



**mineral resources**

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

**ENVIRONMENTAL MANAGEMENT  
PLAN  
AVONTUUR PRA**

NAME OF APPLICANT:  
Zirco Roode Heuwel (PTY) LTD

DMR REFERENCE NUMBER:  
NC 30/5/1/1/2/10728 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)**

**8 APRIL 2013**

## **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**

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**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**

The proposed area (site) of exploration is located approximately 55 km west-north-west from the town Garies, within the area of jurisdiction of the Kamiesberg Local Municipality (Namaqualand District). The site includes the following properties (refer to the Section 2(2) Plan and Regional Locality Maps below):

**Table 1: Application Area**

Farm Name	Farm Number	Portion Number
Gemsbokvley	479	1, 2, 4, 6, 11 & 17
Avontuur	480	-
Avontuur	487	Remainder, 4, 5, 6 & 7
Jakkalsvlakte	482	-



The site is 12,819 ha in extent, and the farms are owned by Mr. J.A. Mostert. A site and area investigation was undertaken between 27 – 28 February 2013.

The following existing land uses have an impact on the environment within the prospecting (and surrounding) areas:-

#### **1.1.1 Farming activities**

The site and surrounding area is characterised by a farming community and the land under application is used for agricultural purposes. Current activities include livestock farming, mostly sheep and goats. The land is arid and primarily used for grazing by livestock as well as some small game species naturally occurring in the area.

#### **1.1.2 Water Use**

Water is not readily accessible and a scarce commodity. There are various farm dams and windmills on the, and water therein is used mainly for livestock consumption by livestock. The land owner pumps water from existing boreholes, and this water is used mainly for domestic purposes.

#### **1.1.3 Roads**

Access to the farm is via a gravel road, connecting the N7, just north of Garies, with Wallekraal and Hondeklipbay. The gate leading to the farmstead is located on the Hondeklipbay Road, north of Wallekraal.

At Wallekraal, which is situated on the Remainder of Avontuur 487, there is an intersection on the Hondeklipbay Road, with roads leading to Sariesaam to the south and Springbok to the north.

On Portion 7 of the Farm Avontuur 487, the Hondeklipbay Road splits, with one road providing access to Hondeklipbay to the west, and the other road running northwards, towards Soebatsfontein.

Just south of Portion 4 Avontuur 487, there is another intersection on the Hondeklipbay Road. From here, Portions 5-487, 1, 2 & and 11-479 is bordered by the Jantjeskop Road on its western boundary.

The main gravel road is fairly accessible, but due to sandy conditions mainly fit for 4 x 4 vehicles. Due to its remote location, these roads do not carry large volumes of traffic.

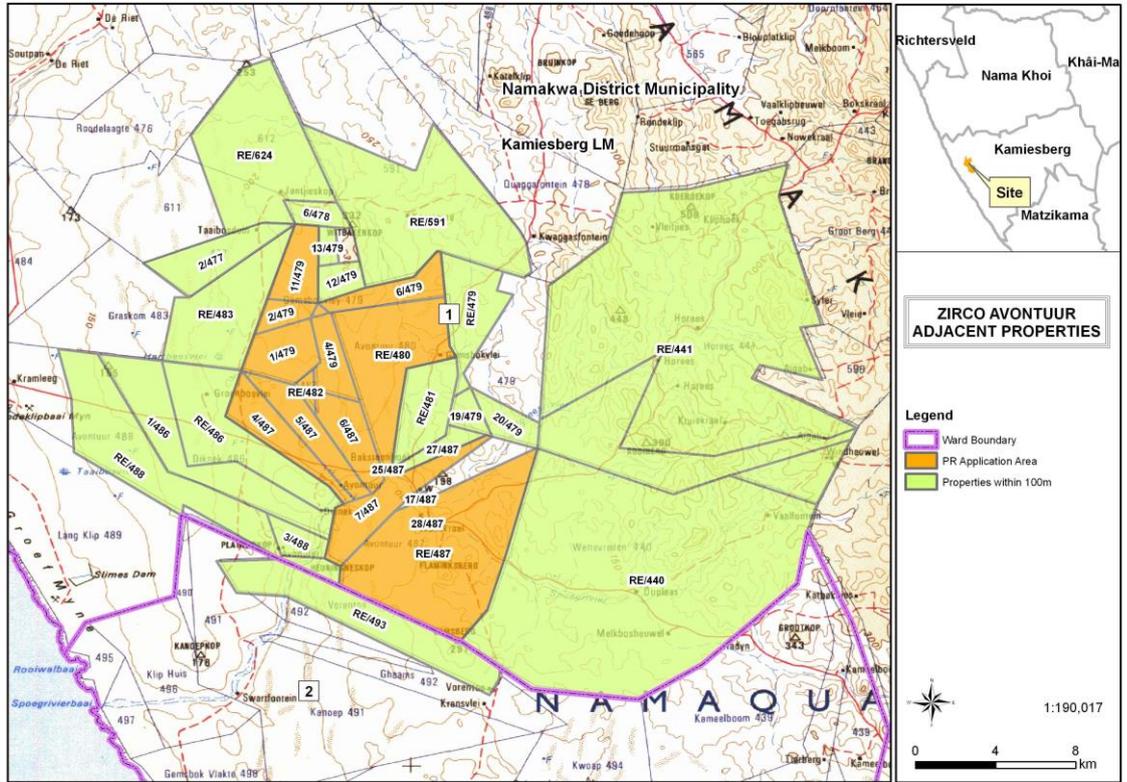
#### **1.1.4 Infrastructure**

There are three residences located on the land where prospecting is proposed, as well as outbuildings, sheds and fences, demarcating property boundaries and animal enclosures.

#### **1.1.5 Surrounding Area**

The surrounding environment is similar to that of the on-site environment. Surrounding farms are either privately owned and used for livestock farming, or owned by the Kamiesberg Local Municipality

or SANPARKS. The site is bordered by the Namaqualand National Park on its western boundary. Naturally, this area is used for conservation purposes, and it was indicated by the landowner that SANPARKS plan to expand its area.



**Figure 3: Surrounding area and adjacent farms**

Numerous prospecting projects have been or are currently being undertaken within the area of jurisdiction of the Kamiesberg Local Municipality. In addition, several mining operations have been established or are planned within the broader area, however, none within the immediate vicinity of the site.

The images below depict the environments typical of the application area and beyond.



**Image 1: Residence of Mr. JA Mostert  
(the land owner)**



**Image 2: Portion 6 Avontuur 487 –  
View towards Mostert residence**



**Image 3: View of Portion 4 Avontuur 487 –  
view towards Namaqua National Park**



**Image 4: On the boundary of the Namaqua National Park**



**Image 4: Heuweltjieveld on the remainder of Avontuur 487**



**Image 5: Portion 4 Avontuur 487 - problematic re-establishment of vegetation, note erosion**



**Image 6: Portion 4 Avontuur 487 – Inland Duneland (Deep sand)**



**Image 7: View towards the Spoegrivier at Wallekraal**



**Image 8: Old School at Wallekraal**



**Image 9: Remainder Avontuur 487 - Vygieveld**

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

### **1.2.1 Description of the Environment**

#### **1.2.1.1 Biodiversity**

##### **The Mining and Biodiversity Guideline (MBG) (2012)**

The most recently developed 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 4 shows the identified biodiversity priority areas relevant to the site. The following should be noted:

- (a) The site is situated adjacent to a protected area, i.e. the Namaqua National Park and a 10 km protected area buffer is applicable (Refer to Figure 5);
- (b) The site is affected by River and Wetland Freshwater Ecosystem Priority Areas (FEPAs), and a 1 km buffer applicable to river and wetland FEPAs (Refer to Figure 5);
- (c) The site does not fall within any critically endangered and/or endangered ecosystem;
- (d) Ecological support areas – three areas of importance are applicable (ESA\_T, T1 and T2);
- (e) Land-Based Protected Area Expansion Focus Areas – large areas across the site are identified for protected area expansion;
- (f) The site is located within the Succulent Karoo Priority Area (SANBI).

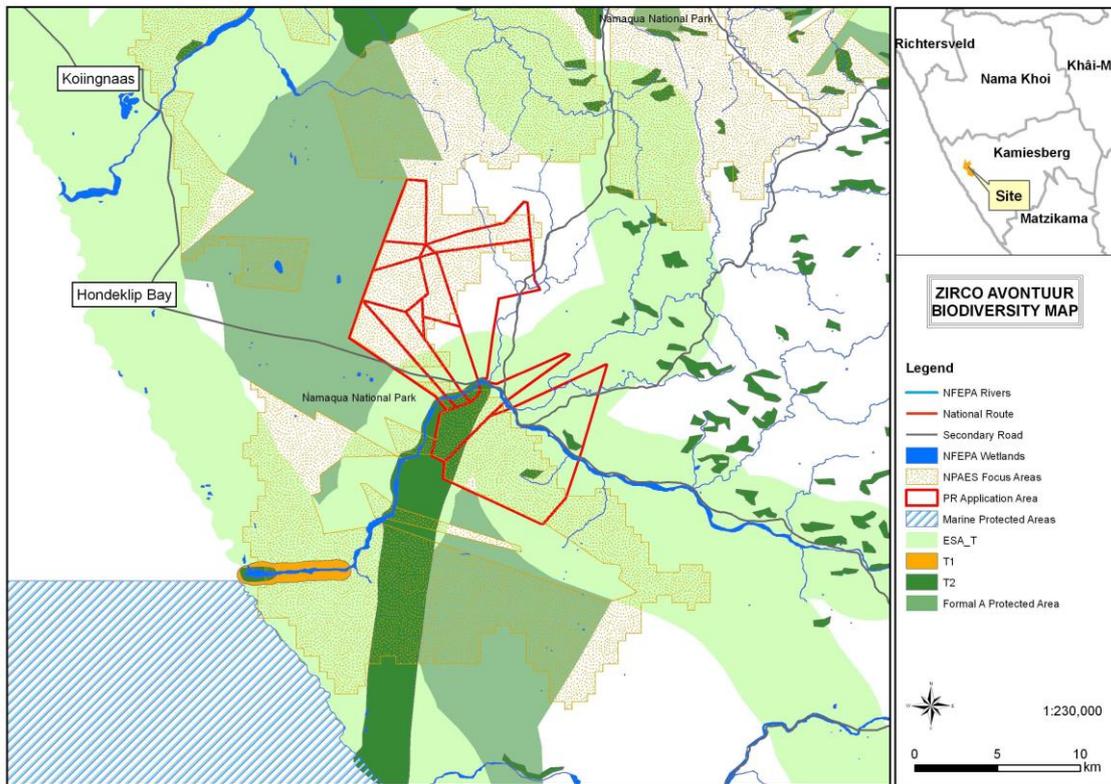


Figure 4: Identified Biodiversity Priority Areas

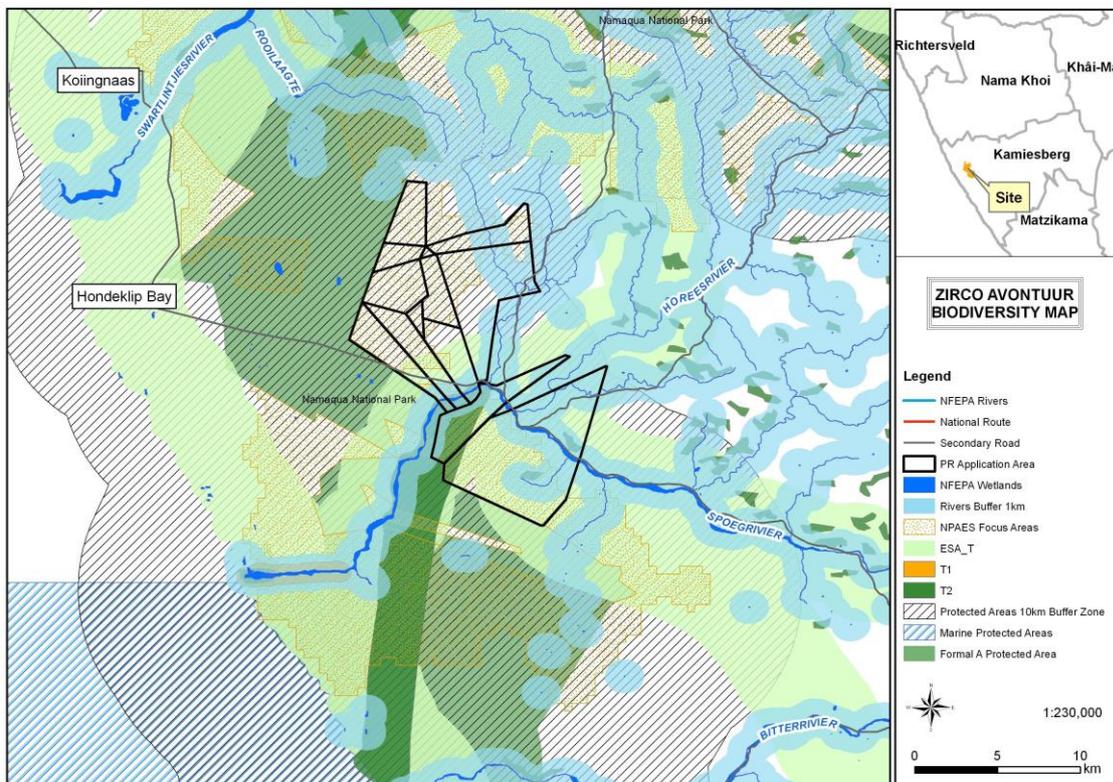


Figure 5: Drainage line and protected area buffers

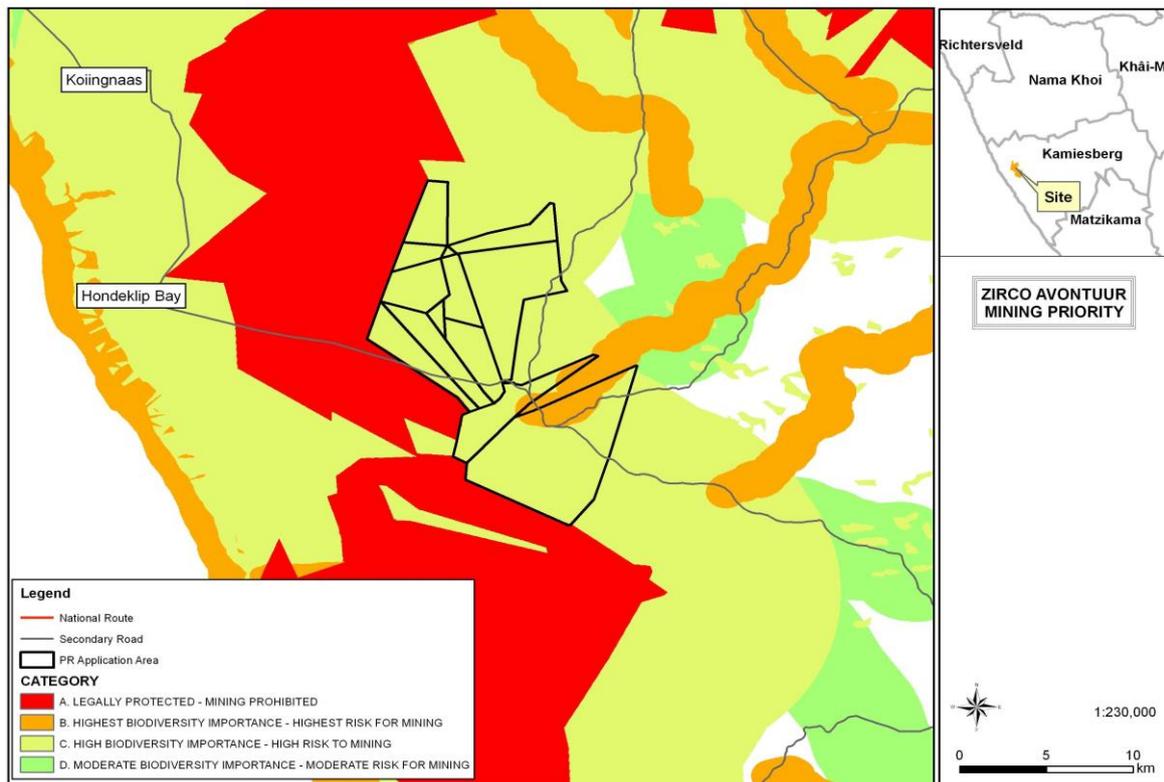
The MBG further distinguishes between four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem services point of view, as follows:

