

**Application for Amendment of  
the Approved Environmental  
Management Programme in  
Respect of Portion 1 of Farm  
Gams 60, Namaqualand,  
Northern Cape**

DMR Ref: NC-00085-MR/102

**Final Basic Assessment  
Report and  
Environmental  
Management Plan**

Gamsberg East & South  
Prospecting

**On behalf of:** Black Mountain Mining (Pty) Ltd



2020

**Declaration of Consultant Independence**

This report has been prepared by EndemicVision Environmental Services (Pty) Limited, with all reasonable skill, care and diligence within the terms of the contract with the client. EndemicVision Environmental Services is a multidisciplinary environmental management and consulting company with more than 20 years of experience in the field. The technical appointments for this project are detailed below.

<b>Team Member</b>	<b>Qualifications</b>	<b>Experience</b>	<b>Project Role</b>
Chrizette Neethling Prof Nat Sci #400104/17	MSc BSc Honors BA – EM ND Conservation NC Business Management	Over 24 years of broad-based environmental experience with more than 85 projects completed in mining, biodiversity and development industries.	Project Manager and Ecologist
Elsche Cronjé	MSc Candidate BSc Honors	Three years' experience infield	Environmental Technician
Annalien De Ath	BA Geography and Environmental Management	Two years' experience infield.	Environmental Technician

The author of this report, EndemicVision Environmental Services, do hereby declare that it is an independent consultant and has no business, financial, personal or other interest in the activity, application or appeal in respect of which it was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of the persons performing such work. All opinions expressed in this report are its own.



Signed: C.D. Neethling

Dated: 19 November 2020

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## Project Summary

### Description of the environmental impact assessment process to date

The project can be described as the expansion of the exploration prospecting for base minerals on the property of Black Mountain Mining (Pty) Ltd: Gamsberg (Portion 1 of the farm Gams 6 - East and South) which is part of the existing mining right area to identify potential resources and reserves to ensure the sustainability of Black Mountain Mining (Pty) Ltd: Gamsberg. Prospecting is required to refine the geological model and possible extension of the known ore body.

This is the third basic assessment for the Gamsberg South and East prospecting (FBARV03).

The initial basic assessment (DBARV01) commenced in 2017. DBARV01 was made available to the competent authority and all stakeholders on 10 October 2017. The original scope included 114 prospecting drill sites on natural and disturbed areas, reinstatement of existing tracks and the construction of new tracks, with a total footprint impact of 17ha. Some drill sites and access tracks were planned within the highly sensitive no-go areas on Gamsberg. Numerous responses were received, amongst which the main requirement is the biodiversity risk and biodiversity offset requirements of the affected area. The "no go" alternative was raised by Interested and Affected Parties (I&APs) as well as concerns around current environmental and biodiversity compliance of the recently established Gamsberg Zinc Mine. To address these concerns adequately, specialists were appointed in January 2018 and the following reports were generated and supplied to stakeholders verifying the status of concerns raised:

- ↓ Biodiversity Offset Report Status Report;
- ↓ Biodiversity Offset Agreement Final;
- ↓ Plant species monitoring protocol for Gamsberg Zinc Mine and BMM;
- ↓ Dust monitoring protocol – vegetation;
- ↓ SANBI proposal for seed collection;
- ↓ Dust Management Plan;
- ↓ Gamsberg EMP performance report;
- ↓ Big Syncline 01 Prospecting EMP Performance Report;
- ↓ Big Syncline 02 Prospecting EMP Performance Report;
- ↓ Botanical independent assessment report;
- ↓ Prospecting Rehabilitation Status Report - Gams East 01;
- ↓ Prospecting Rehabilitation Status Report - Big Syncline 01;
- ↓ Gamsberg Nursery Management Plan;
- ↓ Gamsberg Search, Rescue and Translocation Protocol;
- ↓ DAFF and DENC permits; and
- ↓ Moolman's ECO Dust compliance audit reports.

The basic assessment was adapted to incorporate changes in the drill plan and mitigation measures. DBARV02 was made available to the competent authority and all stakeholders on 28 June 2018 and the FBARV02 was submitted on 06 August 2018. Scope changes from V01 to V02 focused on reducing the total impact footprint, increasing boreholes per drill site and increasing the mitigation measures. The original 114 drill sites were reduced to 80 drill sites and the total impact footprint was reduced from 17 ha to 13ha. The FBARV02 was accepted by the regulator and the Environmental Authorization (EA) was issued. A successful appeal was lodged to the Department of Environmental Affairs on 29 March 2019.

BMM responded to the appeal and the final appeal decision was issued on 05 August 2019. The final decision highlighted that:

- ↓ Measures to protect flora are not proven to be effective;
- ↓ The transplantation of flora may not be effective; and
- ↓ Offset areas should be determined to be appropriate to species that are endemic to Gamsberg.

