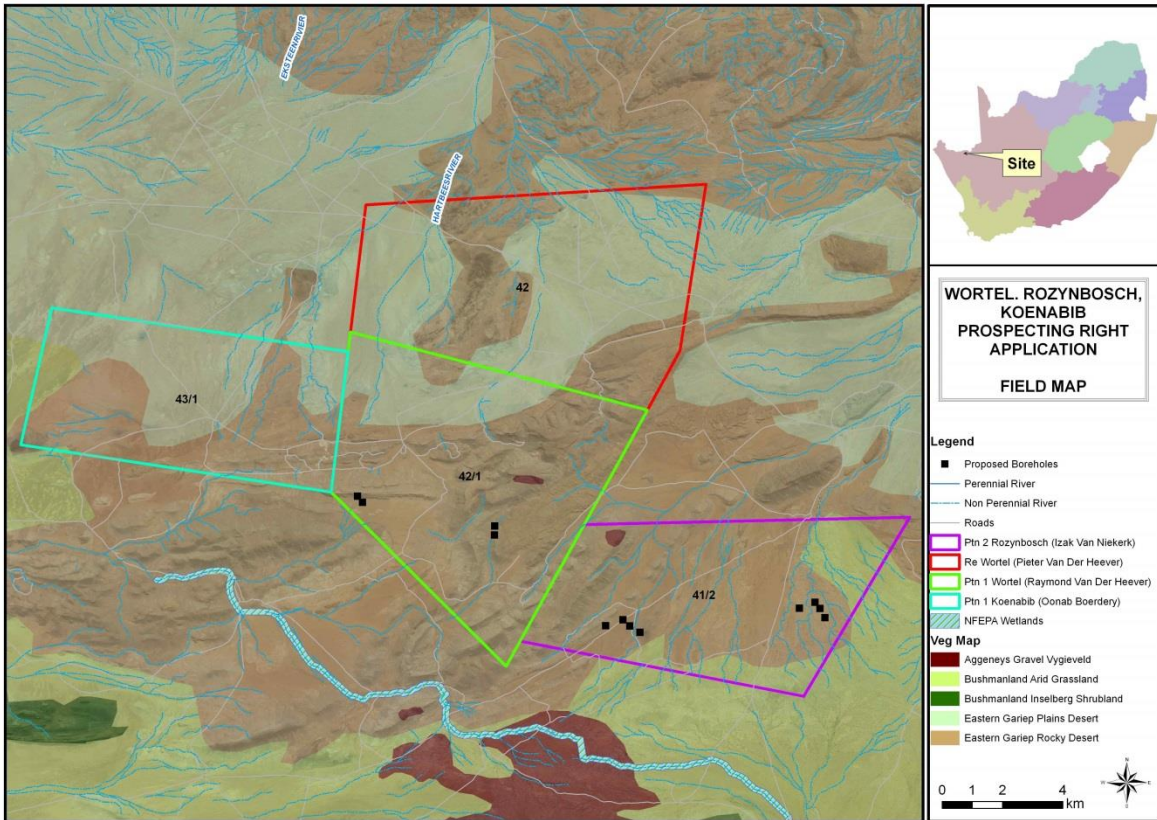


Figure 5: Vegetation Units present on site according to VEGMAP (Mucina & Rutherford, 2006)