**Table 2: Biodiversity Priority Area Categories (MBG 2012)**

Category	Biodiversity priority area	Risk for prospecting / mining	Implications for prospecting / mining
A. Legally protected	Protected Areas, i.e. National Parks, reserves etc. Areas declared under Section 49 of the MPRDA	Prohibited	Mining projects cannot commence as mining is legally prohibited. Although mining is prohibited in Protected Areas, it may be allowed in Protected Environments if both the Minister of Mineral Resources and Minister of Environmental Affairs approve it. In cases where mining activities were conducted lawfully in protected areas before Section 48 of the Protected Areas Act came into effect, the Minister of Environmental Affairs may, after consulting with the Minister of Mineral Resources, allow such mining activities to continue, subject to prescribed conditions that reduce environmental impacts.
B. Highest biodiversity importance	Critically endangered and endangered ecosystems Critical Biodiversity Areas (or equivalent areas) from provincial spatial biodiversity plans River and wetland Freshwater Ecosystem Priority Areas (FEPAs), and a 1km buffer around these FEPAs Ramsar Sites	Highest risk for mining / prospecting	Environmental screening, EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making for mining, water use licences, and environmental authorisations. If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services. These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being. An environmental impact assessment should include the strategic assessment of optimum, sustainable land use for a particular area will determine the significance of the impact on biodiversity. This assessment should fully take into account the environmental sensitivity of the area, the overall environmental and socio-

			<p>economic costs and benefits of mining, as well as the potential strategic importance of the minerals to the country. Authorisations may well not be granted. If granted, the authorisation may set limits on allowed activities and impacts, and may specify biodiversity offsets that would be written into licence agreements and/or authorisations.</p>
C. High biodiversity importance	<p>Protected area buffers (including buffers around National Parks, World Heritage Sites* and Nature Reserves)          Transfrontier Conservation Areas (remaining areas outside of formally proclaimed protected areas)          Other identified priorities from provincial spatial biodiversity plans          High water yield areas          Coastal Protection Zone          Estuarine functional zone</p>	High risk to mining	<p>These areas are important for conserving biodiversity, for supporting or buffering other biodiversity priority areas, for maintaining important ecosystem services for particular communities or the country as a whole. An environmental impact assessment should include an assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity. Mining options may be limited in these areas, and red flags for mining projects are possible. Authorisations may set limits and specify biodiversity offsets that would be written into licence agreements and/or authorisations.</p>
D. Moderate biodiversity importance	<p>Ecological support areas          Vulnerable ecosystems          Focus areas for protected area expansion (land-based and offshore protection)</p>	Moderate risk to mining	<p>These areas of moderate biodiversity value. EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, identifying features (e.g. threatened species) not included in the existing datasets, and on providing site-specific information to guide the application of the mitigation hierarchy. Authorisations may set limits and specify biodiversity offsets that would be written into licence agreements and/or authorisations.</p>

Figure 6 shows that the site includes areas of highest as well as areas of high biodiversity importance, implying highest to high risk to mining.



**Figure 6: Biodiversity importance and associated risk to planned mining / prospecting activities**

Although the site is situated within an area of high biodiversity importance, the nature of the proposed prospecting activities is such that it should not, at this stage of the project, be considered as a threat to biodiversity and/or the Namaqua National Park. Proper planning and the implementation of management measures will alleviate potential impacts on biodiversity. However, buffer areas around drainage areas should be observed. No prospecting may occur within 1 km from identified drainage lines.

### 1.2.1.2 Vegetation

The site is situated within the Succulent Karoo Biome, a semi-desert region with winter rainfall of between 100 – 200 mm per annum. The region is renowned as an area where spectacular displays of flowers occur during the spring months, depending on the timing and amount of rain received during the winter months. The area has the richest succulent flora in the world with about one-third of the world's approximately 10 000 succulent species present.

A mere 5.8% (6 500 km<sup>2</sup>) of the Succulent Karoo Biome is formally protected in statutory and non-statutory reserves (Mucina & Rutherford 2006). Outside formal reserves, land use is primarily focussed on agriculture, with livestock grazing as a dominant land use in 90% of the region. Although grazing is a form of land use that is theoretically compatible with biodiversity conservation, overgrazing has had its consequences (Rutherford and Mucina, 2006). Fences, permanent watering points and high stocking densities of domestic livestock and ostriches have led to degradation in places. Loss of vegetation cover, seed banks and soil quality may have dire consequences for biodiversity in general.

According to Rutherford and Mucina (2006), although locally devastating, mining may have protected the Succulent Karoo Biome from massive transformation due to development and overgrazing. This is because many mines own large buffer areas of land, generally in an excellent condition. Only about 5% of the geographic area of the Succulent Karoo Biome has been irreversibly transformed, providing a relatively good situation for conservation planning. The unique botanical diversity of the region is a major advantage as it provides solid justification for conservation planning based on plant diversity.

According to Rutherford and Mucina (2006) both mining and livestock grazing constitute a major threat to biodiversity in the Succulent Karoo. The primary mining impact is from trench excavation and overburden stripping in larger areas to reach minerals. Of key concern is that specialised habitats such as riverine flood plains and coastal terraces are being targeted. In many cases, these are the areas considered as key habitats for ecological processes. New markets and discoveries of various metals and industrial minerals continue to transform large areas of limited habitat types. Mining has already transformed parts of the landscape, but today many mines have reached the end of their lives and thus pose new challenges for restoration. A formidable task is to provide locally adapted indigenous propagules on the scale required for restoration. This is a prime opportunity for emerging small scale businesses (Rutherford & Mucina, 2006).

In terms of livestock grazing, it should be noted that livestock exclusion alone is believed to be insufficient to restore degraded areas that may require more intensive and expensive interventions. Due to changing economic climates, there has been a resurgence of interest in game farming for ecotourism and hunting throughout the Karoo. Although heralded as a sustainable alternative to livestock farming, there are real threats such as the introduction of non-native herbivores, causing resource competition and niche displacement, genetic pollution and even acting as disease vectors (Rutherford & Mucina, 2006).

The Succulent Karoo Ecosystem Plan (SKEP), is an overall framework to guide conservation action in the Succulent Karoo, and has been completed by a team of regional experts funded by Conservation International. SKEP has been contacted and encouraged to provide comment and/or input in terms of this prospecting application. To date, SKEP has not responded to the application.

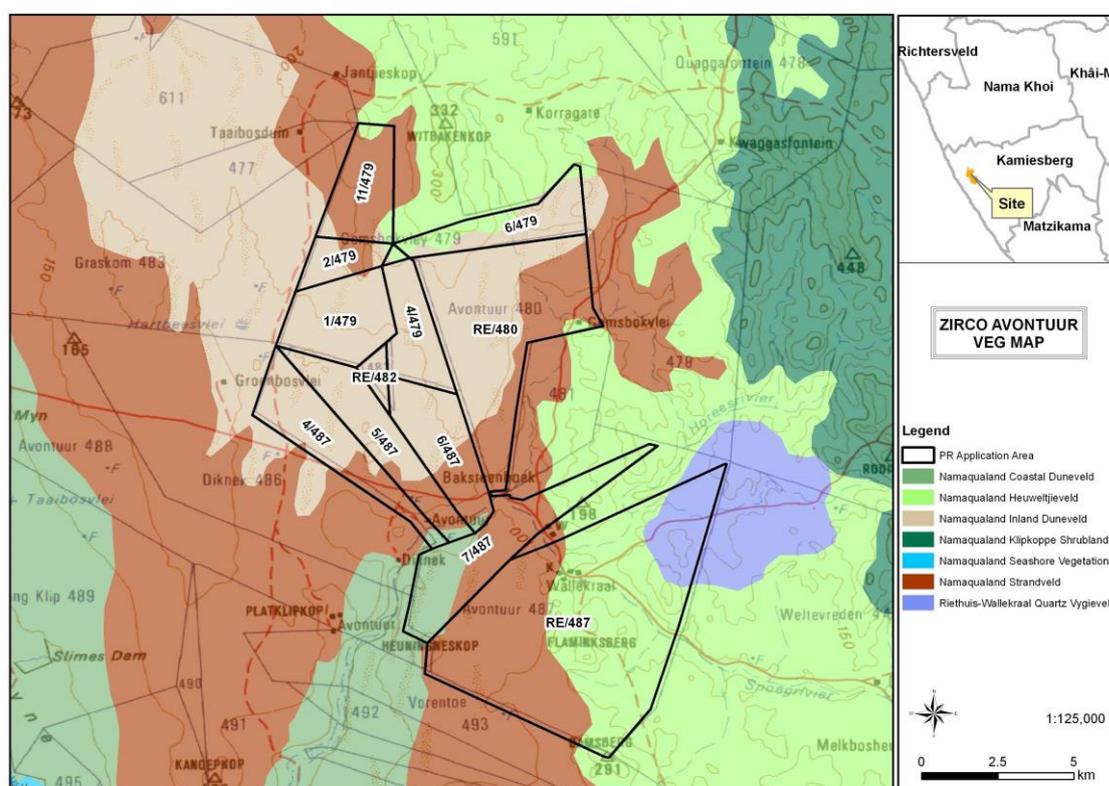
### **On-site vegetation**

The Succulent Karoo Biome encompasses sixty three (63) vegetation units, forming six (6) distinct bioregions. The site is characterised by five (5) of the 63 vegetation units and falls within two (2) of the identified bioregions. According to Rutherford and Mucina (2006), vegetation on site can be classified as follows (see Figure 7: Vegetation Map):

**Table 3: Vegetation Units Identified on Site**

Nr.	Vegetation Unit	Bioregion	Portion	Farm Name	Farm Nr.
1	Namaqualand Coastal	Namaqualand	Southern sections of 4, 5, 6 and	Avontuur	487

	Duneveld	Sandveld Bioregion	mostly portion 7		
2	Namaqualand Heuweltjieveld (SKn 4)	Namaqualand Hardeveld Bioregion	Remainder & 7	Avontuur	487
			Remainder	Avontuur	480
			6	Gemsbokvley	479
3	Namaqualand Inland Duneveld	Namaqualand Sandveld Bioregion	4, 5 & 6	Avontuur	487
			Remainder	Jakkalsvlakte	482
			1, 2, 4, 6 & 11	Gemsbokvley	479
			Remainder	Avontuur	480
4	Namaqualand Strandveld (SKs 7)	Namaqualand Sandveld Bioregion	Remainder, 4, 5, 6, & 7	Avontuur	487
			Remainder	Avontuur	480
			2 & 11	Gemsbokvley	479
5	Riethuis-Wallekraal Quartz Vygieveld	Namaqualand Sandveld Bioregion	North-eastern section of the Remainder	Avontuur	487



**Figure 7: Vegetation Map**

It should be noted that the site was not subjected to detailed biodiversity assessment. However, the presence of the vegetation units as presented on the vegetation map was confirmed during the site visit.

The table below provides information on the vegetation and landscape features, conservation status, as well as a list of some biogeographically important taxa and/or endemic species associated with the identified units (Rutherford & Mucina, 2006). All of these units are classified as least threatened in terms of VEGMAP (Rutherford & Mucina, 2006).

**Table 4: Characteristics of identified vegetation units**

Vegetation	Vegetation and Landscape	Some Biogeographically	Conservation status
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Unit	Features	Important Taxa (endemic species) which may occur on site	
Namaqualand Coastal Duneveld (SKs8)	Coastal peneplain with semi-mobile sandplains to highly mobile sharp and angular dune plumes usually north of the estuaries. Vegetation is dwarf shrubland dominated by erect succulent shrubs. As well as non succulent shrubs. Spiny grasses are a common sight on wind-blown semi-stable dunes, with 1 – 2 m erect to spreading shrubs mostly with malacophyllous leaves protected from the wind between dunes. Annual flora can present spectacular displays in wet years, but unlike the usual well-known displays of Namaqualand annual flowers, the display is produced mostly by perennial species.	<i>Wooleya farinosa</i> <i>Gazania sp.</i>	None of the unit is conserved in statutory conservation areas, but the area between the Spoeg and Groenrivers has been earmarked for a national park.  Large areas were affected by diamond mining and prospecting (about 8% of the area transformed). Kelp collection and vehicle tracks to the beach are also a disturbing factor in accessible places. Invasion by <i>Acacia Cyclops</i> .  <i>Capparis hereroensis</i> has enormous old underground tubers, making it possible to survive moving dunes that periodically cover and uncover the plants. The species is known only from a few plants (<20) between the Bitter and Swartlintjies Rivers and then they only occur in the Namib desert in Namibia.
Namaqualand Heuweltjieveld (SKn 4)	Undulating plains with a mosaic of plant communities on heuweltjies (i.e. slightly raised, rounded termite mounds up to 10 m in diameter) and in between the heuweltjies. Low shrubland dominated by leaf-succulent shrubs. In places, heuweltjies are turned into bare circles by overgrazing, often with <i>oncosiphon suffruticosum</i> as the only species occurring here. Heuweltjies are often home to burrowing animals like erdvark or antbear, porcupine and Brant's whistling rat.	<i>Psilocaulon foliosum</i> <i>Stoeberia frutescens</i> <i>Tetragonio namaquensis</i>	11% of the area unit statutorily conserved in Namaqua National Park.  Not under immediate threat except for local intensive grazing pressure responsive for veld degradation
Namaqualand Inland Duneveld (SKs 9)	Coast peneplain with mobile dunes. Vegetation is tall shrubland dominated by non-succulent shrubs ( <i>Berkeya</i> , <i>Eriocephalus</i> , <i>Euclea</i> , <i>Goveria</i> , <i>Lycium</i> , <i>Rhus</i> , <i>Tetragonia</i> , <i>Zygophyllum</i> ), as well as some grasses ( <i>Ehrharta</i> ) and restioids ( <i>Willdenowia</i> ).	<i>Othonna cylindrica</i> <i>Tetragonia fruticosa</i> <i>Zygophyllumj morgsana</i> <i>Diospyros ramulosa</i> <i>Eclea racemosa</i> <i>Nylandtia spinos</i> <i>Rhus longspina</i> <i>Rhus undulate</i> <i>Eriocephalus racemosus var affinis</i> <i>Helichrysum hebelepis</i> <i>Berkheya fruticosa</i> <i>Gloveria integrifolia</i> <i>Hermannia trifurca</i> <i>Lebeckia sericea</i> <i>Monechma spartioides</i> <i>Pharnaceum incanum</i> <i>Pteronia paniculata</i> <i>Salvia lanceolata</i> <i>Selago pinguicula</i> <i>Trichogyne ambigua</i> <i>Tripteris oppositifolia</i> <i>Willdenowia incurvata</i> <i>Ehrharta barbinodis</i> <i>Ehrharta calycina</i> <i>Ficinia argyropa</i>	Least threatened and none conserved in statutory reserves.  No obvious transformation evident, although overgrazing and trampling can result in destabilising of the sandy substrate. Invasion by <i>Acacia Cyclops</i> .
Namaqualand	Flat to slightly undulating	<i>Lampranthus sauvissimus</i>	None of the area is conserved in