In light of this decision, the following processes commenced:

- ↓ Updating of the search, rescue and transplantation plan;
- ↓ Review, verification and integration of requirements from all specialists in terms of specific environmental authorization conditions;
- ↓ Reworking of the prospecting drill plan;
- ↓ Re-calculating the biodiversity offset requirements;
- ↓ External auditing of the current biodiversity offset implementation agreement between the applicant and the Northern Cape Department of Nature Conservation; and
- ↓ Completion of a stakeholder engagement process to present changes as required in the appeal (this process).

The DBARV03 is presented with a focus to avoid sensitive areas on Gamsberg and reduce biodiversity risk to acceptable levels.

<b>Scope of Environmental Impact Assessment</b>	
This impact assessment identifies and evaluates the actual and potential environmental consequences associated with the proposed activity. Furthermore, the potential for mitigation of negative impacts and enhancement of positive impacts (DEFF) are described.	
<b>Project Name</b>	Gamsberg East & South Prospecting: Amendment of existing Mining Right
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<b>Property reference</b>	Farm Gams No 60 - Portion 1
<b>Surveyor General Property Code</b>	Gams 60, Portion 1: C0530000000006000001
<b>Local Municipality</b>	Khâi-Ma Local Municipality
<b>Magisterial district</b>	Namakwa District Municipality
<b>District Municipality</b>	Namakwa District Municipality
<b>Province</b>	Northern Cape

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## List of Abbreviations

AIA	Archaeological Impact Assessment
ABP	Area Based Plans
DALRRD	Department Agriculture, Land Reform and Rural Development
DEFF	Department Environment Forestry and Fisheries
DMRE	Department Mineral Resources and Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IUCN	International Union of Conservation of Nature
LRAD	Land Redistribution for Agricultural Development
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEM-AQA	National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
NEMBA	The National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
PIA	Paleontological Impact Assessment
PPP	Public Participation Process
SAHRA	South African Heritage Resource Agency
SAHRIS	South African Heritage Resource Information System
SANBI	South African National Biodiversity Institute
SANBIS	South African National Biodiversity Information System



## mineral resources

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

# BASIC ASSESSMENT REPORT and ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (Act No. 107 of 1998) (NEMA) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (Act No. 28 of 2002) (MPRDA) (AS AMENDED).

**NAME OF APPLICANT:** Black Mountain Mining (Pty) Ltd

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**PHYSICAL ADDRESS:** 1 Penge Road, Aggeneys, 8893

FILE REFERENCE NUMBER SAMRAD: NC-00085-MR/102

## 1. Important notice

In terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002 as amended) MPRDA, the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorization (EA) can be granted following the evaluation of an Environmental Impact Assessment (EIA) and an Environmental Management Programme report (EMPR) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

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

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

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

## 2. Objective of the Basic Assessment Process

The objective of the Basic Assessment Process is to, through a consultative process—

- (a) Determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) Identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) Describe the need and desirability of the proposed alternatives;
- (d) Through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of the impact of the proposed activity and technology alternatives on these aspects to determine:
  - (i) nature, significance, consequence, extent, duration, and the probability of the impacts occurring to; and
  - (ii) the degree to which these impacts—
- (aa) Can be reversed;
- (bb) May cause irreplaceable loss of resources; and
- (cc) Can be managed, avoided or mitigated;
- (e) Through a ranking of the site sensitivities and possible impacts, the activity and technology alternatives will impose on the sites and location identified through the life of the activity too—
  - (i) identify and motivate a preferred site, activity and technology alternative;
  - (ii) identify suitable measures to manage, avoid or mitigate identified impacts; and
  - (iii) identify residual risks that need to be managed and monitored.

## PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

### 3. Contact person and correspondence address

#### 3.1. Details of EAP

##### 3.1.1 Details of the EAP

**Name of the Practitioner:** EndemicVision Environmental Services (Pty) Ltd  
 Chrizette Neethling

**Tel No.:** +27 (0) 53 723 1379

**Fax No.:** +27 (86) 590 7261

**E-mail address:** cdn@endemicvision.co.za

##### 3.1.2 The expertise of the EAP

Please refer to Appendix A for the Curriculum Vitae of Chrizette Neethling

##### 3.1.3 The qualifications of the EAP

Please refer to Appendix A for the Curriculum Vitae of Chrizette Neethling

##### 3.1.4 Summary of the EAP’s past experience

Please refer to Appendix A for the Curriculum Vitae of Chrizette Neethling

#### 3.2. Location of the overall Activity

The following table presents the location and associated cadastral details associated with the proposed project area.