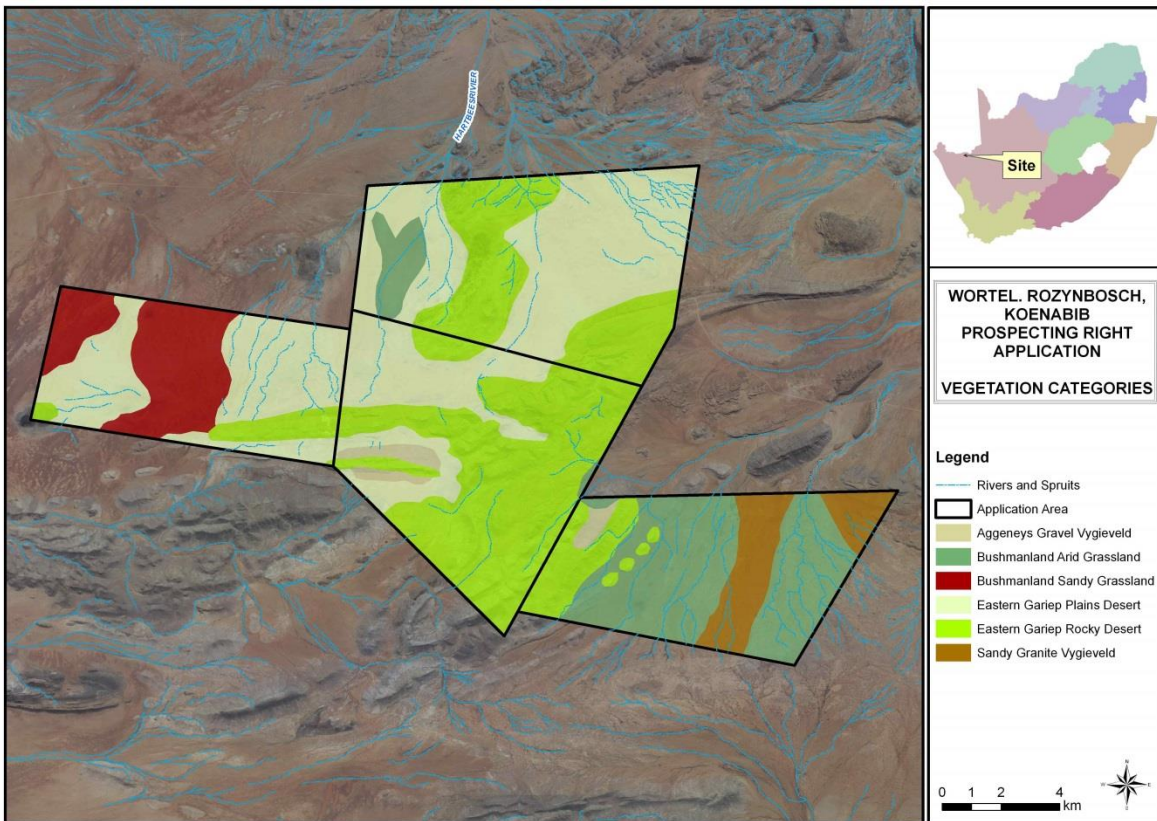


Figure 6: Vegetation Map

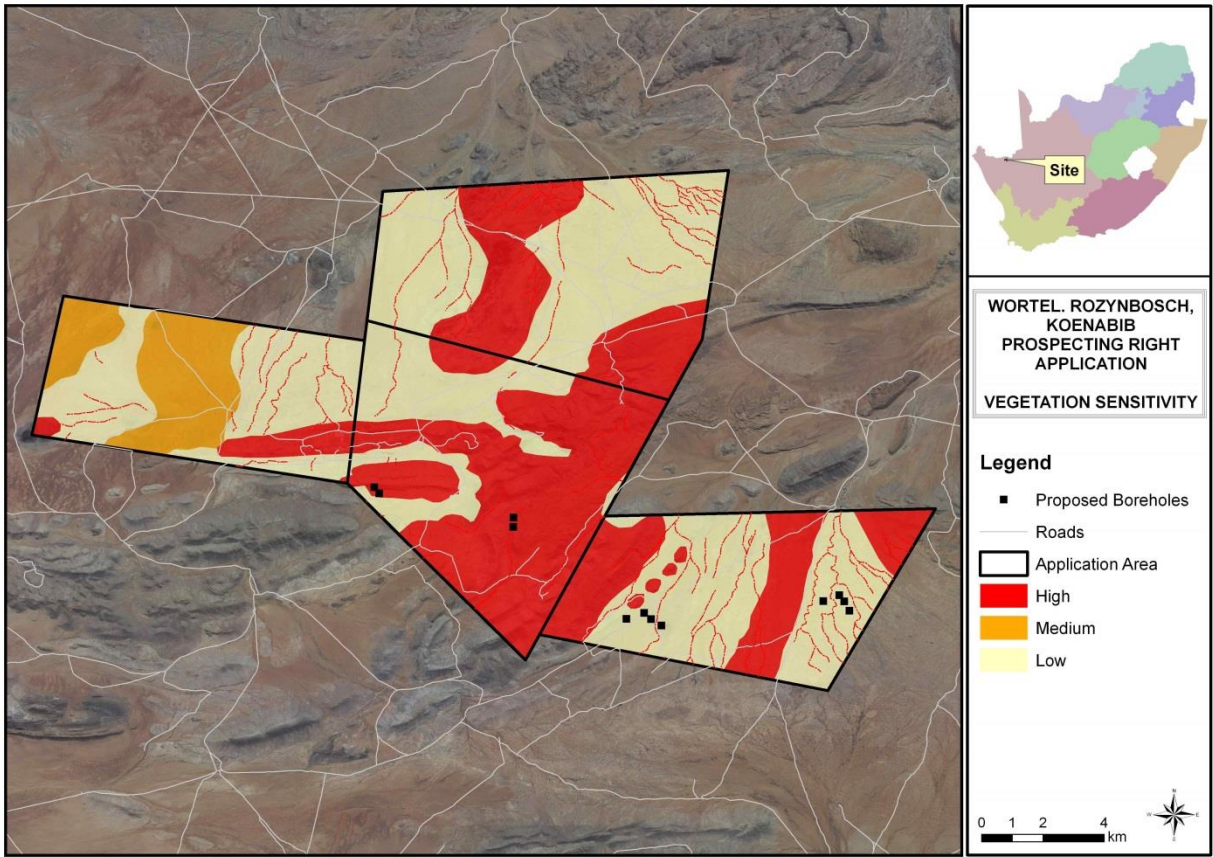


Figure 7: Environmental Sensitivity Map

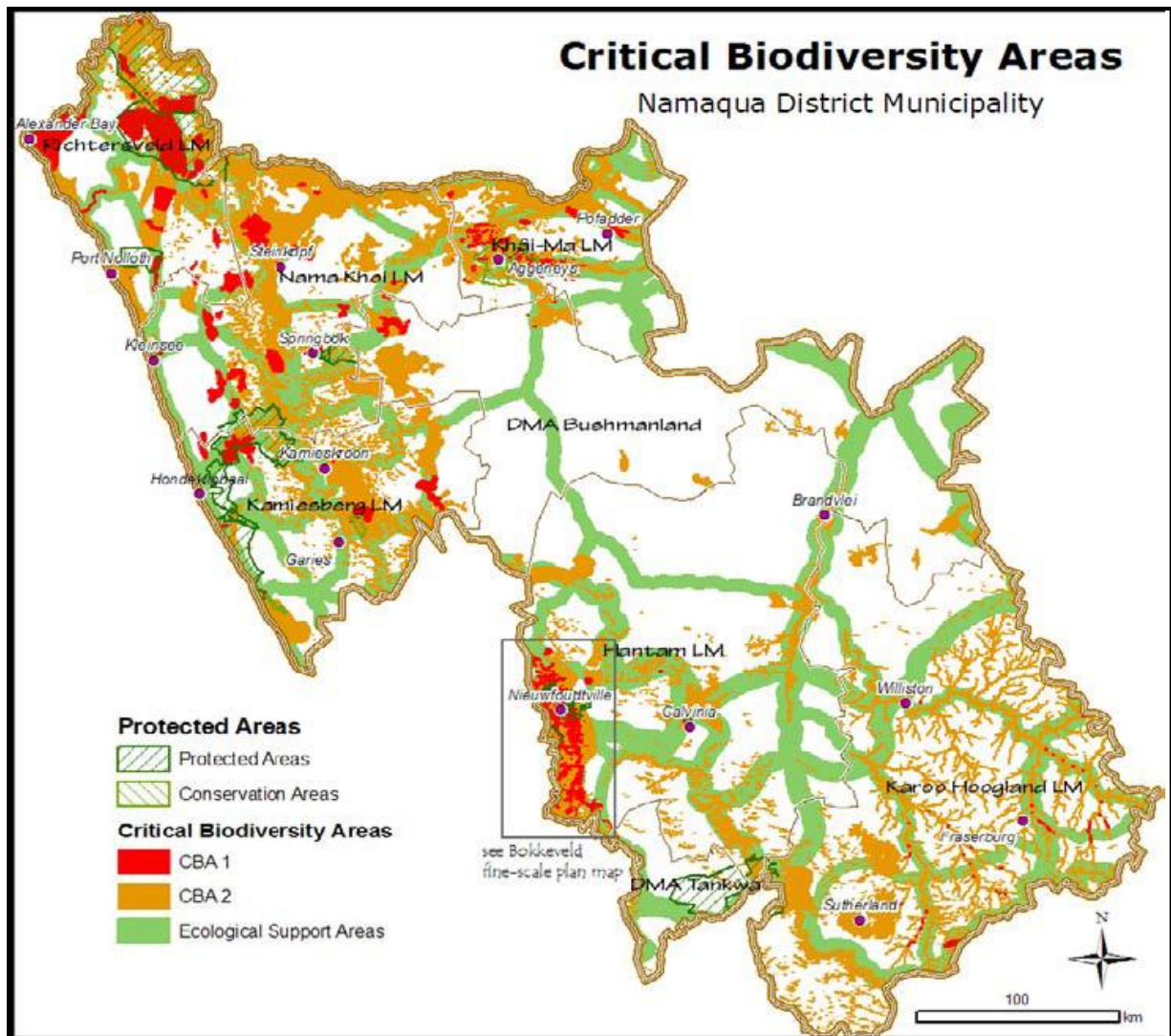


Figure 8: Critical Biodiversity Areas (CBAs) in the Namaqua District Municipality. Note the presence of CBA1 north of Aggeneys, with CBA2 in the vicinity, while an Ecological Support Area (ESA) forms a corridor south of Aggeneys (Namaqua District Biodiversity Sector Plan, 2008)