Strandveld (SKs 7)	landscape of coastal peneplain. Vegetation is low species rich shrubland dominated by a plethora of erect and creeping succulent shrubs	<i>Tylecodon decipiens</i> <i>T. fragalis</i> <i>Afrolimon</i> sp. <i>Gorteria</i> sp. <i>Sutera multrimosa</i> <i>Lachenalia valeriae</i> <i>Romulea sinispinosensis</i>	statutory conservation areas, but in some small private reserves.  Threats are coastal mining for heavy metals. 10% of the area has been transformed. Generally subject to extensive grazing.
Riethuis-Wallekraal Quartz Vygieveld (SKs10)	Slightly undulating plains covered by white patches of quartz pavement covered with open canopy dwarf-succulent shrubland with dominant local endemic species of <i>Jacobsenia</i> , <i>Monilaria</i> and <i>Dicrocaulon</i> .	<i>Dicrocaulon ramulosum</i> <i>Dicrocaulon spissum</i> <i>Monilaria scutata</i> subsp. <i>Scutata</i> <i>Jacobsenia vaginata</i> <i>Meyerophytum globosum</i> <i>Afrolimon namaquanum</i> <i>Conophytum auriflorum</i> <i>Conophytum concavum</i> <i>Conophytum obscurum</i> subsp. <i>Vitreopapillum</i> <i>Crassula susannae</i>	About 25% is statutorily conserved in the Namaqua National Park.  Due to low suitability for grazing or other agricultural uses, the vegetation of this unique quartz vygieveld has not been transformed or disturbed to allow invasion of alien plants. Trampling and browsing caused severe damages to the vulnerable quartz field vegetation.

A list of Species of Conservation Concern (Table 5) for the Grids 3017DA and 3017DB was obtained from the database on the SANBI website. Threatened species are those that are facing high risk of extinction, indicated by the categories Critically Endangered (CE), Endangered (EN) and Vulnerable (VU). Species of Conservation Concern include the Threatened Species, but additionally have the categories Near Threatened (NT), Data Deficient (DD), (DDT = lack of taxonomic data), Critically Rare (CR), Rare (R) and Declining (D). This is in accordance with the new Red List for South African Plants (Raimondo *et al.* 2009). Should suitable habitat exist, these species may occur on the site.

**Table 5: Species of conservation concern which may occur on the site, depending on habitat availability**

Grid 3017DA		
Family	Species	Status
Fabaceae	<i>Wiborgiella bowieana</i> (Benth.) Boatwr. & B.- <i>E.van Wyk</i>	CR
Asphodelaceae	<i>Aloe arenicola</i> Reynolds	NT
Asphodelaceae	<i>Aloe krapohlina</i> Marloth	DDD
Iridaceae	<i>Babiana hirsuta</i> (Lam.) Goldblatt & <i>J.C.Manning</i>	NT
Apiaceae	<i>Capnophyllum leiocarpon</i> (Sond.) Manning & <i>Goldblatt</i>	Declining
Asteraceae	<i>Cotula pedicellata</i> Compton	Threatened
Eriospermaceae	<i>Eriospermum ramosum</i> P.L.Perry	Rare
Asteraceae	<i>Felicia serrata</i> (Thunb.) Grau	Rare
Amaryllidaceae	<i>Haemanthus pubescens</i> L.f. subsp. <i>arenicola</i> <i>Snijman</i>	Rare
Proteaceae	<i>Leucospermum lineare</i> R.Br.	VU
Proteaceae	<i>Leucospermum praemorsum</i> (Meisn.) <i>E.Phillips</i>	VU
Proteaceae	<i>Leucospermum rodolentum</i> (Salisb. ex Knight) <i>Rourke</i>	VU
Polygalaceae	<i>Muraltia obovata</i> DC.	VU
Mesembryanthemaceae	<i>Ruschia phyllicoides</i> L.Bolus	DDT

Campanulaceae	<i>Wahlenbergia polyclada</i> A.DC.	DDD
<b>Grid 3017DB</b>		
<b>Family</b>	<b>Species</b>	<b>Status</b>
Iridaceae	<i>Babiana lobata</i> G.J.Lewis	Rare
Asphodelaceae	<i>Bulbine flexuosa</i> Schltr.	DDT
Lobeliaceae	<i>Cyphia longiflora</i> Schltr.	NT
Eriospermaceae	<i>Eriospermum attenuatum</i> P.L.Perry	DDD
Euphorbiaceae	<i>Euphorbia brakdamensis</i> N.E.Br.	DDT
Brassicaceae	<i>Heliophila schulzii</i> Marais	Rare
Oxalidaceae	<i>Oxalis cathara</i> T.M.Salter	Rare
Oxalidaceae	<i>Oxalis virginea</i> Jacq.	Rare
Asteraceae	<i>Pteronia pillansii</i> Hutch.	DDD
Apocynaceae	<i>Quaqua inversa</i> (N.E.Br.) Bruyns	Rare
Mesembryanthemaceae	<i>Ruschia pungens</i> (A.Berger) H.Jacobsen	DDT

It is recommended that the site is assessed by a biodiversity specialist (appropriately qualified and registered with SACNASP), to confirm the presence of listed plant and/or animal species prior to commencement of prospecting. Where red data or specifically sensitive environments occur, these must be demarcated and avoided.

### 1.2.1.3 Fauna

During the site visit, duiker, steenbok, rabbits, mongoose, tortoises, geckos, lizards and a variety of bird species were observed on site.

Faunal species which may occur on site and within the surrounding area may include *inter alia* small mammals such as duiker, steenbok, rabbits, rodents, squirrels, mongoose, caracal, aardvark, porcupine, etc.; reptiles, with specific reference to tortoises, geckos, lizards and snakes; as well as ground living bird species. The following animals have been observed across the boundary in the Namaqua National Park: gemsbok, duiker, steenbok, ostriches, korhaan, falcons, secretary bird, sparrows, black headed heron.

### 1.2.1.2 Surface Water

The site is transected by the Hoerees - and Spoegrivers and their tributaries, draining south-west towards Spoegriverbay (Figure 4). All drainage lines are considered to be of conservation importance, and must be avoided in order to prevent impacts on the quality and flow of these systems.

According to the Mining and Biodiversity Guideline (MBG) (2012) the abovementioned rivers are classified as River and Wetland Freshwater Ecosystem Priority Areas (FEPAs), and a 1 km buffer is applicable, implying that no activity must be undertaken within 1 km of the identified drainage lines (Refer to Figure 4).

### 1.2.1.3 Cultural Heritage Resources

A desktop study with regards to the cultural heritage relating to the site has been undertaken by Archaetnos Culture & Cultural Resource Consultants (Archaetnos) (Appendix A).

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 study undertaken by Archaetnos, it is clear that not much is known about the presence of heritage sites and structures in the area under investigation. As far as the prehistory is concerned, this is the result of a lack of research, not only on the affected farms, but also in the wider geographical area. As far as the recent history is concerned, the lack of information is probably because no event of national importance is linked to any of these farms.

The lack of information 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 found at geographical features such as overhangs, caves and rock shelters. The diagrams of the farms indeed indicate hills and water sources, where such sites may be expected.

At least one building was indicated on the maps studied and a few other structures also seem to be present. If these still exist, even as ruins, it is older than 60 years and may be considered of heritage significance. An assessment of these would be needed in order to be able to determine its grading and exact level of significance.

Although very few buildings are indicated on any of the maps, this is not uncommon. The lack of such structures on the maps therefore does not necessarily mean that only a few buildings were constructed here. These were not always indicated on these maps. One can therefore definitely expect to find buildings and other structures dating to the at least the mid-19th century on the farms. This may also include graves. The latter is usually found close to homesteads. Farm houses would more than often also be close to a water source. Even buildings dating to the early and mid-20th century may be present and have a latent heritage significance as these are older than 60 years. It is important to note that all cultural resources older than 60 years are potentially regarded as part of the heritage and that detailed studies are needed in order to determine whether these indeed have cultural significance.

It is suggested that all structures and graveyards occurring on site are avoided during prospecting, and that a buffer area of 50 m is applied around graveyards, and 100 m around man-made structures, especially at Wallekraal, where an old school and hostel as well as a small monument, commemorating the Great Trek, is located.

It is clear that although not many heritage sites could be identified, the area shows a certain degree of potential to host Stone Age and historical sites. Such sites will need to be assessed before any mining development could commence. During prospecting activities, these sites should be avoided.

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

As per the maps included above.

**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**

The landowner was consulted in person, on 27 February 2013. The landowner participated in the compilation of the description of the environment, by way of structured interview (Refer to Appendix B – Record of Consultation). In addition, an information document, containing a baseline description of the environment, was made available to the landowner and I&APs for comment, from 22 February - 1 April 2013.

The landowner indicated that, generally, previous prospecting initiatives in the area resulted in environmental degradation, where prospecting sites failed to rehabilitate successfully. Due to the arid nature of the environment, sustained re-establishment of vegetation is difficult to achieve. In addition, where new tracks are made, these areas fail to recover and increases potential for erosion and loss of topsoil, resulting in the formation of erosion gullies, presenting hazardous conditions to livestock. The main concern is the potential loss of livelihoods, which may occur as a result of damage to vegetation, which is used for grazing purposes. Farming activities may cease to exist due to the damage which may occur as a result of recurring prospecting activities (cumulative impacts).

Stakeholders were encouraged and reminded to submit comments / input in terms of the project as far as possible within the legislated timeframe.

Supporting information pertaining to stakeholder consultation is provided in Appendix B.

## 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 Applicant proposes to prospect for the following minerals on the abovementioned properties:

- (a) Heavy Minerals (General);
- (b) Ilmenite;
- (c) Leucoxene (Heavy Mineral);
- (d) Rutile (Heavy Mineral); and
- (e) Monazite (Heavy Mineral).

The quaternary sediments over the application area consist of up to 20 m of unconsolidated quartz sands, enriched with heavy minerals including ilmenite, rutile, monazite and zircon. Airborne radiometric surveys conducted in the 1970s identified a prominent radio-active anomaly in the south of the application area. Follow-up drilling by the Geological Survey and subsequently by Anglo American showed that the radiometric anomaly is related to economic concentrations of heavy minerals in similar anomalies to the south. The applicant currently holds prospecting rights to the south, where exploration confirmed the presence of heavy minerals. The mineralisation seems to continue into this application area. This was confirmed by the identification of surface concentrations of heavy minerals along roads crossing the application area.

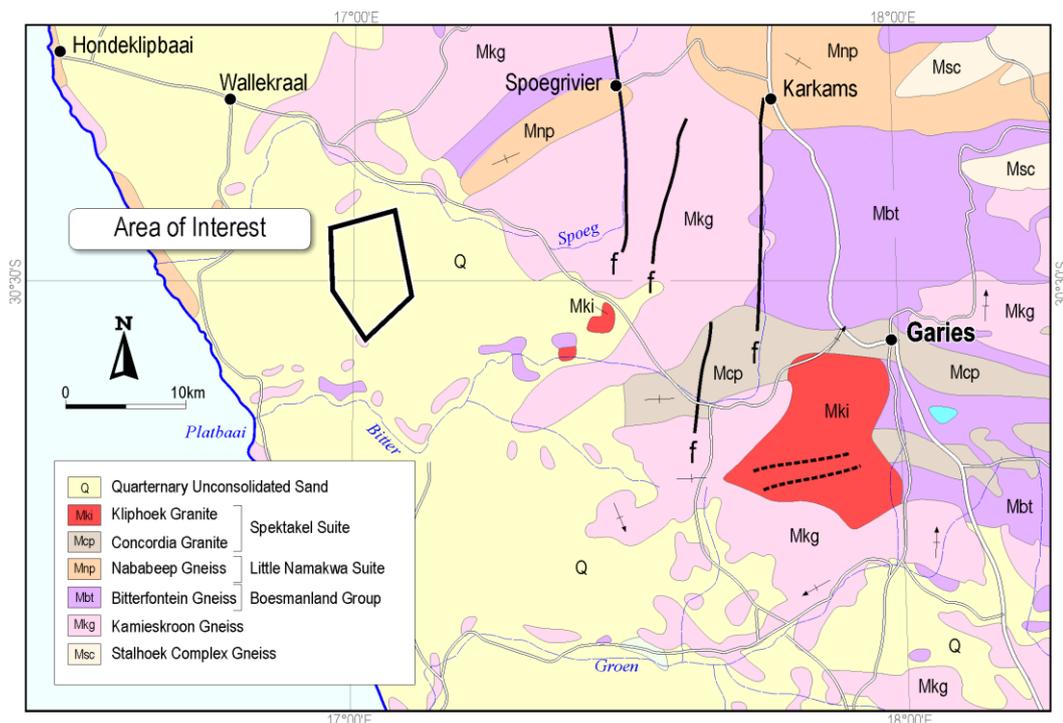


Figure 8: Regional Geology

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

It is envisaged that the proposed prospecting will be conducted in three phases over a four year period. The proposed prospecting programme involves both non-invasive and invasive prospecting methods. The programme can be summarised as follows:

**Table 6: Proposed prospecting activities and dimensions**

<b>PHASE</b>	<b>ACTIVITY &amp; DIMENSIONS</b>	<b>DURATION</b>
Phase 1 Invasive	Hand augering - 37 holes, 3 m deep, 1600 m x 1600 m spacing Sampling, analyses	1 Year
Phase 2 Invasive Non invasive	Reconnaissance drilling - 37 holes, 5 m deep, 1600 m x 1600 m spacing Sampling, analyses Resource estimate	1 Year
Phase 3 Invasive Non invasive	Inferred drilling - 112 holes, 5 m deep, 800m x 400m spacing Sampling, analyses Resource estimate	2 Years

The establishment of a site camp is not required. Personnel will be based at the guest houses available in the area. Three to seven people will be present on site during the day time. Approximately 20 litres bottled water for drinking purposes will be brought in to site, from the place of accommodation, per day. There is no need for the provision of mobile sanitation facilities. Equipment will be left on site overnight, but not guarded, since the area is remote and crime in the area minimal.