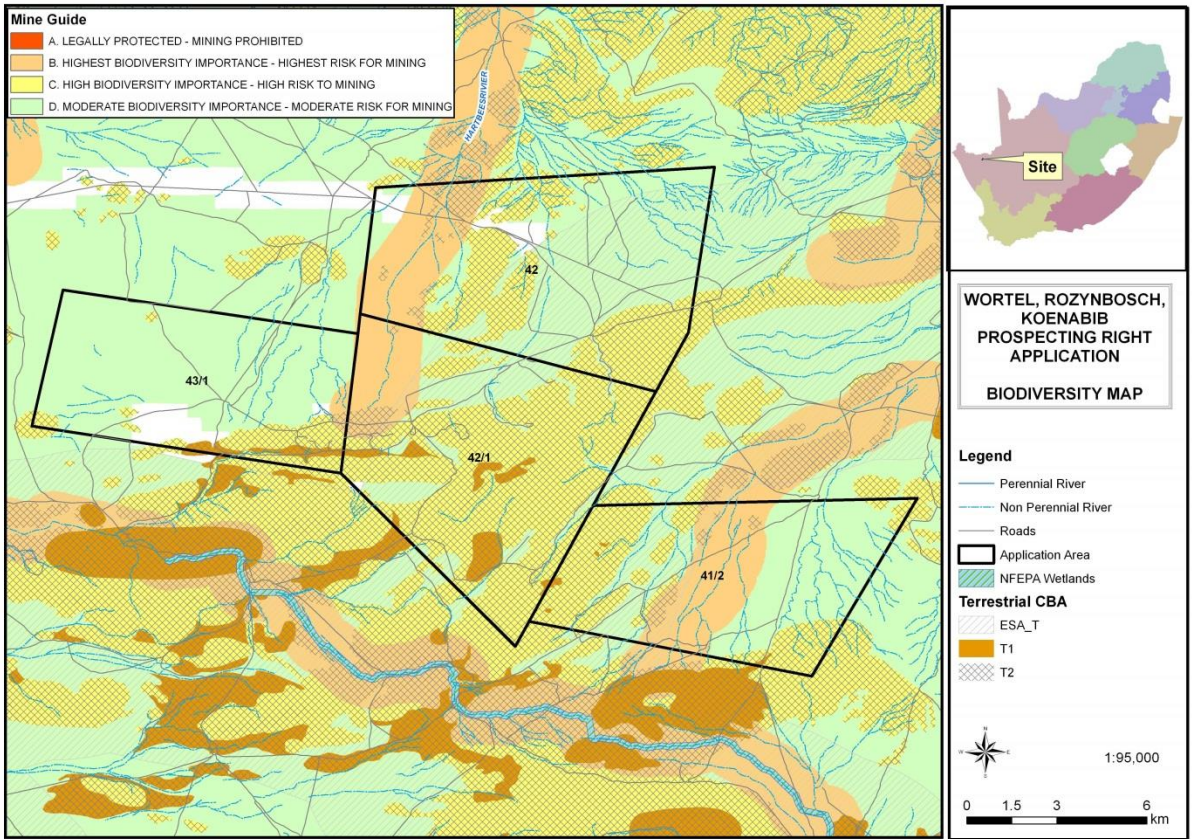


Figure 9: Identified Biodiversity Priority Areas and associated risk to planned mining / prospecting activities in terms of the Mining and Biodiversity Guideline (MBG), 2012 and the Namakwa District Biodiversity Sector Plan, 2008

ADDENDUM B: INFRASTRUCTURE AND LAND USE PHOTOS





Image 1: Infrastructure and land use - Portion 1 Wortel 42. Note the remnants of previous mining activities on the last two photos (road to the left and excavation on the right).



Image 2: Infrastructure and land use – Portion 1 Koenabib 43 at the boundary between Koenabib and Portion 1 Wortel 43





Image 3: Infrastructure and land use - Remainder Wortel 42





Image 4: Infrastructure and land use - Portion 2 Rozybosch 41

ADDENDUM C:

PHOTOS ILLUSTRATING IDENTIFIED VEGETATION UNITS



Image 5 : Typical Bushmanland Arid Grassland



Image 6: Bushmanland Sandy Grassland



Image 7: Gravel patches with Aggeneys Gravel Vygieveld



Image 8: Vygies on Sandy Granite Vygieveld





Image 9: Eastern Gariep Rocky Desert on the mountains. Note the scree at the foot of mountains and *Pachypodium namaquanum* on the mountain top



Image 10: Eastern Gariep Plains Desert



Image 11: Dry Drainage Lines (Spruits)

ADDENDUM D: PHOTOS OF TYPICAL PROPOSED NON-INVASIVE AND INVASIVE PROSPECTING ACTIVITIES

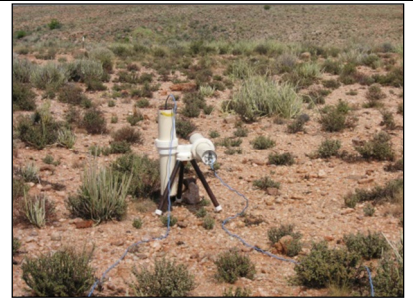


Image 12: Examples of non-invasive prospecting activities



Image 13: Examples of a typical drill site (invasive prospecting activities)



Image 14: Example of rehabilitated drill site and drill rig in the distance

NAME OF APPLICANT: Black Mountain Mining (PTY) Ltd (BMM)

REFERENCE NUMBER: NC 30/5/1/1/2/11296 PR (Wortel_Rozynbosch_Koenabib)

29 July 14

REPORT ON THE RESULTS OF CONSULTATION WITH COMMUNITIES AND INTERESTED AND AFFECTED PARTIES

AS REQUIRED IN TERMS OF SECTIONS, 16(4)(b) or 27 (5) (b) OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT (ACT 28 of 2002), AND IN ACCORDANCE WITH THE STANDARD DIRECTIVE FOR THE COMPILATION THEREOF AS PUBLISHED ON THE OFFICIAL WEBSITE OF THE DEPARTMENT OF MINERAL RESOURCES.



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

A. Definitions

'consultation' means a two way communication process between the applicant and the community or interested and affected party wherein the former is seeking, listening to, and considering the latter's response, which allows openness in the decision making process.

'community' means a group of historically disadvantaged persons with interest or rights in a particular area of land on which the members have or exercise communal rights in terms of an agreement, custom or law: Provided that, where as a consequence of the provisions of the Act negotiations or consultations with the community are required, the community shall include the members or part of the community, directly affected by prospecting or mining, on land occupied by such members or part of the community.

'Interested and affected' parties include, but are not limited to; –

- (i) Host Communities
- (ii) Landowners (Traditional and Title Deed owners)
- (iii) Traditional Authority
- (iv) Land Claimants
- (v) Lawful land occupier
- (vi) The Department of Land Affairs,
- (vii) Any other person (including on adjacent and non-adjacent properties) whose socio-economic conditions may be directly affected by the proposed prospecting or mining operation
- (viii) The Local Municipality,
- (ix) The relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.

B. Report on the results of consultation

1. Methodology applied to consultation.

1.1. Name the community or communities identified, or explain why no such community was identified.

The prospecting area is located approximately 22 km north of the town Aggeneys in the Northern Cape Province, and falls within the area jurisdiction of the Khai Ma Local Municipality (KMLM) and the Namakwa District Municipality.

The proposed prospecting area, i.e. Portion 2 Rozybosch No. 41, Portion 1 Koenabib No. 43, and the Remaining Extent & Portion 1 of the farm Wortel No. 42, comprises farmers, utilising privately owned land primarily for livestock farming / grazing purposes.

1.2. Specifically state whether or not the Community is also the landowner.

The land involved in the application is privately owned.

1.3. State whether or not the Department of Land Affairs been identified as an interested and affected party.

The Department of Land Affairs has been identified as an interested and affected party and was informed of the application (refer to Appendix C).

1.4. State specifically whether or not a land claim is involved.

The Department of Land Affairs confirmed in writing that there is no land claims relevant to the farms under application.

1.5. Name the Traditional Authority identified

The prospecting area falls within the area of jurisdiction of the Khai Ma Local Municipality (KMLM). To our knowledge, there are no traditional authority relevant to this application. Both the KMLM and the relevant Farmers' Associations have been informed of the application. To date, no response has been received from these parties.

1.6. List the landowners identified by the applicant. (Traditional and Title Deed owners)

1. Portion 2 Rozynbosch No. 41: Mr. Izak Jacobus van Niekerk

2. Portion 1 Koenabib No. 43: Oonab Boerdery CC (Mr. Edmund Agenbag, Mr. John James Agenbach, Mr, John James Agenbag Jr and Mr. Louis Karel Agenbach)

3. Remaining Extent Wortel No. 42: Mr. Pieter van den Heever

4. Portion 1 Wortel No. 42: Mr. Raymond Paul van den Heever (deceased) and Mrs. Van den Heever.

1.7. List the lawful occupiers of the land concerned.

As per 1.6 above.