Drill rigs would utilize the existing gravel roads and two-track roads transecting the farms as far as possible. Where roads do not exist, the proposed drill line will be accessed via veld. Generally, vegetation cover is low and it is anticipated that road construction and/or vegetation clearance, in order to access drill sites will be minimal.

Bore hole sites are GPS located and pegged. The site is 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. Excess sand (not sampled) will be returned to the drill hole, i.e. the holes will be

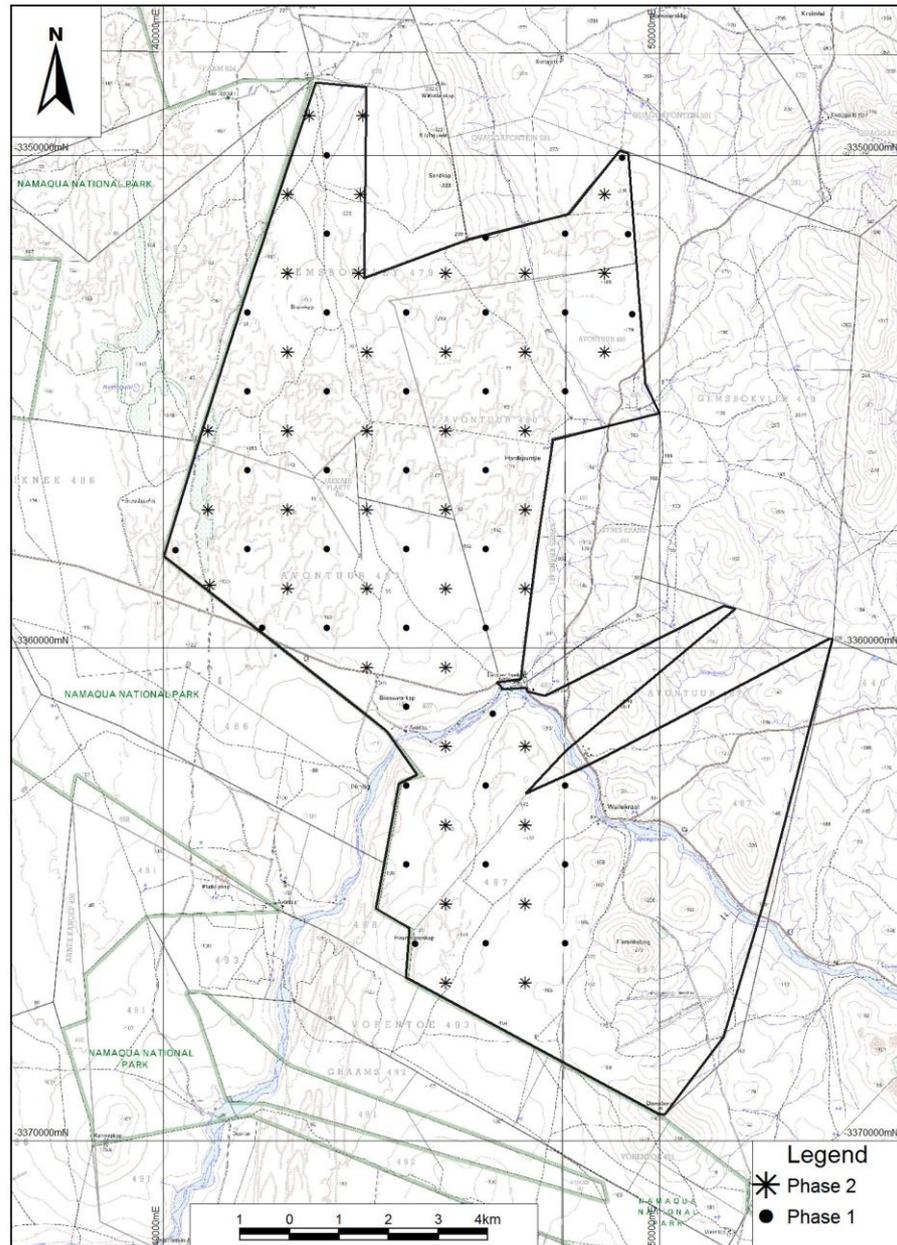
backfilled immediately upon completion of each individual drill hole. The average time spent on drilling a hole is approximately ½ hour. Original soils would finally be spread over each drill location. Disturbance to the land surface will be minimal as the drilling only removes a very small amount of ground for sampling and analysis.

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.

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

### **2.1.2 Plan of the main activities with dimensions**

The proposed prospecting activities will be undertaken within a phased approach based on preceding phase success and results (refer to Table 6 above and Figure 9 below).



**Figure 9: Preliminary locations of drill holes – Phases 1 & 2**

**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 proactive 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 locations of the boreholes as well as access routes to drill sites in terms of slope, vegetation type, existing disturbances and sensitive features of the area, are of critical importance for the sustainable and effective rehabilitation of the project. This should always be taken into account during planning phases.

During this phase, the site will be assessed by a biodiversity specialist / ecologist (appropriately qualified and registered with SACNASP), to confirm the presence of listed plant and/or animal species prior to commencement of prospecting. Where red data or specifically sensitive environments (including drainage lines and their associated buffers) occur, these areas will be demarcated and avoided.

The planning phase also entails further detailed consultation with the landowner, and should include not only compensation and access arrangements, but details on how and when the landowner 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 landowner, prior to commencement of Phase 1 of the PWP.

#### **2.1.3.2 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 above.

#### **2.1.3.3 Operational Phase**

The operational phase comprises the proposed activities as described above.

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 then be mitigated through the contingency plans identified in the EMP (Table 9).

During this phase, the required monitoring programmes as per the commitments of this EMP will be initiated.

The operational phase will consist of both invasive and non-invasive activities, as described below.

##### **i) Invasive Activities**

- **Drilling**

Drilling will be the most important method of prospecting. Initially this will be done with hand auger, thereafter suitable targets will be followed up with mechanised drilling.

The drilling method to be used is referred to as air-core drilling. The latter is a dry drilling method, meaning that no water is required. The drill machine to be used is a Wallis Mantis 75 hydraulic top-drive rig, mounted on a 4 x 4 Toyota Landcruiser, with an on-board compressor. The hole diameter is typically 82 mm wide. The heavy mineral deposit is present from surface and generally thin, up to 10 – 20 m deep. 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.



**Image 10: Image of typical drilling operation**

- **Sampling and Analyses**

A representative sample is collected for each meter drilled using a rig-mounted rotary splitter. The sample is logged, bagged and numbered in the field. The bagged samples are then moved to an off-site sample preparation site where the sample is again split using a standard riffler. One sample per meter is sent to a laboratory for analyses and the other sampled is stored for future reference. Analyses to determine the heavy mineral content and composition is conducted off site at an accredited laboratory.

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.

- ii). **Non-Invasive Activities – Resource estimation**

The geological logs, analytical results and collar surveys are captured into an electronic database. A geological model is then developed that forms the basis for the resource estimate. The purpose of the resource estimate is to obtain an indication of the size, grade and quality of the heavy mineral deposit present. The resource estimate will determine whether the resource is feasible for mining.

#### **D. Decommissioning**

After the drilling is completed, each borehole collar is surveyed by an independent surveyor using a high-accuracy differential GPS. Thereafter drill sites are rehabilitated, photographed and monitored over a two – three year period, as per legal requirement.

Decommissioning will take place in the form of rehabilitation activities which will include the ripping of compressed soil areas and re-profiling and re-vegetation of affected areas where necessary.

All rehabilitation referred to in this environmental management programme will be done concurrent to prospecting operations. This aims not only to minimise final rehabilitation cost during the decommissioning phase (mostly rehab of access routes), but also to reduce the cumulative effect of impacts as soon as they are identified.

#### **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, after mitigating measures as set out in the EMP, will occur as a result of:

- (a) Driving in the veld on predetermined access routes in order to access identified drill sites; and
- (b) Drilling (hand auger and mechanised air-core drilling).

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

- (a) Localised soil compaction;
- (b) Damage to vegetation; and
- (c) Potential pollution resulting from spills of hydro-carbons.

The initial use of hand augers for drilling will be followed by mechanised air-core drilling with the drill machine mounted on Toyota Landcruisers. These vehicles will as a rule not require the cutting/clearing of access roads. However, as drilling is laid out in a grid, there will be a very small number of frequently used tracks created by multiple/repeated use during prospecting.

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. This implies that natural habitat will be repaired concurrently with drilling, during the operational phase. This will result in the restoration of the affected resource to its original state.

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, and areas identified to be environmentally sensitive, such as drainage lines and its buffers will be avoided. Where required, impacts will be minimised through scaling down, relocating or redesigning the exploration campaign as appropriate.

Table 7 presents the potential impacts which may result from the proposed prospecting activities.

**Table 7: Identified impacts resulting from proposed prospecting activities**

<b>CONSTRUCTION PHASE</b>		
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.		
<b>OPERATIONAL PHASE</b>		
<b>ACTIVITY</b>	<b>IDENTIFIED IMPACT</b>	<b>DESCRIPTION OF IMPACT</b>
<b>1. Presence of personnel and contractors in the area</b>		
Spending and direct and/or indirect employment creation	Positive impact on local socio-economic conditions.	i). Spending (accommodation, food, drink, consumables, fuel, diesel etc.) and employment creation will stimulate the local economy through the injection of cash into the immediate community.
<b>2. Creation of access routes and drilling activities</b>		
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 pollution	Excess dust generated by additional vehicles utilising access roads, changing the visual character of the area and potentially impact on human health.
Presence and movement of people and vehicles in the veld, on predetermined access routes 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	Vegetation may be damaged and/or destructed by the frequent movement of vehicles over them, and as a result of activity 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

		<p>threatened or protected flora, impacting on biodiversity;</p> <p>iii). The loss of grazing available to livestock and wildlife occurring naturally in the area.</p>
	Potential disturbance, displacement and killing of fauna	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 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"> <li>i). Potential spillage of hydrocarbon substances such as diesel and/or oil and lubricants;</li> <li>ii). Litter; and</li> <li>iii). Ablution.</li> </ul> <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 water courses, i.e. the Hoerees - and Spoegrivers and their tributaries, draining south-west towards Spoegriverbay.</p>
	Disturbance and/or destruction of structures of cultural/heritage importance and/or graveyards / graves	<p>Existing structures, older than 60 years, as well as graves and/or graveyards occurring on site may be affected by the drilling campaign.</p> <p>Care will be taken to avoid all visible structures, monuments and graveyards occurring on site, especially at Wallekraal. Should any graves, other than those located in graveyards, 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>
	Impact on the landowner	<ul style="list-style-type: none"> <li>i). Potential disturbance of daily farming practices (gates left open, fences being cut etc.);</li> <li>ii). Uncertainty in terms of the particulars of daily prospecting activities on the farm – the whereabouts of the vehicles and staff;</li> <li>iii). Theft of livestock and farm implements, general security at the farm;</li> <li>iv). Loss of livelihood, potentially resulting from damage to grazing and loss of livestock (animals stepping into drill holes, ingesting foreign substances such as plastic etc.)</li> <li>v). Degradation of the environment will result in SANPARKS not being interested in acquiring his land as part</li> </ul>

		of their planned expansions.
	Noise pollution	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb the 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.
<b>DECOMMISSIONING PHASE</b>		
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.		

### 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 routes 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. There are concerns that 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 landowners can continue to earn a living on these lands.

The cumulative impacts of various existing and proposed prospecting projects in the area may have a detrimental impact on the plans of SANPARKS to expand the boundaries of the Namaqua National Park.

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. Likewise potential future mining activities may change the character of the area significantly; however, the employment opportunities generated by the mining sector may result in longer term socio-economic well-being. However, the implementation of potential new

tourism initiatives may also stimulate economic growth in the area over time.

### **2.2.3 Potential impact on heritage resources**

A specialist desktop heritage impact assessment was undertaken to identify potential heritage resources.

From the study undertaken by Archaetnos, it is clear that not much is known about the presence of heritage sites and structures in the area under investigation. As far as the prehistory is concerned, this is the result of a lack of research, not only on the affected farms, but also in the wider geographical area. As far as the recent history is concerned, the lack of information is probably because no event of national importance is linked to any of these farms.

The lack of information 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 found at geographical features such as overhangs, caves and rock shelters. The diagrams of the farms indeed indicate hills and water sources, where such sites may be expected.

At least one building was indicated on the maps studied and a few other structures also seem to be present. If these still exist, even as ruins, it is older than 60 years and may be considered of heritage significance. An assessment of these would be needed in order to be able to determine its grading and exact level of significance.

Although very few buildings are indicated on any of the maps, this is not uncommon. The lack of such structures on the maps therefore does not necessarily mean that only a few buildings were constructed here. These were not always indicated on these maps. One can therefore definitely expect to find buildings and other structures dating to the at least the mid-19th century on the farms. This may also include graves. The latter is usually found close to homesteads. Farm houses would more than often also be close to a water source. Even buildings dating to the early and mid-20th century may be present and have a latent heritage significance as these are older than 60 years. It is important to note that all cultural resources older than 60 years are potentially regarded as part of the heritage and that detailed studies are needed in order to determine whether these indeed have cultural significance.

It is suggested that all structures and graveyards occurring on site are avoided during prospecting, and that a buffer area of 50 m is applied around graveyards, and 100 m around man-made structures,

especially at Wallekraal, where an old school and hostel as well as a small monument, commemorating the Great Trek, is located.

It is clear that although not many heritage sites could be identified, the area shows a certain degree of potential to host Stone Age and historical sites. Such sites will need to be assessed before any mining development could commence. During prospecting activities, these sites should be avoided.

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 is no identified direct impact or risk on local communities. However, in terms of impacts relating to the broader community, it should be noted that the Garies area generally constitutes a relatively poor community. The principle of JJ Lombert Primary indicated that any project which may result in employment generation will benefit the community. High levels of unemployment prevail. 80% of the parents whose children are attending primary school are dependant on social grants, and can not afford school fees. The school can not provide adequate tuition without receiving required school fees (refer to Appendix B - Comments from I&APs).

##### The Kamiesberg Local Municipality

The project is in line with existing prospecting operations which is ongoing in the broader area. The Kamiesberg LM supports any project, as it may potentially result in economic growth and employment creation. The municipality recognises the importance of the mining sector, including prospecting, as part of the local economy.

##### The South African Police Service

The SAPS indicated informally, by way of interview, that they are not aware of any increase in crime occurring as a result of increasing prospecting projects in the area. The SAPS also informed the Department of Justice (Mr. Hendri Wessels) of the proposed project. The Dept. of Justice posted the notices, informing the public of the project on their notice boards, and are receiving enquiries with regard to employment opportunities.

## The landowner

The concerned land for prospecting is privately owned by Mr. J.A. Mostert and Blommeland Boerdery CC, which is also registered in the name of Mr. Jakobus Albertus Mostert. The landowner is weary of mining / exploration companies and at this stage objects to the proposed prospecting activities based on explanation provided below.

The dominant land-use is the ranching of small stock, i.e. sheep and goats. The perception exists that farming practices may be under threat from the cumulative impacts of recurring prospecting activities on natural pastures, since vegetation and soils are particularly vulnerable to disturbance.

Based on previous experience with companies undertaking prospecting on his farms, the landowner indicated that prospecting is disruptive and/or intrusive to farming activities. Contractors drive around the farm carelessly and at their leisure, resulting in the creation of tracks and damage to vegetation, which is used as grazing for livestock.

The landowner would like to be consulted with prior to any prospecting taking place on his farm, and compensation should be agreed prior to the right being awarded. Furthermore, the landowner must be kept informed of the whereabouts and planned activities of contractors on a daily basis, should the permit be granted. Suitable arrangements must be made with the landowner to ensure minimal disruption and uncertainty regarding the nature of activities on the farm during prospecting operations. In addition, issues pertaining to access routes, prevention of degradation of vegetation and rehabilitation must be pertinently discussed / reported on a daily basis.

The landowner indicated that, should mining occur on his property, his property value will be significantly reduced and the adjacent SANPARKS will not be interested in procuring his properties for incorporation into the Namaqua National Park.

In summary, the following issues causes concern to the landowner:

- (a) Crime, i.e. theft and damage to infrastructure such as fences and gates.
- (b) Loss of livestock / game - leaving gates open / animals stepping into drill holes.
- (c) Loss of livelihood - as a result of soil disturbances and the destruction of vegetation (impact on grazing capacity). Farming activities may cease to exist due to the cumulative damage which may occur as a result of

recurring prospecting activities. If prospecting occurs, care must be taken to minimise veld damage and that rehabilitation is done to the satisfaction of both the DMR and the landowner.

### The Namaqua National Park

Should the resource estimation indicate that mining is feasible, the latter will be a land use which is in conflict with the conservation / tourism mandate of SANPARKS and the WWF, the entity owning land adjacent to the application area. The areas to the east of the Namaqua National Park has been identified as potential expansion areas, as per the Mining and Biodiversity Guidelines (2012) – refer to Figure 4. The entire Namqualand District is considered environmentally sensitive. Although tourism (leisure) in the area is mostly seasonal and very much limited to the flowering period after the winter rain, travel to the area to experience the display of flowers may be impacted upon by potential future mining activities.

However, during prospecting, it is unlikely that SANPARKS and the WWF will be adversely affected. The proposed method of prospecting will have very limited impacts on the bio-physical environment where drilling is proposed. Although the site is located in an area which is classified as having high biodiversity importance, site specific environmental sensitive areas, such as drainage lines and its associated buffers, as well as areas hosting red and/or orange listed plant species, will be delineated and avoided. Access routes and drill sites will be rehabilitated to its original state as per the proposals made in this EMP.

### A.P. De Villiers Family – Mrs. Olet De Villiers and Mr. Izak Abraham (Sakkie) De Villiers (Tierberg)

Mrs. Olet De Villiers (AP De Villiers' grand daughter) indicated that the area is extremely environmentally sensitive and should be conserved. Land use must be in line with the objectives of SANPARKs and tourism. Prospecting will result in environmental degradation and destruction which in turn will impact on the conservation and tourism potential of the area.

The De Villiers family objects to prospecting based on the ecological sensitivity of the area and scarcity of water. It was reiterated that veld is managed carefully in terms of grazing carrying capacity, and that in the past two years grazing had to be reduced due to varying and low levels of rainfall to ensure sustainable yield. The family reiterated SANPARK's mandate to expand their land area for the purpose of conservation.

The family indicated that, through years of valuable experience, having grown up in the area and utilising the land, it has been proven that degraded and/or damaged land does not rehabilitate successfully.

It was further mentioned that prospecting companies continues as they want, without regard for the views of the land owner and surrounding farming community. The perception exists that prospecting companies have no regard for the environment and the conservation thereof, and engage in reckless conduct.

#### The South African Heritage Resources Association (SAHRA)

SAHRA indicated that there may be impacts on heritage resources, and required that a heritage assessment is undertaken. This assessment is enclosed as Appendix B. Prospecting activities may potentially affect existing man-made structures (older than 60 years) and/or graves and graveyards occurring on the site.

#### Kleinzee Heavy Minerals (PTY) LTD and West Coast Mineral Sands (PTY) LTD

The abovementioned entities have a prospecting right accepted by the DMR over the same properties. It is insisted that Zirco's application be dealt with in terms of Section 9(1)(b) of the MPRDA, whereby if a regional manager receives more than one application for a prospecting right in respect of the same mineral and land, applications received on different dates must be dealt with in order of receipt.

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

The affected landowners, adjacent landowners and Interested and/or Affected Parties (I&APs) have been informed about the proposed prospecting activities through a letter and Information Documents (IDs). A detailed information document was made available for comment from 22 February - 1 April 2013, and key stakeholders were contacted and encouraged to submit comments no later than 1 April 2013, so as to facilitate the finalisation of the EMP for submission to the DMR on 8 April 2013.

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

## 2.2.6 Confirmation of specialist report appended

Please refer the Appendix A – Heritage Report.

### 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.

Once the assessment of potential impacts has been completed, mitigating measures are described to prevent and reduce the potential impacts. These measures may alter project design. For implementation, an Environmental Management Plan is compiled to ensure that these mitigation measures are implemented. This also includes monitoring to evaluate the effectiveness of the mitigation measures (Lohani et al. 1997).

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	Definate	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"> <li>Positive and negative impacts of low significance should have no significant influence on the proposed development project.</li> </ul>	< 30
MS	Medium Significance	<ul style="list-style-type: none"> <li>Positive impact: Should weigh towards a decision to continue ;</li> <li>Negative impact: Should be mitigated before project can be approved.</li> </ul>	30 – 60
HS	High Significance	<ul style="list-style-type: none"> <li>Positive impact: Should weigh towards a decision to continue, should be enhanced in final design.</li> <li>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.</li> </ul>	> 60

### 3.1.2 Potential impact of each main activity in each phase, corresponding significance assessment (without and with proposed mitigation)

The significance of identified impacts in each phase are determined in described in Table 8. Mitigation measures for each of the identified impacts are also presented.

**Table 8: Identified impacts and corresponding significance assessment, with and without mitigation**

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		
1. Activity	Presence of personnel and contractors in the area	
Potential Impact: Positive impact on local socio-economic conditions	Spending (on accommodation, food, drink, consumables, fuel, diesel etc.) and potential direct and indirect employment creation will stimulate the local economy through the injection of cash into the community.	
	Without Mitigation	With Mitigation
Extent	2	2
Duration	2	2
Severity	2	4
Probability	3	3
Significance	Low 18	Medium 24
Status	Positive	Positive
Can impacts be mitigated / enhanced?	Yes, enhanced through the utilisation of local labour where possible.	
2. Activity	Creation of access routes and drilling activities	
a) Potential Impact: 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.	
	Without Mitigation	With Mitigation
Extent	2	2
Duration	2	2
Severity	2	2
Probability	4	3
Significance	Low 24	Low 18
Status	Negative	Negative
Can impacts be mitigated / Mitigation measures	Yes. <ul style="list-style-type: none"> <li>• Speed limits on public gravel roads must be observed at all times.</li> <li>• Driving after sunset is prohibited.</li> <li>• Driver fatigue must be addressed through having a sufficient number of drivers available, taking turns to drive whenever necessary</li> <li>• 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</li> <li>• All vehicles within the prospecting area are not to exceed a maximum speed limit of 30 km/h.</li> <li>• 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</li> </ul>	

	and any access points do not get built up with mud or sand.	
b) Potential Impact: Air Pollution	Excess dust generated by additional vehicles utilising access roads, changing the visual character of the area and potentially impact on human health.	
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	2	1
<b>Duration</b>	2	2
<b>Severity</b>	2	0
<b>Probability</b>	4	4
<b>Significance</b>	Low 24	Low 12
<b>Status</b>	Negative	Negative
<b>Can impacts be mitigated / Mitigation measures</b>	<p>Yes.</p> <ul style="list-style-type: none"> <li>• Speed limits on public gravel roads must be observed at all times.</li> <li>• All vehicles within the prospecting area are not to exceed a maximum speed limit of 30 km/h.</li> <li>• Trips to the site must be adequately planned, to prevent unnecessary utilisation of roads.</li> </ul>	
c) Potential Impact: Localised soil compaction	<p>Soils will be compacted by the frequent movement of vehicles over them, contributing to the degradation of the environment. The compaction of soil may:</p> <p>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</p> <p>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;</p> <p>iii). Erosion processes may result in the sedimentation and associated degradation of drainage lines.</p>	
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	1	1
<b>Duration</b>	2	2
<b>Severity</b>	6	4
<b>Probability</b>	4	2
<b>Significance</b>	Medium 36	Low 14
<b>Status</b>	Negative	Negative
<b>Can impacts be mitigated / Mitigation measures</b>	<ul style="list-style-type: none"> <li>• Vehicles are to utilise existing tracks where they are available.</li> <li>• 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.</li> <li>• Actual locations of access routes must be discussed and agreed with the landowner prior to commencement of prospecting activities.</li> <li>• Access routes may not be scraped or graded.</li> <li>• Driving may only occur on predetermined routes.</li> <li>• Land surrounding access routes and drill sites are considered no-go areas for contractors and vehicles.</li> <li>• Access routes may not cross or be located within drainage lines.</li> <li>• No drilling activities are to take place within 1 km of the centreline of identified drainage lines. It is essential that no disturbance of the associated riparian vegetation takes place.</li> <li>• Predetermined access routes must be screened for the presence of sensitive vegetation units and red / orange listed plant species, and re-routed accordingly. Where these plants</li> </ul>	

	<p>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</p> <ul style="list-style-type: none"> <li>Exposed areas should be suitably top-soiled and vegetated as soon as is possible at each drill site and after prospecting.</li> <li>All areas susceptible to erosion must be protected with suitable erosion control measures from the onset of the project.</li> <li>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.</li> </ul>																					
c) Potential Impact: Localised damage to and/or destruction of vegetation	<p>Vegetation may be damaged and/or destructed by the frequent movement of vehicles over them, and as a result of activity surrounding drill sites. This may result in:</p> <ol style="list-style-type: none"> <li>The degradation and/or loss of ecologically sensitive or important vegetation units;</li> <li>The loss and/or displacement of threatened or protected flora, impacting on biodiversity;</li> <li>The loss of grazing available to livestock and wildlife occurring naturally in the area.</li> </ol>																					
	<table border="1"> <thead> <tr> <th></th> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Extent</td> <td>2</td> <td>2</td> </tr> <tr> <td>Duration</td> <td>4</td> <td>2</td> </tr> <tr> <td>Severity</td> <td>4</td> <td>2</td> </tr> <tr> <td>Probability</td> <td>4</td> <td>4</td> </tr> <tr> <td>Significance</td> <td>Medium 40</td> <td>Low 24</td> </tr> <tr> <td>Status</td> <td>Negative</td> <td>Negative</td> </tr> </tbody> </table>		Without Mitigation	With Mitigation	Extent	2	2	Duration	4	2	Severity	4	2	Probability	4	4	Significance	Medium 40	Low 24	Status	Negative	Negative
	Without Mitigation	With Mitigation																				
Extent	2	2																				
Duration	4	2																				
Severity	4	2																				
Probability	4	4																				
Significance	Medium 40	Low 24																				
Status	Negative	Negative																				
Can impacts be mitigated / Mitigation measures	<p>Yes.</p> <ul style="list-style-type: none"> <li>Vehicles are to utilise existing tracks where they are available.</li> <li>Bulk clearance of vegetation will be permitted. However, localised damage and/or removal of vegetation may occur along access routes of at drill locations. This must be kept to an absolute minimum.</li> <li>Should new tracks be required these must be kept to a minimum and agreed upon by the land owner.</li> <li>Areas outside of access routes and drill locations are considered no-go areas.</li> <li>Due to the ecologically sensitive nature of the site, access routes and drill sites must be inspected by a suitably qualified ecologist, registered with SACNASP, to confirm the presence, location and status of ecologically sensitive areas.</li> <li>Access routes and drill sites will be examined for the presence of listed / protected plant species prior to drilling. Where these are encountered, it will be cordoned off and avoided, or where possible, for those that can be transplanted successfully, relocated to a suitable location, as identified and advised by the project ecologist. Where required, the necessary permission and permits shall be obtained from Provincial Nature Conservation prior to commencement of works.</li> <li>No invasive species may be introduced to the project.</li> <li>No fires shall be allowed on site under any circumstance (The Forest Act, 1984 (Act No. 122 of 1984).</li> </ul>																					
d) Potential impact: Potential disturbance, displacement and killing of fauna	<p>The presence of vehicles and people on site may disturb wildlife and livestock occurring in the area. In particular, faunal species such as tortoises, snakes and ground-living birds may be affected.</p>																					

	Without Mitigation	With Mitigation
<b>Extent</b>	2	2
<b>Duration</b>	2	2
<b>Severity</b>	4	2
<b>Probability</b>	4	3
<b>Significance</b>	Medium 32	Low 18
<b>Status</b>	Negative	Negative
<b>Can impacts be mitigated / Mitigation measures</b>	<ul style="list-style-type: none"> <li>• Staff / contractors operating on site have to be vigilant in terms of spotting animals utilising the site.</li> <li>• No faunal species may unnecessarily be handled, killed, hunted or harassed during the prospecting period.</li> <li>• 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</li> <li>• 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 in Garies.</li> </ul>	
e) Potential Impact Pollution	<p>Pollution of soil and 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). Litter; and</p> <p>iii). Ablution.</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 sheetwash during rainfall events and find their way into larger water courses, i.e. the Hoerees - and Spoegrivers and their tributaries, draining south-west towards Spoegriverbay.</p>	
	Without Mitigation	With Mitigation
<b>Extent</b>	2	1
<b>Duration</b>	2	2
<b>Severity</b>	4	2
<b>Probability</b>	4	3
<b>Significance</b>	Medium 32	Low 15
<b>Status</b>	Negative	Negative
<b>Can impacts be mitigated / Mitigation measures</b>	<ul style="list-style-type: none"> <li>• Hydrocarbon materials utilised on site are to be stored correctly, in suitable containers on an impermeable surface. The quantity of these materials brought onto site, on a daily basis, is to be kept to a minimum.</li> <li>• 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.</li> <li>• Drill areas shall be monitored continuously for spills and any spills shall be contained, cleaned and re-mediated immediately.</li> <li>• Leaking containers shall be repaired or removed from site.</li> <li>• 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.</li> <li>• 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</li> </ul>	

	<p>deposited on site and/or on adjacent/surrounding. Waste must be removed from site and disposed of using the municipal system in Garies.</p> <ul style="list-style-type: none"> <li>Due to the limited amount of people accessing the site on a daily basis (3 – 7), mobile sanitation units are not necessary. Ablution will occur in the veld when necessary, and will be appropriately covered using shovel and soil. Staff will return to and overnight in guesthouses in the Garies area. The impact of driving in the veld to access a mobile facility as and when necessary outweighs the impact which additional driving in the veld, to access the ablution facility, will have.</li> </ul>	
f) Potential Impact Disturbance and/or destruction of structures of cultural/heritage importance and/or graveyards / graves	Existing structures, older than 60 years, as well as graves and/or graveyards occurring on site may be affected by the drilling campaign.	
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	2	1
<b>Duration</b>	2	1
<b>Severity</b>	4	0
<b>Probability</b>	2	1
<b>Significance</b>	Low 16	Low 2
<b>Status</b>	Negative	Negative
<b>Can impacts be mitigated / Mitigation measures</b>	<p>Yes.</p> <ul style="list-style-type: none"> <li>All visible structures, monuments and graveyards occurring on site, especially at Wallekraal, must be avoided. A buffer area of 50 m is applicable around graveyards, and 100 m around man-made structures.</li> <li>Any heritage and/or archaeological sites exposed during prospecting may not be disturbed prior to authorisation by the South African Heritage Resources Agency.</li> <li>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.</li> <li>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.</li> <li>Under no circumstances shall archaeological artefacts or buildings older than 60 years be removed, destroyed or interfered with.</li> </ul>	
g) Potential Impact Noise	Movement of vehicles and drilling will result in an intermittent short-term increase in ambient noise levels. Noise may disturb the 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.	
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	1	1
<b>Duration</b>	2	2
<b>Severity</b>	4	2
<b>Probability</b>	4	4
<b>Significance</b>	Low 28	Low 20
<b>Status</b>	Negative	Negative
<b>Can impacts be mitigated /</b>	Yes.	