1.8. Explain whether or not other persons' (including on adjacent and non-adjacent properties) socio-economic conditions will be directly affected by the proposed prospecting or mining operation and if not, explain why not.

It is unlikely that other persons' and/or adjacent land owners will be directly affected by the proposed prospecting activities. The proposed method of prospecting will have very limited impacts on the farms where drilling will be undertaken, as well as on the farms situated adjacent to the prospecting area. The application has been discussed with the affected landowners during the week of 23 June 2014. Minimal concern was raised by landowners at this stage of the consultation process, with no pertinent objections being raised.

The EMP for the project has been finalised and stakeholders have been informed that this document is currently available for comment, until 29 August 14. Impacts pertinent to the proposed prospecting activities are discussed in detail in the Environmental Management Plan (EMP). The main area of interest mentioned by all the affected landowners is that of the agreement which have to be entered into if the prospecting right is granted by the DMR. Landowners were asked whether they expect that the proposed prospecting activities would affect surrounding properties. It was indicated that the temporary nature and scale of the proposed operations are such that the socio-economic conditions of other persons will not be directly affected by the proposed activities.

1.9. Name the Local Municipality identified by the applicant

Khai Ma Local Municipality (KMLM)

- 1.10. Name the relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.

Refer to Appendix for the complete database of stakeholders, including contact details:-

**Regional Land Claims Commission Free State and Northern Cape
Department of Rural Development and Land Reform
NC Department of Agricultural & Land Reform
National Department of Public Works - Regional Manager
South African National Roads Agency
Namakwa District Municipality - Municipal Manager
Khai Ma Local Municipality (KMLM)
Nama Khoi Local Municipality (NKLM)
Department of Water Affairs
NC Department of Environment and Nature Conservation (DENC)
South African Heritage Resources Agency
South African National Biodiversity Institute (SANBI)
Succulent Karoo Ecosystem Programme (SKEP)
WESSA (Northern Cape Regional Office)
Endangered Wildlife Trust
Botanical Society of South Africa
Agri Namakwa and associated Farmer's Associations**

- 1.11. Submit evidence that the landowner or lawful occupier of the land in question, and any other interested and affected parties including all those listed above, were notified.

Evidence is enclosed as Appendix C.

- 2. Description of the existing status of the cultural, socio-economic or biophysical environment, as the case may be, prior to the proposed prospecting or mining operation.**

- 2.1.1. Confirm that the identified and consulted interested and affected parties agree on the description of the existing status of the environment.

Interested and Affected Parties (I&APs) were informed about the proposed prospecting activities by way of telecommunication, letters (fax, e-mail and post where necessary) and the provision of an Information Document, containing the following:

(a) A baseline description of the environment;

(b) A list of pre-identified anticipated impacts which may occur as a result of the proposed prospecting activities.

I&APs have been invited and encouraged to comment on the list of identified potential impacts which may arise as a result of the proposed activities, and to provide input in terms of anticipated additional impacts which they think should be addressed in the environmental impact assessment process and compilation of the Environmental Management Plan (EMP).

Based on the meetings with affected landowners it is confirmed that the landowners agree with the current baseline description of the environment. Key environmental aspects agreed upon during landowner meetings include the following:

i) The prospecting area is located within an arid, water scarce area, mainly used for livestock farming (sheep, goats and cattle).

ii) Due to the arid nature of the environment, vegetation is sensitive to disturbance and recovers slowly once disturbed, affecting grazing capacity.

iii) Various individuals of *Pachypodium namaquanum* (halfmens), a protected plant species, occur on Portion 1 Wortel No. 42, and should be protected.

The EMP is based on data gathered during site specific investigations. Key stakeholders and registered I&APs will be provided opportunity to review and comment on the information as provided in the EMP.

2.1.2. Describe the existing status of the cultural environment that may be affected

The current cultural environment is that of a predominantly Afrikaans-speaking farming community. Farms are privately owned and in some instances, occupants have been resident on the farm for generations.

The quiet lifestyle on the farms may be affected by the proposed prospecting activities. These activities, however, are short lived and present a short term disturbance.

2.1.3. Describe the existing status of any heritage environment that may be affected

Portion 2 Rozynbosch No. 41 is characterised by features dating from 1911. In addition, some of the farms are characterised by small family grave yards in proximity to the homesteads.

The South African Heritage Resources Agency (SAHRA) has been contacted. All structures and/or infrastructure, of heritage value (i.e. older than 60 years), graves/graveyards and palaeontological finds must be avoided during prospecting operations. SAHRA provisionally indicated that due to the nature of the proposed activities and limited footprint of the project, an application for exemption may be considered. This will be decided on submission of the EMP for comment.

2.1.4. Describe the existing status of any current land uses and the socio-economic environment that may be directly affected

The broader area is generally characterised by a mining and farming community. The area to be prospected is within ore trucking distance of Black Mountain Mining's existing concentrator plant at Aggeneys. Black Mountain Mining at Aggeneys is currently the only operating mine within the area. However, over the past years the area has been subjected to various prospecting and smaller mining campaigns, undertaken by a number of different companies.

The land under application is used for the ranching of small stock, mostly sheep, goats and some cattle. The land is arid and primarily used for grazing. The remaining extent of Wortel No. 42 is permanently occupied, whilst the owners of Portion 1 Koenabib No. 43, Portion 2 Rozynbosch No. 41 and Portion 1 Wortel resides elsewhere, with one or two workers tending the farms. All of the farms are considered productive economic units.

The prevailing socio-economic situation is impacted by the absence of rain, resulting in lower carrying capacity, smaller yield and reduced income. Generally, the farming community struggles under severe conditions of drought. Vegetation and soils are particularly vulnerable to potential disturbance and erosion, and takes years to recover. Grazing practices have to be adapted continually, based on veld condition, to ensure maximum yield.

2.1.5. Describe the existing status of any infrastructure that may be affected.

The propsecting area is situated approximately 22 km north of the town of Aggeneys and is accessible mostly via gravel roads from the N14, running east-west between the towns of Upington, Pofadder, Aggeneys and Springbok. On-site roads are visible on the map provided in Appendix C. Telephone lines are present along the main access roads.

On-site infrastructure includes typically the following:

Homesteads and surrounding outbuildings, gravel roads, wells, dams, windmills, water pipelines, fences, gates, livestock enclosures and feeding-troughs.

2.1.6. Describe the existing status of the biophysical environment that will be affected, including the main aspects such as water resources, flora, fauna, air, soil, topography etc.

A. Climate

The mean annual precipitation is 99 mm, with a high annual coefficient of variation (40%). Rain can fall in any month but is mainly in the later austral summer, peaking in February-April. Mean annual evaporation potential exceeds rainfall almost 30-fold, so mean annual soil moisture stress is high (87%). Mean annual temperature is 17.3 degrees Celcius, but mean monthly temperatures exceed 30 degrees Celcius in mid-summer and drop close to zero in mid-winter, with 21 mean frost days annually.

B. Geology

The terrain varies from flat lying plains with poor outcrop of granitic gneiss and slivers of meta-sediments in the east to mountainous terrain in the west. Meta-sedimentary rocks underlie the mountainous terrain. The mountains raise some 100m above the plain and are capped by massive white quartzite. The meta-sedimentary rocks are of mid-Proterozoic age and correlate to the Bushmanland Sequence. These metamorphosed sedimentary rocks consist of white to blue quartzite, biotite - sillimanite schist and poorly developed iron formations. These rocks correlate to the metasedimentary sequence hosting the zinc – copper – lead – silver deposits at Aggeneys and Gamsberg. The inferred tectono-stratigraphic setting of the prospecting area is therefore considered favourable for hosting zinc-copper-lead-silver mineralization similar to that currently being exploited at the Black Mountain Mine.

The following stratigraphic classification is used in the Aggeneys area:

The Wortel Subgroup: The Wortel Subgroup is subdivided into the Aluminous Schist (bottom) and White Quartzite Formations (top). Quartz- biotite- sillimanite-muscovite schist forms the bulk of the Aluminous Schist Formation. The White Quartzite Formation consists off layered to massive, white to light grey weathering metaquartzite.

The Kouboom Subgroup: The Kouboom Subgroup is subdivided into the Pelitic Schist, Dark Quartzite and Diamictite Formations. The Pelitic Schist Formation consists of quartz - muscovite - biotite - sillimanite schist with sparse interlayers of thin, lenticular muscovite quartzite beds. The Dark Quartzite Formation consists

of quartz with accessory zircon, apatite, muscovite, sericite, sillimanite, hematite and magnetite. Conglomerate lenses are locally developed in the quartzite.

The Gams Formation: The Gams Formation conformably overlies the Kouboom Formation. Stratiform basemetal (Cu, Pb, Zn, Fe, Mn and Ba) mineralization and chemical sediments (banded iron formation, calc-silicate rocks, marble and baritic rocks) are characteristic of the sequence.

The Koeries Formation: Muscovite quartz rocks, grading from schist to quartzite, conglomerate lenses and amphibolite form the bulk of the Koeries Formation.

C. Topography and drainage

The topography is generally flat and open, except for the gabbro, quartzite and granite mountains on the farms Wortel No. 42 and the Witberg on Portion 1 Rozybosch No. 41. Given the low rainfall, recent drainage lines are relatively lightly incised and shallow. The area forms part of the palaeo-drainage system of the Gariiep River basin, evident on and around the site as rather ill-defined washes (i.e. small, dry, non-perennial, seasonal spruits). The mountains on site generally have steep slopes, with coolest sides facing southwest, into the prevailing wind, and their warmer and steep sides facing northeast, with associated effects on the biodiversity on either side.

The Hartbees River drains northwards and is prominent on Wortel No. 42 and Portion 1 Koenabib No. 42, while the Rooiwal River drains northwards from Rozybosch No. 41. The plains in the northern parts of the farm Wortel No. 42, as well as the plains crossing the eastern part of the farm Rozybosch No. 41, have a dense network of small spruits (washes) draining northwards. These washes are wide and sandy, and blend into the landscape, merging with adjacent grassland vegetation. On Rozybosch No. 41, the spruits form a dense gulley-like network on the granite / gneiss sheets. Washes are of conservation concern and regarded as sensitive ecosystems, due to the ecosystem processes linked to the provision and transport of water in the landscape.

D. Soil

Much of the area is covered with rocky mountains, characterised by shallow soil on the southern parts of Wortel and Koenabib. Shallow soil also occur on granite on much of Rozybosch, while sandy plains with grassland occur in the northern parts of Wortel and Koenabib and the south-eastern parts of Rozybosch. Typical dunes are rare within the site boundary, however, deeper red soil occurs in the western parts of Koenabib. The quartzite gravels occur in three main forms, i.e. small fine-grained patches on the tops and foothills of the mountains, more variable and widespread sizes around the erosion zones below the mountains,

and small feldspar patches, with calcrete gravels also emerge in a few patches where exposed by erosion on the flats.

E. Land Use

The only agricultural land use is livestock grazing at low densities with sheep, cattle and goats currently present in the prospecting area. No prominent game farming (springbok, gemsbok) occur within the prospecting area.

F. Vegetation

As mentioned above, the prospecting area falls within the area of jurisdiction of the Khai-Ma Local Municipality (KMLM). According to Marsh et al. 2009, the KMLM comprises virtually the entire extent of the Bushmanland Inselberg priority area. The latter is one of the nine zones identified through the Succulent Karoo Ecosystems Project (SKEP) process as important conservation areas in the Succulent Karoo. Inselbergs are important refugia for plants and animals and act as steppingstones for rock-loving species migrating east west across the sand-covered plains of Bushmanland. The isolation of populations has led to diversification within the dwarf succulent shrublands, creating remarkable local populations of plant life. The KMLM area is unique, containing many rare and fragile habitat types. These unique and confined areas are host to a remarkable number of endemic plants (Marsh et al. 2009).

The main vegetation types occurring on the prospecting area are classified in terms of as per Mucina & Rutherford (2006), as the Bushmanland Arid Grassland, with the mountains and granite plains representing the Eastern Gariiep Rocky Desert and the Eastern Gariiep Plains Desert. Small areas represent the Aggeneys Gravel Vygieveld. This classification was refined during the site investigation and a new mapping unit namely Sandy Granite Vygieveld was distinguished from the mountainous Eastern Gariiep Rocky Desert. According to SANBI & DEAT (2009) and Mucina & Rutherford (2006) none of the ecosystems occurring on the prospecting area are considered as threatened ecosystems. Nonetheless, the areas north of Aggeneys are considered as Critical Biodiversity Areas (CBAs) within the Namakwaland District. These aspects will be discussed in detail in the forthcoming EMP.

A protected species which may occur in the prospecting area is *Acacia erioloba* (Camel Thorn), and may be present on the sandy plains. A further protected species which have been recorded on Portion 1 Wortel No.42 is the halfmens (*Pachypodium namaquanum*). Most, if not all, succulent plants are protected species. A list of threatened species and species of conservation concern, which may be present within the prospecting area, will be provided in the EMP.

G. Fauna

The larger part of the prospecting area comprises natural habitats, subject to relatively low stocking levels of livestock (sheep, goats, cattle), with the majority of disturbed areas occurring around water points, farm houses and access tracks.

i) Mammals

The local occurrences of mammals are closely dependent on broadly defined habitat types, in particular terrestrial, arboreal (tree-living), rupicolous (rock-dwelling) and wetland-associated vegetation cover. It is thus possible to deduce the presence or absence of mammal species by evaluating the habitat types within the context of global distribution ranges.

From a mammal habitat perspective, it was established that two of the identified four major habitats are very prominent in the prospecting area, namely terrestrial and rupicolous (rock-dwelling) habitat. Very little arboreal and wetland-associated vegetation cover habitat occurs on the prospecting area.

Terrestrial habitat forms a large part of the study site and is of great ecological significance. Many mammal species have burrows or live almost permanently in the soil. The grassy plains are the most extensive habitat on site, characterised by the flat topography and red sandy surface, but with a mosaic of patches of grass and/or gravel. Most of these are present near the washes, but also extending up slopes to the feet of the various mountains and hills scattered across the landscape. The open plains grade into the red sand and dune fields. Very few termitaria or moribund termitaria, which are the preferred habitat for some mammal species, were found.

The various rocky mountains form prominent and well-defined habitats that support their own unique biodiversity. These mountains and hills provide important habitat for rupicolous mammals.

Although not obvious in dry conditions, during periods of exceptional rainfall there are watercourses that flow and pans that fill with water, supporting a range of unusual biodiversity. The wash with its associated pans are the most obvious.

Arboreal habitat is almost non-existent on the study site. A few Acacia species and other small trees and bushes occur scattered in the dunes. A few Quiver trees (*Aloe dichotoma*) occur on some of the mountain slopes.

The 500 metres of adjoining zones along the study sites are similar to conditions described. The broader adjacent habitats are extensions of those present on site.