<b>Mitigation measures</b>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>	
h) Potential Impact Impact on the landowner	<p>The following issues have been identified by the landowner:</p> <ul style="list-style-type: none"> <li>Compensation must be discussed and agreed with the landowner prior to the granting of the prospecting permit.</li> <li>Potential disturbance of daily farming practices (gates left open, fences being cut etc.);</li> <li>Uncertainty in terms of the particulars of daily prospecting activities on the farm – the whereabouts of the vehicles and staff;</li> <li>Theft of livestock and farm implements, general security at the farm;</li> <li>Loss of livelihood, potentially resulting from damage to grazing and loss of livestock (animals stepping into drill holes, ingesting foreign substances such as plastic etc.)</li> <li>Degradation of the environment will result in SANPARKS not being interested in acquiring his land as part of their planned expansions.</li> </ul>	
	<b>Without Mitigation</b>	<b>With Mitigation</b>
<b>Extent</b>	2	2
<b>Duration</b>	2	2
<b>Severity</b>	6	6
<b>Probability</b>	4	2
<b>Significance</b>	Medium 40	Low 20
<b>Status</b>	Negative	Negative
<b>Can impacts be mitigated / Mitigation measures</b>	<ul style="list-style-type: none"> <li>The landowner must be engaged as soon as possible, prior to granting of the permit, to discuss compensation, the location of access routes, arrangements in terms of daily <i>modus operandi</i>, liability in terms of theft and loss of livestock and concerns about the prospecting affecting SANPARKs planned future expansion. If necessary, a meeting can be convened with SANPARKs to discuss implications. Written agreement must be reached.</li> </ul>	
<b>DECOMMISSIONING PHASE</b>		
<p>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.</p> <p>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.</p>		

### 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 routes which can lead to erosion and proliferation of invader species and weeds over time. Alien infestations may lead to the degradation of the habitat.

If the mitigation measures described above are implemented, the cumulative effect of the potential identified impacts that may affect the regional hydrology, is negligible.

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. There are concerns that 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 landowners can continue to earn a living on these lands.

The cumulative impacts of various existing and proposed prospecting projects in the area may have a detrimental impact on the plans of SANPARKS to expand the boundaries of the Namaqua National Park.

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. Likewise potential future mining activities may change the character of the area significantly; however, the employment opportunities generated by the mining sector may result in longer term socio-economic well-being. However, the implementation of potential new tourism initiatives may also stimulate economic growth in the area over time.

### **3.2 Proposed mitigation measures to minimise adverse impacts**

Proposed mitigation measures to minimise identified adverse impacts have been provided in the Impact Assessment Table (Table 8) in Section 3.1.2 above – Mitigation Measures are identified per activity.

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

Activities that have sufficiently significant impacts to require mitigation include the following:

- (a) Driving in the veld on predetermined access routes in order to access identified drill sites; and
- (b) Drilling (hand auger and mechanised air-core drilling).

The main impacts associated with the abovementioned activities, requiring management and rehabilitation are (Refer to Table 8 above):

- (a) Localised soil compaction - Significance of impact medium without mitigation;
- (b) Damage to vegetation compaction- Significance of impact medium without mitigation; and
- (c) Potential pollution resulting from spills of hydro-carbons compaction - Significance of impact medium

### **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 (refer to Table 9 provided in Section 5 - Planned monitoring and performance assessment of the environmental management plan).

The site activities will be monitored against the recommendations contained in the EMP and the Department of Mineral Resources will be provided with the required annual compliance reports / performance assessments, as per the specification in the MPRDA. Overall responsibility for compliance with the EMP lies with the applicant (Zirco Roodeheuwel (PTY) LTD).

#### Establishment of appropriate reporting structure

Zirco will develop an internal reporting structure, to monitor compliance with the commitments given in the EMP and to inform the compilation of the annual performance assessment report. The following is recommended:-

The site manager or onsite geologist supervising the prospecting activities will be responsible for daily implementation of the EMP. It is the responsibility of the site manager that sound environmental management occurs throughout the duration of the project and that complaints received from the landowner and/or any other party is addressed and reported. It is therefore recommended that weekly reports are produced, which in turn will inform a monthly audit report which is to be submitted to the appointed Environmental Control Officer (ECO). If the monitoring programs identify any non-compliance, the ECO will contact the relevant decision making authorities within 5 working days to discuss mitigation measures.

The ECO will undertake quarterly site inspections. Formal quarterly reports will be produced and will include information on environmental impacts, issues and management and will

highlight the occurrence of incidents and any instances of non-compliance with the EMP. Quarterly reports will inform the required annual compliance reports / performance assessments, which must be formally submitted to the DMR on a yearly basis, as per the requirements of the MPRDA.

The ECO is responsible to initiate the revision of documents, as and when it may be required as a result of changes to proposed operations. Clear procedures must be specified at the beginning of the project for making changes to the EMP, circulating updated documents, and destroying obsolete versions. Documents must be revised as required by changing circumstances. Distribution lists and document change control sheets must be kept for all documents and records must be kept.

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

Please refer to the comprehensive Impact Assessment Table provided in Section 3.1.2 above, where the significance of identified impacts, after bringing proposed mitigation measures into consideration, have been determined using a ranking system.

In summary, based on the assessment methodology described previously, all identified potential impacts have low significance after bringing the proposed mitigation measures into consideration.

Activities that have sufficiently significant impacts to require mitigation include the following:

- (a) Driving in the veld on predetermined access routes in order to access identified drill sites; and
- (b) Drilling (hand auger and mechanised air-core drilling).

The main impacts associated with the abovementioned activities, requiring management and rehabilitation are (Refer to Table 8 above):

- (a) Localised soil compaction (Significance of impact low with mitigation);
- (b) Damage to vegetation (Significance of impact low with mitigation); and
- (c) Potential pollution resulting from spills of hydrocarbons compaction (Significance of impact low with mitigation).

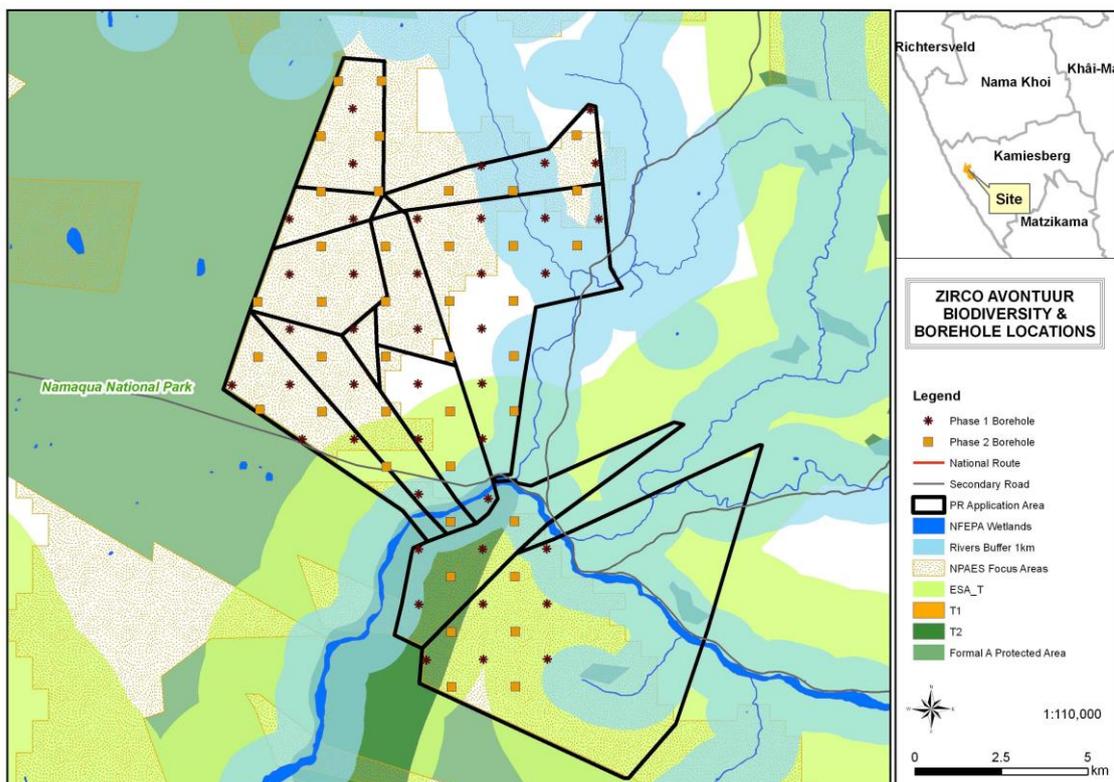
#### 4 REGULATION 52 (2) (d): Financial provision The applicant is required to-

##### 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).

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.

The proposed activity is a prospecting activity, to be undertaken in various phases, which are referred to as the operational component of the project. The location of the proposed activity is as per the attached plan provided in Section 2.2.2 and included below for ease of reference. Activities requiring rehabilitation (closure) will be predetermined access routes and drill sites. The actual extent and location of access routes will be discussed and agreed with the landowner prior to commencement of prospecting.



**Figure 10: Location of drill sites to be rehabilitated. Note The position of existing public main access roads are provided. The location of access routes into the field will be discussed and agreed with the landowner**

##### 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. This commitment is supported by the various undertakings documented in this EMP and summarized below.

#### Site access

- (a) The site will be accessed daily by the required vehicles, from the Hondeklipbay Road connecting Garies with Hondeklipbay. No site camp is required and camping on site is prohibited.
- (b) Vehicular movement will be confined to existing roads as far as possible. Where this is impossible, the landowner will be consulted as to the proposed positioning access routes.
- (c) No roads will be constructed or graded. Due to the nature and distribution of vegetation cover, vehicles will access the veld directly using predetermined routes, thereby restricting unnecessary driving in the veld.
- (d) Identified access routes will be screened for the presence of red and/or orange listed plant species prior to these areas being used for access to proposed drill sites.
- (e) Access gates will always be left in their original open or closed positions.
- (f) No fences will be cut without the permission of the landowner. Cut fencing will be restored immediately after the passage of vehicles.

#### Drilling Sites

- (a) Drilling sites will be sited after consultation with the landowner. Sites shall be practically selected based on geological information (refer to proposed drill sites provided in Figure 9)
- (b) With regards to grid prospecting, line cutting will not be used. Bore hole sites are GPS located and marked with pegs, which are to be removed.
- (c) Drill sites will be screened for the presence of red and/or orange listed plant species. Drill sites are inspected and photographed prior to any disturbance.
- (d) Due to the nature and distribution of vegetation, the removal of vegetation or cutting of vegetation at drill sites is not required.
- (e) 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
- (f) Only air-core drilling will be conducted. This is a dry drilling method and no water is required. The drill machine to be used is

a Wallis Mantis 75 hydraulic top-drive rig, mounted on a 4 x 4 Toyota Landcruiser, with an on-board compressor. No sump will be excavated. Where oil is required to lubricate the system, the volumes used will be recorded and documented. Only small volumes of oil will be required for this purpose

- (g) 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.
- (h) No fires will be permitted.

### Waste Disposal

- (a) Contents of drip pans and linings will be bagged / stored in containers, removed off-site and disposed of at through the municipal system in Garies.
- (b) Any spill onto the ground will be cleaned up immediately and consigned the appropriate municipal facility in Garies. All incidents shall be reported.
- (c) All litter & refuse will be removed from site on a daily basis.
- (d) Due to the limited amount of people accessing the site on a daily basis (3 – 7), mobile sanitation units are not necessary. Ablution will occur in the veld when necessary, and will be appropriately covered using shovel and soil. Staff will return to and overnight in guesthouses in the Garies area. The impact of driving in the veld to access a mobile facility as and when necessary outweighs the impact which additional driving in the veld, to access the ablution facility, will have.

### Rehabilitation

- (a) After drilling is completed, excess sand (not sampled) will be returned to the drill hole, i.e. the holes will be backfilled immediate upon completion of each individual drill hole. No foreign material shall be introduced into the hole. Original soils will be spread over each drill location. Drilling only removes a very small amount of ground for sampling and analysis
- (b) A single permanent marker will be required to mark the location of the drill hole for future reference. The siting of such a marker shall be cleared with the landowner.
- (c) Each borehole is surveyed by an independent surveyor using a high-accuracy differential GPS. Thereafter drill sites are photographed and monitored over a two – three year period, as per legal requirement. Photographs of the access routes and drill holes to be taken before and after rehabilitation and kept on record for the Director: Mineral Development.
- (d) Access routes, and in particular those that are frequently used may require ripping of compressed soil areas and re-profiling and re-vegetation. The effectiveness of re-vegetation and erosion control must be monitored. 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.

- (e) 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.
- (f) 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 reseeding.

### 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.

Therefore the EMP will be reviewed at least every two years.

The Environmental Control Officer (ECO) Project Geologist 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:-

- i). Show that the requirements of relevant legislation have been complied with.
- ii). Show that the objectives as described in the EMP have been met.
- iii). 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.
- iv). 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.

#### **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 made in terms of the quantum calculation include the following:

- (a) The initial use of hand augers for drilling will be followed by mechanised air-core drilling with the drill machine mounted on Toyota Landcruisers. These vehicles will as a rule not require the cutting/clearing of access roads. However as drilling is laid out in a grid, it is assumed that there will be a very small number of frequently used tracks created by multiple/repeated use during prospecting. It is assumed that a percentage of their area will require basic rehabilitation which will involve hand raking and very limited seeding.
- (b) All staff and contractors involved in the exploration campaign will remain off-site over-nighting in guest houses.
- (c) All vehicles utilised in any way by the exploration campaign will be parked off-site at night, and all maintenance and repairs will be done off-site at formal service centres.
- (d) All fuel, greases and other liquids required for the drilling (other than water) will only be transported on site in tanks which form part of generators, drill machines, vehicles.
- (e) Potable water will be sourced off-site and carried in the drill vehicles.
- (f) Staff will not dispose of any waste on site, other than returning materials from the drill holes back into them.
- (g) Staff will not collect or remove plants or animals while on site.
- (h) 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 sites are composed of sandy, often loose soils on which duneveld and shrubland vegetation exists in low densities. With a rainfall of less than 200 mm p.a. the eco-system is semi desert.

The main anticipated impacts (after mitigating measures as set out in the EMP) are localised soil compaction and vegetation damage. There is also a limited potential for spills of hydro-carbons.

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.

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

### **Costs of Rehabilitation after drilling**

It is assumed that one or two key routes onto site will become frequently used tracks. For the 12 819 hectares, it is assumed that a single track will come into being from the existing road at Baksteenhoek, reaching into the middle of the exploration area over a length of 6 km, and that another frequently used access route will branch off the western perimeter road traversing a significant part of the lease area from west to east over a length of approximately 4 km.

Due to the nature of the soils it is assumed that at worst 10% of these track areas would require rehabilitation. At a track width of 3.5 meters (due to frequent use) this would amount to an approximate surface area of 0.35 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. At 3500 sq.m. this amounts to R 30 520.

In addition it is assumed that each drill hole (including those made by hand augers) will create an impacted area of ca. 25 sq. m., which is likely to require rehabilitation which must be provided for at the same rate as above. Given a total of 186 holes this would amount to a total area of approximately 0.5 ha creating a total liability of R43 600.

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. As the drill holes and access tracks are expected to cover the entire site, this flat monitoring rate cannot be applied on a per hectare basis. Instead, a provision equivalent to 3 hectares will be provided for to allow for spot-check monitoring of key sites within the affected area. Based upon this it is believed a total provision R 34 800 is made.

Thus the total provision to close out the impacts associated with the exploration campaign envisaged amount to a maximum of R108 920.

#### **4.4 Undertaking to provide financial provision**

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

Zirco Roodeheuwel (PTY) LTD will provide the indicated financial provision of R108 920.00 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**

Table 9 below 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 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 will be undertaken by the site manager or exploration geologist on site on a daily basis. Weekly reports will be compiled and filed in support of an overall monthly report.

The compliance of this EMP will be audited quarterly by the Environmental Control Officer (ECO) in order to inform the performance assessment report which is generated annually for submission to the DMR, as per legal requirement.

#### **5.3 Roles and responsibilities for the execution of monitoring programmes**

The Site Manager or Project Geologist will be responsible for daily monitoring, culminating in weekly and monthly reporting to the ECO.

The ECO will be responsible for quarterly site inspections, culminating in the compilation of the annual performance assessment report which is to be submitted to the DMR.

#### **5.4 Committed time frames for monitoring and reporting**

Reporting will occur on a daily, weekly, monthly and annual basis.

**Table 9: Action plans and schedule for each phase prospecting (Note that no construction activities are required)**

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
<b>PLANNING PHASE</b>				
Consultation with the landowner	To ensure the establishment of a transparent relationship To ensure that the landowner's concerns are addressed To ensure that cognisance is taken of the landowner's requirements in terms of planned daily operations	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 livestock and concerns about the prospecting affecting SANPARKs planned future expansion. If necessary, a meeting can be convened with SANPARKs to discuss implications. Written agreement must be reached.	Zirco	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 developed with the input of the project ecologist.	Zirco	Once-off, prior to commencement of prospecting
Appointment of a suitable qualified ecologist (registered with SACNASP)	To ensure that the site is screened for the occurrence of identified red and/or orange listed plant species	A Project Ecologist must be appointed to ensure that cognisance is taken of ecological site sensitivities during planning and operational phases. Identified drainage lines, their associated buffers (1 km from the centre of the drainage line) and red / orange listed species must be avoided.	Zirco	Once-off
		The ecologist must confirm the actual occurrence of identify red and/or orange listed plant species on site and make recommendations as to either the avoidance or relocation of identified species.	Project Ecologist	Once off and as required
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.	Zirco	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.	Zirco / Contractor	Throughout the duration of the project
Appointment of	To ensure implementation	An independent Environmental Control Officer (ECO) must be	Zirco	Once-off

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
Environmental Control Officer	and monitoring of the EMP, by an independent party. The ECO will provide formal report to The DMR and the relevant Provincial Environmental Authority	appointed, with the purpose if independently monitoring compliance with the EMP		
		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.	ECO	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 required format	ECO	Yearly
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	Zirco / 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	Prior to the commencement of prospecting, all personnel must attend an environmental briefing / training session with regards to contents of the EMP. Staff should pertinently be informed about the potential occurrence of red / orange listed species and should receive a description and visual presentation of the species involved.	Zirco / Contractor / ECO	Once-off, prior to commencement of prospecting
	Worker conduct	No alcohol, drugs or weapons will be allowed on site or in the vehicles transporting staff to/from site Excessive noise and unsocial behaviour is prohibited. No trespassing is allowed on surrounding properties Driving under the influence of alcohol is strictly forbidden. No fires are permitted on site. No plant material or animals may be collected, harvested or removed from site, including firewood No bird or animal, including livestock may be hunted by any	SM	Throughout duration of the project.

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
Health and Safety	Ensure safe working and healthy environment and prevention of injuries of the workers on site.	means, including the use of snares and traps.		
		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
		All work to be carried out under strict supervision	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
Record of environmental incidents	To ensure that incidents are recorded and remedial action is taken to restore the environment to acceptable conditions. Immediate and appropriate response to environmental incidents. Prevention of recurrence of similar incidents.	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
		The incidents must be handled appropriately and record be kept of all incidents.	SM and ECO	Throughout the duration of the project
		Rehabilitation of areas affected by incidents must commence immediately after the incident occurring.		
		Records of all incidents must be provided to the ECO within 24 hours of the 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 ECO. 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.				
<b>OPERATIONAL PHASE (SITE ACCESS AND DRILLING)</b>				
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 ECO of any accidents on site.	SM	Daily
		Instruct all drivers to use the designated access points and routes.	SM	Once-off
		Speed limits on public gravel roads must be observed at all times.	SM	Daily
		Driving after sunset is prohibited.	SM	Daily

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		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 30 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
Dust generation	To avoid dust nuisance resulting from driving on gravel roads	Speed limits on public gravel roads must be observed at all times (80 km / hour).	SM	Daily
		All vehicles within the prospecting area are not to exceed a maximum speed limit of 30 km/h.	SM	Daily
		Trips to the site must be adequately planned, to prevent unnecessary utilisation of roads.	SM	Daily
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 discussed and agreed with the landowner prior to commencement of prospecting activities.		
		Access routes may not be scraped or graded.		
		Driving may only occur on predetermined routes.		

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		<p>Land surrounding access routes and drill sites are considered no-go areas for contractors and vehicles.</p> <p>Access routes may not cross or be located within drainage lines</p> <p>No drilling activities are to take place within 1 km of the centreline of identified drainage lines. It is essential that no disturbance of the associated riparian vegetation takes place.</p> <p>Predetermined access routes must be screened for the presence of sensitive vegetation units and red / orange listed plant species, and re-routed accordingly. 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</p> <p>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.</p> <p>All areas susceptible to erosion must be protected with suitable erosion control measures from the onset of the project.</p> <p>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 removal of 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. Bulk clearance of vegetation will not be permitted. However, localised damage and/or removal of vegetation may occur along access routes of at drill locations. This must be kept to an absolute minimum.	SM / ECO	Daily

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		<p>Should new tracks be required these must be kept to a minimum and agreed upon by the land owner.</p> <p>Areas outside of access routes and drill locations are considered no-go areas.</p> <p>Due to the ecologically sensitive nature of the site, access routes and drill sites must be inspected by a suitably qualified ecologist, registered with SACNASP, to confirm the presence, location and status of ecologically sensitive areas.</p> <p>Access routes and drill sites will be examined for the presence of listed / protected plant species prior to drilling. Where these are encountered, it will be cordoned off and avoided, or where possible, for those that can be transplanted successfully, relocated to a suitable location, as identified and advised by the project ecologist. Where required, the necessary permission and permits shall be obtained from Provincial Nature Conservation prior to commencement of works.</p> <p>If species of concern are observed on site, the Environmental Control Officer (ECO) must be contacted immediately and she/he must inform Relevant Provincial Environmental Authority.</p> <p>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.</p> <p>No invasive species may be introduced to the project. Invasion of alien species must be monitored on a quarterly basis. Invasive species must be removed by a method as identified by the project ecologist or ECO.</p> <p>No fires shall be allowed on site under any circumstance (The Forest Act, 1984 (Act No. 122 of 1984).</p>		
Impacts on fauna	To prevent mortality and displacement of fauna and maintain biodiversity	<p>Staff / contractors operating on site have to be vigilant in terms of spotting animals utilising the site.</p> <p>No faunal species may unnecessarily be handled, killed, hunted</p>	SM	Daily
			SM	Daily

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
		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	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
Pollution	To keep the site free from pollution, resulting in environmental degradation	Litter generated on-site must be contained, kept in vehicles, taken of site on a daily basis and disposed of through the municipal system or the system in place at local guest houses.	SM	Daily
Hydrocarbon materials utilised on site are to be stored correctly, in suitable containers on an impermeable surface. The quantity of these materials brought onto site, on a daily basis, is to be kept to a minimum.				
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 the veld when necessary, and will be appropriately covered using shovel and soil. Ablution must occur outside of identified drainage lines and water courses.				

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
Impacts on Heritage Resources		All visible structures, monuments and graveyards occurring on site, especially at Wallekraal, must be avoided. A buffer area of 50 m is applicable around graveyards, and 100 m around man-made structures. 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 disturbed prior to authorisation by the South African Heritage Resources Agency.		
		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.		
		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.		
Noise	To reduce the impact of noise associated with prospecting activities	All construction machines will be equipped with appropriate noise reduction equipment and the vehicles should be roadworthy.	SM	Daily
		Construction and the use of construction machinery should be limited between 07h00 and 18h00.		
		All mechanical equipment should be in good working order		
		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.		
Landowner	To ensure transparent relationship and amiable work conditions	Daily liaison with the landowner	SM	Daily
<b>DECOMMISSIONING PHASE</b>				

ACTIVITY	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TIMEFRAME
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 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> <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 project ecologist or ECO.</p>	SM / ECO	Daily at drill sites and access routes once drilling has been finalised

## 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).

The areas and aerial extent of the drilling campaign is provided in the figure below. Activities requiring rehabilitation (closure) will be predetermined access routes 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.

The actual extent and location of access routes will be discussed and agreed with the landowner prior to commencement of prospecting. At this time, plans for rehabilitation are based on the assumption that one or two key routes onto site will become frequently used tracks. For the 12 819 hectares, it is assumed that a single track will come into being from the existing road at Baksteenhoek, reaching into the middle of the exploration area over a length of 6 km, and that another frequently used access route will branch off the western perimeter road traversing a significant part of the lease area from west to east over a length of approximately 4 km.

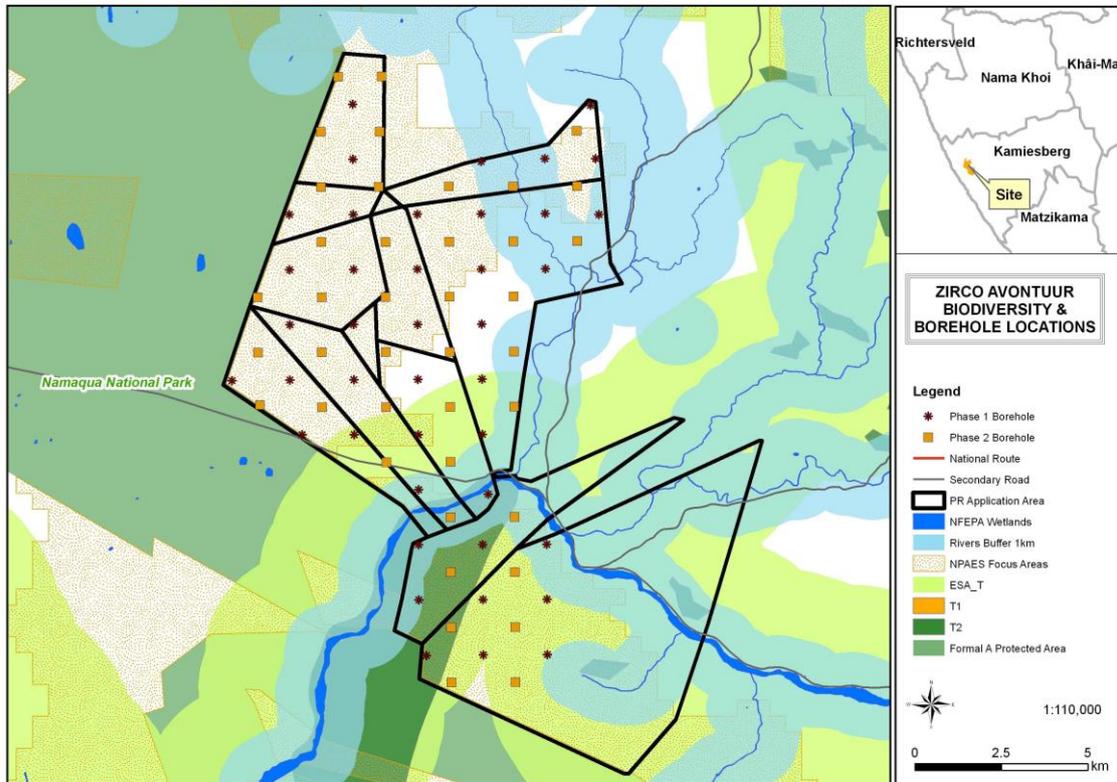
Due to the nature of the soils, it is assumed that at worst 10% of these track areas would require rehabilitation. At a track width of 3.5 meters (due to frequent use) this would amount to an approximate surface area of 0.35 hectare. This provision would also be sufficient to cover *ad hoc* impacts that may occur due to localised soil conditions and/or accidents on less frequently used tracks.

After each drill hole is completed, excess sand (not sampled) is returned to the drill hole, i.e. the holes will be backfilled immediate upon completion of each individual drill hole. Original soils will be spread over each drill location. It is assumed that each drill hole (including those made by hand augers) will create an impacted area of ca. 25 sq.m., which is likely to require rehabilitation.

A single permanent marker will be required to mark the location of the drill hole for future reference. Each borehole is surveyed by an independent surveyor using a high-accuracy differential GPS.

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.



**Figure 10: Location of drill sites to be rehabilitated. Note The position of existing public main access roads are provided. The location of access routes into the field will be discussed and agreed with the landowner**

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

The areas requiring possible rehabilitation will be drill sites and predetermined access routes, as described above.

Rehabilitation of areas disturbed during the proposed exploration activities will be to the extent where those areas will resemble a landscape similar to that prior to the exploration activities having taken place. 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.

### **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).

The affected landowner, adjacent landowners and Interested and/or Affected Parties (I&APs) have been consulted in terms of the environmental objectives in terms of closure. A detailed information document was made available for comment from 22 February - 1 April 2013, and key stakeholders were contacted and encouraged to submit comments no later than 1 April 2013, so as to facilitate the finalisation of the EMP for submission to the DMR on 8 April 2013.