It is expected that the following mammal species occur within the prospecting area:

Aardvark, Rock dassie, Cape hare, Scrub hare, Smith's red rock rabbit, Cape porcupine, Springhare, SA ground squirrel, Brant's whistling rat, Litledale's whistling rat, Aardwolf, Caracal, African wild cat, Suricate, Yellow mongoose, Bat-eared fox, Cape fox, Black-backed jackal, Steenbok and Klipspringer. A comprehensive list of mammal species which may frequent the site, as well as red data species, will be provided in the EMP.

iii) Herpetofauna

Likewise, from a herpetological habitat perspective, it was established that two of the four major habitats are naturally present and very prominent on the study site, namely terrestrial and rupicolous (rock-dwelling) habitat. Very little arboreal and wetland-associated vegetation cover habitat occurs on the study site.

Man-made rupicolous habitat exists in the form of a homesteads and its surrounding outbuildings, built dams and worker accommodation. These man-made habitats are often islands in the sea of terrestrial habitat and have created excellent artificial habitat for many rupicolous reptile species.

Connectivity across the area is fair and real opportunities for migration exist.

Based on the habitat identified above, a variety of reptile and some amphibian species are expected to occupy the prospecting area. Common and widespread species include for example the Karoo tent tortoise, brown house snake, common egg eater, puff adder, horned adder, cape cobra, bibron's tubercled gecko, giant ground gecko, Anchieta's agama and western rock skink. A species list and associated red data status will be provided in the EMP.

iii) Birds

Based on the habitats identified above, a wide variety of bird species occurs, and is expected to occur on the prospecting area. Bird species expected on and around the prospecting area include inter alia the following: Common Ostrich, Acacia Pied Barbet, African Hoopoe, Swallow-tailed Bee-eater, European Bee-eater, White-backed Mousebird, Common Swift, Barn Owl, Rock Dove, Speckled Pigeon, Laughing Dove, Cape Turtle-Dove, Namaqua Dove, Ludwig's Bustard Kori Bustard, Karoo Korhaan, Namaqua Sandgrouse, Double-banded Sandgrouse and many others. A comprehensive species list and associated red data status will be provided in the EMP.

2.1.7. Provide any relevant additional information.

N/A.

3. The anticipated environmental, social or cultural impacts identified.

3.1. Confirm that the community and identified interested and affected parties have been consulted and that they agree that the potential impacts identified include those identified by them.

3.1.1. Provide a list and description of potential impacts identified on the cultural environment.

As per Section 2.1.1, Interested and Affected Parties (I&APs) has been informed about the proposed prospecting activities by way of telecommunication, letters (fax, e- mail and post) and the provision of an Information Document, containing the following:

- (a) A baseline description of the environment;**
- (b) A list of pre-identified anticipated impacts which may occur as a result of the proposed prospecting activities.**

I&APs have been invited and encouraged to comment on the list of identified potential impacts which may arise as a result of the proposed activities, and to provide input in terms of anticipated additional impacts which they think should be addressed in the environmental impact assessment process and compilation of the EMP.

Based on the meetings held with the affected landowners during the week of 23 June 2014, it can be confirmed that the landowners agree with the list of pre-identified impacts. Potential pre-identified impacts included the following, and are elaborated in in the EMP:

- Impacts on fauna en flora (ecology/biodiversity);**
- Impacts on soil / agricultural resources;**
- Impacts on day to day farming activities;**
- Impacts on water resources;**
- Noise impacts;**
- Traffic impacts; and**
- Impacts on heritage resources.**

In essence, the site constitutes an important ecological ecosystem which is sensitive to environmental change which may potentially be brought on by proposed prospecting activities (and overgrazing). The proposed prospecting activities are however, small scale and temporary in nature. The significance of identified impacts is assessed in the EMP and appropriate mitigation and management measures are proposed.

The EMP is currently available to stakeholders for comment, until the end of August 2014. Comments received from I&APs on the EMP will be addressed and submitted to the DMR.

In terms of identified impacts on the cultural environment, the following:-

The increased presence of people and vehicles in the area may result in disturbance of the otherwise quiet lifestyle of the farmers in the area. The presence of migrant labour / non-local workers raised concerns about increased crime and safety.

The scale and extent of the drilling work envisaged is expected not to be excessively intrusive to the activities of land owners. However, should the permit be granted, suitable arrangements must be made with landowners to ensure minimal disruption and uncertainty regarding the nature of activities on the affected farms during prospecting operations.

3.1.2. Provide a list and description of potential impacts identified on the heritage environment, if applicable.

Due to the nature and scale of the proposed activities, it is not anticipated that there will be negative impacts on heritage and/or archaeological / palaeontological resources, as these will be avoided where they are visible.

The EMP contains generic mitigation measures as far as the presence of these resources is concerned. The EMP is currently available to the SAHRA for comment.

3.1.3. Provide a list and description of potential impacts identified on the socio-economic conditions of any person on the property and on any adjacent or non adjacent property who may be affected by the proposed prospecting or mining operation.

As described in Section 2.2.1, the area is characterised by a farming community and the land under application is used for agricultural purposes. Current activities include livestock farming (sheep and goats / cattle) and associated grazing. Although proposed prospecting activities may potentially result in the degradation of natural veld and impact on livelihoods, it was indicated by landowners that disturbances caused by BMM as a result of previous prospecting have been rehabilitated successfully. If prospecting occurs, care must be taken to minimise veld damage and impacts, and that rehabilitation is done to the satisfaction of both the DMR and affected landowners.

Apart from compensation to the landowners in terms of the agreements which are to be entered into, should the right be granted, it is not anticipated that the project will have significant adverse impacts on the socio-economic conditions of the inhabitants of the area. The local shops and/or guesthouses in the area may possibly gain a few customers during the times when the prospecting activities are active. This will however be on a very small scale and temporary in nature.

During the consultation process, the following key issues were raised:

(a) Contractors may drive around the farms carelessly without consideration of day-to-day farming activities and potential long term impacts, such as damage to natural veld, impacting on grazing capacity.

(b) Noise will disturb livestock and wild life and grazing regimes may have to be adapted / changed.

(c) Snares which are being set to control predators will have to be removed, thereby increasing risk of attack to livestock

(d) Loss of livestock - leaving gates open / animal theft.

(e) Loss of livelihood, as a result of soil disturbances and the destruction of vegetation and unsuccessful rehabilitation

(e) Theft and damage to infrastructure such as fences and gates may occur

Should the right be awarded, the landowners must be kept informed of the whereabouts and activities of contractors on a daily basis, and proposed activities / modus operandi must be mutually agreed, in advance.

The status quo of the natural environment, impacts pertinent to the proposed prospecting activities and issues pertaining to rehabilitation are identified and discussed in detail in the EMP.

3.1.4. Provide a list and description of potential impacts (positive & negative) identified on: employment opportunities, community health, community proximity.

The proposed prospecting activities will not result in permanent job creation. However, the project may result in temporary job creation, with workers being sourced locally where possible. There will be no impacts on human health.

3.1.5. Provide a list and description of potential impacts identified on the biophysical environment including but not be limited to impacts on: flora, fauna, water resources, air, noise, soil etc.

A. Impacts on natural vegetation and animal life

This impact relates to the degradation of veld which is used for the purposes of grazing by livestock, as well as the potential destruction of plant species, which may have an impact on the plant diversity of the area.

Displacement of naturally occurring fauna may also occur, and in extreme instances animals may be injured or killed.

These impacts may occur if there is unregulated driving in the veld.

Existing farm roads must be used as far as possible and driving in the veld must be kept to an absolute minimum.