Comments received from stakeholders regarding closure is that rehabilitation of degraded / damaged veld is nearly impossible provided the arid / harsh natural environmental conditions.

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

## 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 B 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.

All of the identified parties have been contacted; however, minimal input has been received. Stakeholders have been provided opportunity to comment on the project from 22 February - 1 April 2013. 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.

#### Landowner database

AVONTUUR LANDOWNER DATABASE				
	Farm name	Farm number	Property Owner	Send by
1	GEMSBOKVLEY	1/479	MOSTERT JACOBUS ALBERTUS	By hand
2	GEMSBOKVLEY	2/479	MOSTERT JACOBUS ALBERTUS	By hand
3	GEMSBOKVLEY	4/479	MOSTERT JACOBUS ALBERTUS	By hand
4	GEMSBOKVLEY	6/479	BLOMMELAND BOERDERY C C	By hand
5	GEMSBOKVLEY (previously PTN 3 but now)	11/479	MOSTERT JACOBUS ALBERTUS	By hand
6	GEMSBOKVLEY	17/479	MOSTERT JACOBUS ALBERTUS	By hand
7	AVONTUUR	0/480	MOSTERT JACOBUS ALBERTUS	By hand
8	AVONTUUR	0/487	MOSTERT JACOBUS ALBERTUS	By hand

9	AVONTUUR	4/487	MOSTERT JACOBUS ALBERTUS	By hand
10	AVONTUUR	5/487	MOSTERT JACOBUS ALBERTUS	By hand
11	AVONTUUR	6/487	MOSTERT JACOBUS ALBERTUS	By hand
12	AVONTUUR	7/487	MOSTERT JACOBUS ALBERTUS	By hand
13	Jakkalsvlakte	482	MOSTERT JACOBUS ALBERTUS	By hand

### Adjacent Landowners

AVONTUUR ADJACENT LANDOWNER DATABASE				
	Farm name	Farm number	Property Owner	Send by
1	Gemsbokvley 479	RE/479	MOSTERT JACOBUS ALBERTUS	N/A – Landowner
2	GEMSBOKVLEY	12/479	Mr Mostert indicated that this land belongs to the Van Zyls (Middelputs Boerdery)	Registered mail
3	GEMSBOKVLEY	13/479	Mr Mostert indicated that this land belongs to the Van Zyls (Middelputs Boerdery)	Registered mail
4	Gemsbokvley 479	19/479	Mr Mostert indicated that this land belongs to the Kamiesberg LM	By Hand and E-mail
5	Gemsbokvley 479	20/479	Mr Mostert indicated that this land belongs to the Kamiesberg LM	By Hand and E-mail
6	Avontuur 488	RE/488	NASIONALE PARKETRUST VAN SUID-AFRIKA 342/86	E-mail
7	Avontuur 488	3/488	ENGELBRECHT MAGRIETHA CORNELIA	Registered mail
8	AVONTUUR	17/487	VUUREN MARTINUS LAURENS JANSE VAN	Registered mail
9	AVONTUUR	22/487	BLOMMELAND BOERDERY C C	N/A
10	Avontuur 487	25/487	BLOMMELAND BOERDERY C C	N/A
11	Avontuur 487	27/487	MOSTERT JACOBUS ALBERTUS	N/A
12	Avontuur 487	28/487	NED GER KERK-GARIES	Posted at Garies Post Office

13	DIKNEK	0/486	NASIONALE PARKETRUST VAN SUID-AFRIKA 342/86	E-mail
14	DIKNEK	1/486	NASIONALE PARKETRUST VAN SUID-AFRIKA 342/86	E-mail
15	624	RE/624	W W F SUID-AFRIKA	E-mail
16	477	2/477	South African National Parks (RSA Government) (SANPARKS)	E-mail
17	QUAGGAFONTEIN 478	6/478	MOSTERT JACOBUS ALBERTUS	N/A
18	BYNES-KRANS 481	RE/481	MOSTERT CORNELIS ANDRIES ; MOSTERT CORNELIA	Registered mail
19	Graskom 483	RE/483	South African National Parks (RSA Government) (SANPARKS)	E-mail
20	Vorentoe 493	RE/493	South African National Parks (RSA Government) (SANPARKS)	E-mail
21	Welervreden 440	RE/440	BLOMMELAND BOERDERY C C	N/A
23	Horees 441	RE/441	VAN NIEKERK MATTHYS JOHAN	Registered mail
23	Horees 441	15/441	VAN NIEKERK ISAK JACOBUS MARTHINUS	Registered mail
24	591	RE/591	MIDDELPUTS BOERDERY C C	Registered mail

### Key stakeholders

KEY STAKEHOLDER DATABASE - AVONTUUR PRA		
Interested and/or Affected Party	Contact person	Informed by
Existing Mineral Right Holder: Namakwaland Diamonds (SA) (Pty) Ltd	Mr. JP Brink	Registered mail
Existing Mineral Right Holder: ASAM Resources (Pty) Ltd.	Me. Yolandi Viljoen	Email
Existing Mineral Right Holder: Kleinzee Heavy Minerals (Pty) Ltd	The Directors	Email
Regional Land Claims Commission Free State and Northern Cape	Ryan Oliver and Cindy Damons - Chief Director Land Restitution	Fax

Department of Rural Development and Land Reform	Mr. Mvula	Email / fax
Commission on Restitution of Land Rights: Northern Cape and Free State Regional Office	Mr Sydney Hlongwane	Email
NC Department of Agricultural & Land Reform	Mr Nico Cloete	Email
National Department of Public Works		Fax
Namakwa District Municipality	Ms Brand	Fax
Kamiesberg Local Municipality	Mr John Ellis	Email
Kamiesberg Local Municipality	Mr Cloete	By hand / email
Department of Water Affairs	Mr Shaun Cloete	Email
SANPARKS (also adjacent landowner)	Mr Bernard van Lente	Email
SANPARKS (also adjacent landowner)	Fahlaza Monaledi	Email
SANPARKS (also adjacent landowner)	Mr Petrus Schreuder	Email
Nationale Parke Trust van Suid-Afrika (WWF-SA)	N. Wilson	Email
NC Department of Environment and Nature Conservation	Mr Johan Jonk	Email
Succulent Karoo Ecosystem Programme (SKEP)	Mr Abe Koopman	Email
South African Heritage Resources Agency	Ms. Maria Galimberti	Email
South African Heritage Resources Agency	Kathryn Smuts	Email
WESSA (Northern Cape Regional Office)	Suzanne Erasmus	Email
Endangered Wildlife Trust	To whom it may concern	Email
Botanical Society	To whom it may concern	Email

SAPS Garies	Spogter	By hand / email
Department of Justice	Mr. Wessels	Email
Hoerskool Garies	Mev. VR Lottering	Fax
JJ Lombert Primer		Fax
Kamiesberg Boerevereniging	CA Coetzee or John Ellis	Left message / email John Ellis
Garies Boerevereniging	Mr. Tielman or John Ellis	Registered mail / email John Ellis
Buffelsdrift Boerevereniging	John Ellis	Email John Ellis

## **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 B 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 by way of registered mail, fax and e-mail. All parties were provided with a letter of invitation to provide comment on the proposed project, as well as a Information Document (ID), providing information about the project, including details of the proposed prospecting project location, activities, potential environmental impacts and rehabilitation objectives.

#### Consultation with the Landowner

Individual appointment was made with the landowner, who were consulted in person at his place of preference. The landowner was provided with a letter, informing him 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, and all documents were available in Afrikaans and English.

#### Consultation with Adjacent Landowners

Adjacent landowners were provided with same via registered mail and/or fax, and the application was discussed with some individuals telephonically.

#### Consultation with other I&APs (Key Stakeholders)

Key stakeholders, were contacted via registered mail, telephone, e-mail and fax, as appropriate. Information documents were hand delivered to the Kamiesberg LM and the Garies SAPS. Likewise, key stakeholders were provided with a letter, information document, maps and comment/registration sheet.

#### Consultation with Existing Right Holders

Existing right holders were contacted via e-mail and registered mail where appropriate. They were provided with a letter, information document, maps, comment/registration sheet and the PWP for the project, so that the necessary arrangements can be made for the co-existence of operations on the site.

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

All the I&APs as identified in the tables above were contacted and invited to participate. Comments received from I&APs were included in the Consultation Report, which was submitted to the DMR on 8 March 2013 as per regulatory requirement.

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

- a. The Landowner – Mr. J.A Mostert (objects)
- b. The existing right holder – Kleinzee Minerals (PTY) LTD and West Coast Mineral Sands (PTY) LTD;
- c. The Kamiesberg Local Municipality;
- d. The Namaqua District Municipality;
- e. The South African Heritage Resources Agency (SAHRA);
- f. The De Villiers Family of the Farm Tierberg (objects)
- g. The South African Police Service;
- h. The Department of Justice; and
- i. The principle of JJ Lombert Primary.

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

There is no identified direct impact or risk on local communities. However, in terms of impacts relating to the broader community, it should be noted that According to the principle of JJ Lombert Primary (Mr Adams) the Garies area generally constitutes a

relatively poor community. Any project which may result in employment generation will benefit the community. High levels of unemployment prevail. 80% of the parents whose children are attending primary school are dependant on social grants, and can not afford school fees. The school can not provide adequate tuition without receiving required school fees.

The Kamiesberg Local Municipality indicated that the project is in line with existing prospecting operations which are ongoing in the broader area. The Kamiesberg LM supports any project, as it may potentially result in economic growth and employment creation. The municipality recognises the importance of the mining sector, including prospecting, as part of the local economy.

The SAPS indicated informally, by way of interview, that they are not aware of any increase in crime occurring as a result of increasing prospecting projects in the area. The SAPS also informed the Department of Justice (Mr. Hendri Wessels) of the proposed project. The Dept. of Justice posted the notices, informing the public of the project on their notice boards, and enquiries are made with regard to employment opportunities.

The landowner (Mr. J.A. Mostert) is weary of mining / exploration companies and at this stage objects to the proposed prospecting activities. The dominant land-use is the ranching of small stock, i.e. sheep and goats. The perception exists that farming practices may be under threat from the cumulative impacts of recurring prospecting activities on natural pastures, since vegetation and soils are particularly vulnerable to disturbance.

The landowner indicated that, should mining occur on his property, his property value will be significantly reduced and the adjacent SANPARKS will not be interested in procuring his properties for incorporation into the Namaqua National Park.

The De Villiers Family (Tierberg) indicated that the area is extremely environmentally sensitive and should be conserved. Land use must be in line with the objectives of SANPARKs and tourism. Prospecting will result in environmental degradation and destruction which in turn will impact on the conservation and tourism potential of the area.

The De Villiers family objects to prospecting based on the ecological sensitivity of the area and scarcity of water. It was reiterated that veld is managed carefully in terms of grazing carrying capacity, and that in the past two years grazing had to be reduced due to varying and low levels of rainfall to ensure sustainable yield. The family reiterated SANPARK's mandate to expand their land area for the purpose of conservation.

The family indicated that, through years of valuable experience, having grown up in the area and utilising the land, it has been proven that degraded and/or damaged land does not rehabilitate successfully.

The South African Heritage Resources Association (SAHRA) indicated that there may be impacts on heritage resources, and required that a heritage assessment is undertaken. This assessment is enclosed as Appendix B. Prospecting activities may potentially affect existing man-made structures (older than 60 years) and/or graves and graveyards occurring on the site.

#### **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**

Mr. Adams - JJ Lombert Primary: Any project which may result in employment generation will benefit the community in terms of socio-economic upliftment.

The Kamiesberg Local Municipality – the project may potentially result in economic growth and employment creation. The municipality recognises the importance of the mining sector, including prospecting, as part of the local economy. Enquiries are already being made by members of the public, at the SAPS and Department of Justice regarding potential employment opportunities.

The landowner - The dominant land-use is the ranching of small stock, i.e. sheep and goats. The perception exists that farming practices may be under threat from the cumulative impacts of recurring prospecting activities on natural pastures, since vegetation and soils are particularly vulnerable to disturbance.

Based on previous experience with companies undertaking prospecting on his farms, the landowner indicated that prospecting is disruptive and/or intrusive to farming activities. Contractors drive around the farm carelessly and at their leisure, resulting in the creation of tracks and damage to vegetation, which is used as grazing for livestock.

The landowner would like to be consulted with prior to any prospecting taking place on his farm, and compensation should be agreed prior to the right being awarded. Furthermore, the landowner must be kept informed of the whereabouts and planned activities of contractors on a daily

basis, should the permit be granted. Suitable arrangements must be made with the landowner to ensure minimal disruption and uncertainty regarding the nature of activities on the farm during prospecting operations. In addition, issues pertaining to access routes, prevention of degradation of vegetation and rehabilitation must be pertinently discussed / reported on a daily basis.

The landowner indicated that, should mining occur on his property, his property value will be significantly reduced and the adjacent SANPARKS will not be interested in procuring his properties for incorporation into the Namaqua National Park.

In summary, the following issues causes concern to the landowner:

- (j) Crime, i.e. theft and damage to infrastructure such as fences and gates.
- (k) Loss of livestock / game - leaving gates open / animals stepping into drill holes.
- (l) Loss of livelihood - as a result of soil disturbances and the destruction of vegetation (impact on grazing capacity). Farming activities may cease to exist due to the cumulative damage which may occur as a result of recurring prospecting activities. If prospecting occurs, care must be taken to minimise veld damage and that rehabilitation is done to the satisfaction of both the DMR and the landowner.

The De Villiers Family - indicated that the area is extremely environmentally sensitive and should be conserved. Prospecting will result in environmental degradation and destruction which in turn will impact on the conservation and tourism potential of the area. The family indicated that, through years of valuable experience, having grown up in the area and utilising the land, it has been proven that degraded and/or damaged land does not rehabilitate successfully. The family reiterated SANPARK's mandate to expand their land area for the purpose of conservation. Proposed prospecting may jeopardise these initiatives.

The South African Heritage Resources Association (SAHRA) - there may be impacts on heritage resources, and required that a heritage assessment is undertaken. This assessment is enclosed as Appendix B. Prospecting activities may potentially affect existing man-made structures (older than 60 years) and/or graves and graveyards occurring on the site.

#### **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 B, containing records of consultation.

### **7.2.7 Information regarding objections received**

The landowner and the De Villiers Family object to the proposed prospecting activities.

## **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 actions as described in table Table 9 is applicable.

### **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 9.

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.

## **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 cost of rehabilitation after drilling is calculated based on proven experience with rehabilitation activities associated with similar prospecting activities.

The sq.m. master rate applied by the DMR in 2013 for general surface rehabilitation and grassing is R 87 200 / ha.

The total amount provided for the rehabilitation of all anticipated exploration work proposed was calculated based on current rates used within the industry and amounts to R108 920. Refer to Section 4.3 – Quantum Calculations.

### **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 Departments 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.

<b>Full Names and Surname</b>	Mark McKinney
<b>Identity Number</b>	761217094

**-END-**

**APPENDIX A**  
**HERITAGE IMPACT ASSESSMENT**

**APPENDIX B**  
**STAKEHOLDER CONSULTATION**

**APPENDIX C**  
**PROSPECTING WORKS PROGRAMME**