The proposed prospecting activities are such that it will have a limited impact on the plant and animal species occurring within the prospecting area. However, caution should be exercised whilst driving in the veld, so as to minimise impacts on vegetation and fauna species such as reptiles and the nests of ground living birds.

Drill rigs must utilize existing roads as far as possible. However, where roads do

not exist, the proposed drill line will be accessed via veld. However, due to the low vegetation, road construction and/or vegetation clearance is not required. Likewise, there is also no need for the construction of drill pads.

B. Impacts on ground water resources (groundwater qauntity)

Water will be brought in to the prospecting area by truck from the existing mine at Aggeneys. It is, at this time, anticipated that water will not be sourced from landowners. The ground water resource will therefore not be adversely affected.

C. Impacts on water qauality (ground and surface water):

Prospecting activities, i.e. the operation of the drill rigs, pumps and the presence of vehicles on the veld may potentially result in the pollution of drainage lines. Strong control will be exercised over oil usage. Impervious sheeting will be laid underneath the rig to catch any spills and any contaminated soils will be removed to an approved disposal site. Mobile chemical toilets will be made available to on-site personnel and managed as per specification in the EMP. Domestic / non-hazardous waste will be collected centrally and disposed of an approved disposal site.

D. Air Qaulity and Noise

Air quality in the area is relatively good and demonstrates conditions typical of remote rural areas. Apart from dust generation on the main access roads, air quality will not be significantly affected by the proposed prospecting activities.

Likewise, prevailing noise levels on site are low. Noise generation will be localised to specific individual drill sites, resulting in a temporary increase of noise levels in the immediate area.

The impacts as identified above are expanded on and described and assessed in the EMP.

3.1.6. Provide a description of potential cumulative impacts that the proposed operation may contribute to considering other identified land uses which may have potential environmental linkages to the land concerned.

As stated before, the broader area has been and continues to be subjected to prospecting campaigns undertaken by various companies. The potential cumulative impact of prospecting activities in the area on veld condition, may, over time, result in the loss of livelihoods. Grazing must be sustained in the long term to ensure sufficient yield, so that farms can continue to earn a living on these lands.

The cumulative impact of various existing and proposed prospecting projects in the area may result in an increase in the availability of temporary jobs in the area, resulting in improved standards of living.

Regional traffic increase

The proposed project will contribute to temporary, minimal increase in traffic in the area. Due to the size of the proposed operation, the cumulative effect of additional vehicles on the roads is anticipated to be negligible.

Impact on Biodiversity (Soil, Vegetation and Fauna):

Potential cumulative impacts (if post operational mitigation measures are not complied with) at the site resulting from unsuccessful rehabilitation. This may lead to erosion and proliferation of invader species and weeds over time. Alien infestations may lead to the degradation of the habitat and affect regional biodiversity. Provided that the disturbed areas will be rehabilitated and monitored until rehabilitation is satisfactory, the relative contribution of the project to potential loss of biodiversity is minimal compared to impacts generated by large operational mining and infrastructure development projects in the area.

Soil, surface and groundwater pollution: Potential cumulative impacts may occur as a result of uncontrolled / mismanaged spillages of materials containing hydrocarbons, finding their way into water resources, affecting the regional hydrology. The volumes of hydrocarbons used on site does not compare to the high volumes of substances used at existing mining operations. If spills occur, these will be cleaned up immediately. Water pollution which may occur as a result of the proposed project, compared to pollution which may result from various other activities across the region, including mining and agriculture, will be negligible.

Air pollution: The cumulative contribution of dust, resulting in air pollution, to that already existing in the area, will be limited to the site and temporary in nature (compared to dust generated by existing mining operations and surrounding farming activities). Compared to dust generated by the existing mine, dust generated by the proposed prospecting activities will be minimal.

Noise pollution: The cumulative contribution of noise, resulting in increased noise levels / disturbance in the area, to that already existing in the area, will be limited to the site and temporary in nature. Compared to noise generated by the existing mine, noise generated by the proposed prospecting activities will be minimal.

Potential cumulative impacts which may occur as a result of the proposed project is considered temporary. It is anticipated that these impacts will cease to exist after cessation of operations and completion of rehabilitation, but the exact nature of these impacts are addressed in the EMP.

4. Land use or development alternatives, alternative means of carrying out the proposed operation, and the consequences of not proceeding with the proposed operation.

- 4.1. Provide a list of and describe any alternative land uses that exist on the property or on adjacent or non-adjacent properties that may be affected by the proposed mining operation.

The only existing land use on the prospecting area and within the surrounds that may potentially be affected is that of farming, as described in detail in the sections above.

- 4.2. Provide a list of and describe any land developments identified by the community or interested and affected parties that are in progress and which may be affected by the proposed mining operation.

To date, none has been identified by I&APs.

- 4.3. Provide a list of and describe any proposals made in the consultation process to adjust the operational plans of the mine to accommodate the needs of the community, landowners and interested and affected parties.

To date, none has been identified by I&APs.

Arrangements to accommodate specific needs of affected landowners will be specified and agreed upon with landowners should the prospecting right be granted by the DMR. Operational plans will be discussed with landowners and adjusted where possible on an as and when required basis.

- 4.4. Provide information in relation to the consequences of not proceeding with proposed operation

The consequences of not proceeding with the proposed prospecting campaign would be that a potentially economically viable mineral resource that could benefit the community through the influx of development would be left unexplored.

5. Description of the process of engagement referred to in 3.2.1 and 3.2.2 above with identified communities, landowners and interested and affected parties.

- 5.1. Provide a description of the information provided to the community, landowners, and interested and affected parties to inform them in sufficient detail of what the

prospecting or mining operation will entail on the land, in order for them to assess what impact the prospecting will have on them or on the use of their land;

Refer to Appendix B for information which was provided to I&APs.

Consultation with Landowners

The landowners were contacted during the week of 16 June 2014 via telephone to inform them of the proposed project and arrange meetings to discuss the application.

Landowners were provided with a letter, informing them of the application, as well as an information document including a map, identifying the affected property, a summary of the proposed method of prospecting activities and a description of potential impacts which may occur as a result of prospecting activities. A copy of DMR's letter of acceptance of the prospecting right application, was also provided. The landowner consultation process was facilitated by way of structured interviews, through the completion of a questionnaire. The language of choice during this consultation was Afrikaans, and all documents were available in Afrikaans.

Consultation with the existing right holder: Ganna Minerale (PTY) Ltd. Mr. Niemoller of Ganna Minerale was contacted via telephone and a letter hand-delivered, explaining the application and proposed prospecting activities, so that the necessary arrangements can be made for the co-existence of respective operations on the site. To date, no feedback has been received from Mr. Niemoller.

Consultation with Adjacent Landowners

Adjacent landowners have been contacted, and were provided with same via registered mail. Inputs and comment will be considered and addressed over the next month, and submitted to the DMR as required.

Consultation with other I&APs (Key Stakeholders)

Key stakeholders, as indicated in section 1.10 of this document, have been contacted via telephone, e-mail and fax, as may be required. Key stakeholders were provided with a letter, information document, maps and comment/registration sheet.

The public has been notified of the proposed prospecting activities via advertisement in the local newspaper "Die Plattelander", on 4 July 2014. Various site notices (A2) was erected at strategic locations around the prospecting area. Various A3 and A4 posters were placed at the following locations:

In Pofadder at the local garage on the N14 and at the post office.

In Aggeneys at the local grocery store (OK) and the post office.

In Springbok at the local SPAR, Springbok-Agri and the post office.

Proof of site notices, posters and newspaper notification are provided in Appendix C.

5.2. Provide a list of which of the identified communities, landowners, lawful occupiers, and other interested and affected parties were in fact consulted.

Refer to Appendix A for the detailed stakeholder database, containing contact details.

The process of identifying affected landowners and stakeholders commenced on 9 June 14 and the information, as described above, was disseminated to landowners, adjacent landowners, and identified key stakeholders.

The landowners were consulted in person at a location of their choice.

All of the parties as identified in the stakeholder database were contacted and is in process of being consulted. The process of consultation is ongoing and will continue over the next month, with the EMP currently being available for comment. Stakeholders are provided opportunity to comment on the application until 29 August 2014. The results of continued consultation will be submitted to the DMR during the first week of September 14.

All of the identified stakeholders included in the stakeholder database (Appendix A) were contacted.

5.3. Provide a list of their views raised in regard to the existing cultural, socio-economic or biophysical environment, as the case may be.

Mrs. Ronel van Heerden, Mr. Neels van Heerden and Mr. Paul van Heerden (Portion 1 Wortel)

The Van Heerdens indicated that the farm has been subjected to previous prospecting campaigns undertaken by Anglo and Kumba, and very old mine dumps are present on the farm. There are no graves or graveyards present on the farm. The land is currently rented from Mrs. Van Heerden by her son Mr. Neels van Heerden for livestock grazing at low densities (sheep, goats and cattle). Apart from the caretaker, there is currently no one resident on the farm.

Mr. Neels van Heerden indicated that there is "halfmense" present on the property, and that these plants are being monitored by the University of Stellenbosch and the DENC. Sensitive environments on the farm include the areas where the halfmense

occur, as well as the gravel plains and vygieveld. Steenbok, Klipspringer, Jackal, Caracal "Berg Luiperd" and Tortoises are present on the farm.

Mr. Izak van Niekerk (Portion 2 Rozybosch)

Mr. Van Niekerk resides in Nababeep and is not permanently resident on the farm. Mr. Van Niekerk visits the farm over weekends and the farm is tended to by a caretaker during the week. He indicated that BMM drilled on the farm before and required clarification as to why further prospecting is required. He indicated that he was satisfied with the way in which the areas affected by the previous drilling campaign have rehabilitated. He also indicated that Simba Minerals contacted him regarding a proposed future prospecting campaign.

There is a small family graveyard located on the farm, in proximity to the homestead. The original stone house was built during 1911.

There are two springs located on the farm, with one supplying 80% of the farm's water requirements. Due to the small size of the farm (4500 ha) carrying capacity is generally low and grazing regimes must be appropriately managed to ensure maximum yield. Mr. Van Niekerk are not bothered by potential prospecting activities, as long as cognisance is taken of day-to-day operations on the farm. Driving in the veld must be kept to a minimum to limit impacts on vegetation and erosion.

Mr. Pieter van den Heever (RE Wortel)

Mr. Pieter van den Heever is permanently resident on the farm and indicated that there is currently no workers present on the farm. The land is currently used for the ranching of small stock, mostly sheep, goats and some cattle. There is a small family grave yard located in proximity to the homestead. Mr. Van den Heever is not aware of the presence of any environmental sensitive features on the farm.

Oonab Boerdery CC (Mr. Edmund Agenbag) Portion 1 Koenabib

Mr. Edmund Agenbag is one of four shareholders and indicated that he has to consult with the remaining three shareholders regarding the proposed prospecting activities as well. The farm is unoccupied and currently rented out for grazing purposes. Mr. Agenbag indicated that there is currently a different application for a prospecting right for siliminite over his farm, and that he would not want BMM's application to interfere with this that. BMM consulted the DMR in this regard, who indicated that there are no other applications for prospecting rights lodged over this land. Mr. Agenbag indicated that water is scarce, and that he is not aware of the presence of any environmental sensitive or graves or heritage features on the farm.

5.4. Provide a list of their views raised on how their existing cultural, socio-economic or biophysical environment potentially will be impacted on by the proposed prospecting or mining operation.

The Van Heerdens (Porion 1 Wortel) indicated that water is scarce and groundwater availability may be impacted by prospecting operations should borehole water be used for operations. Mrs. Van Heerden indicated that water will not be made available and that water will have to be brought in by BMM. Further concerns raised included the following:

(a) contractors drive around the farms carelessly without consideration of day-to-day farming activities and potential long term impacts, such as damage to natural veld.

(b) noise will drive livestock and wild life away and the grazing regime may have to be adapted / changed.

(c) snares which are being set to control predators may be affected by the presence of people in the area, preventing the elimination of the predators responsible for killing small stock, resulting in loss of income.

(d) loss of livestock - leaving gates open / theft.

(e) theft of and damage to infrastructure such as water pipelines, dams, fences and gates may occur.

Mr. Izak van Niekerk (Portion 2 Rozybosch)

Mr. Van Niekerk also raised the issue that the presence of people on the farm may jeopardise efforts to trap predators. He requested that he must be consulted prior to driving in the veld, to ensure that traps remain unaffected and in tact. In addition, Mr. Van Niekerk indicated that he should be appropriately compensated by BMM, should water be pumped for their prospecting operations.

Mr. Pieter van den Heever (RE Wortel) indicated that water is scarce and that BMM will have to supply their own water should prospecting be undertaken on the farm. He does not foresee any risks or inconvenience as a result of prospecting activities and had no objections or concerns about the proposed project.

Oonab Boerdery CC (Mr. Edmund Agenbag) Portion 1 Koenabib

Mr. Agenbag indicated that proposed prospecting activities may impact adversely on existing roads, and that maintenance will be required. Appropriate compensation will have to be discussed should the prospecting right be granted.

5.5. Provide list of any other concerns raised by the aforesaid parties.

N/A.

5.6. Provide the applicable minutes and records of the consultations as appendices.

Refer to Appendix C.

Meetings were held with landowners as follows:

Mrs. Ronel van den Heever and her sons, Mr. Neels van den Heever and Mr. Paul van den Heever (Portion 1 Wortel No.42): Monday, 23 June 14 at 6 pm at her place of residence in Pofadder.

Mr. Edmund Agenbag (Portion 1 Koenabib No. 43): Tuesday, 24 June 14 at 7 am at the Eskom substation in Aggeneys.

Mr. Pieter van den Heever (RE Wortel No. 42): Wednesday, 25 June 14 at 9 am on the farm.

Mr. Izak van Niekerk (Portion 2 Rozybosch No. 41): Wednesday, 25 June 14 at 1 pm on the farm.

5.7. Provide information with regard to any objections received.

To date, no objections have been received. The consultation process is ongoing, and the EMP is currently available to landowners and registered I&APs for comment. Objections which may surface during the next month will be documented and addressed in the reports to follow.

The Van Heerdens of Portion 1 Wortel No. 42 indicated that they can not indicate at this time whether they object to the proposed prospecting activities. A decision will be made upon review of the EMP.

6. Describe the most appropriate means to carry out the proposed operation with due accommodation of the issues raised in the consultation process.

If the prospecting right is granted, the implementation and monitoring of the EMP must be discussed with the landowners on a frequent basis. Due cognisance must be taken of day-to-day farming activities and landowners must be kept informed of planned schedules and activities in advance. BMM needs to discuss issues of compensation and rehabilitation with individual landowners pertinently and present feasible proposals in this regard.

C. IDENTIFICATION OF THE REPORT

The report on the results of consultation must, at the end of the report include a certificate of identification as follows;

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises the results of consultation as contemplated in Section 16 (4) (b) or 27 (5) (b) of the Act, as the case may be.	
Full Names and Surname	David Edwin Payne
Identity Number	LT0073561 (Passport Number)

- END -