**Table 1: Project Locality Details**

<b>Farm Name:</b>	Farm Gams No 60 Portion 1
<b>Application area (Ha)</b>	3.53 ha
<b>Magisterial district:</b>	Namaqualand [C053]
<b>Distance and direction from the nearest town</b>	The prospecting expansion area of interest is located on BMM property, Portion 1 of Farm Gams 60 within the Khâi-Ma Local Municipality and Namakwa District Municipality, Northern Cape Province.  The areas are situated approximately 11 km East from the Aggeneys town.
<b>21-digit Surveyor General Code for each farm portion</b>	Gams 60, Portion 1: C0530000000006000001

### 3.2.1 Locality map

Show the nearest town; scale not smaller than 1:250 000

\*All maps are available on request with better quality and will be added as a map file for submission to the regulator.

The following figure illustrates the farm associated with the proposed Gamsberg East and South prospecting area, as well as the regional setting.

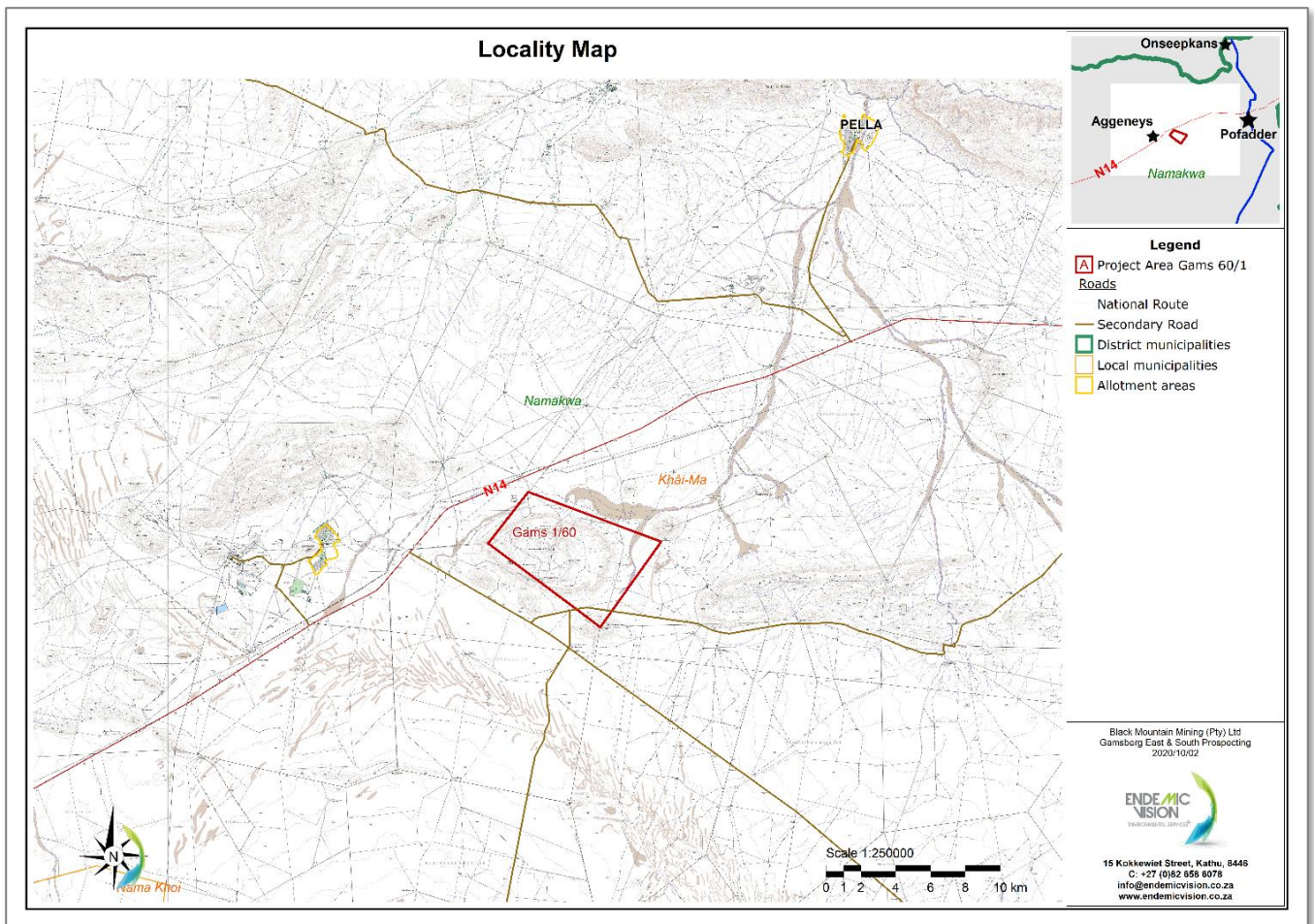
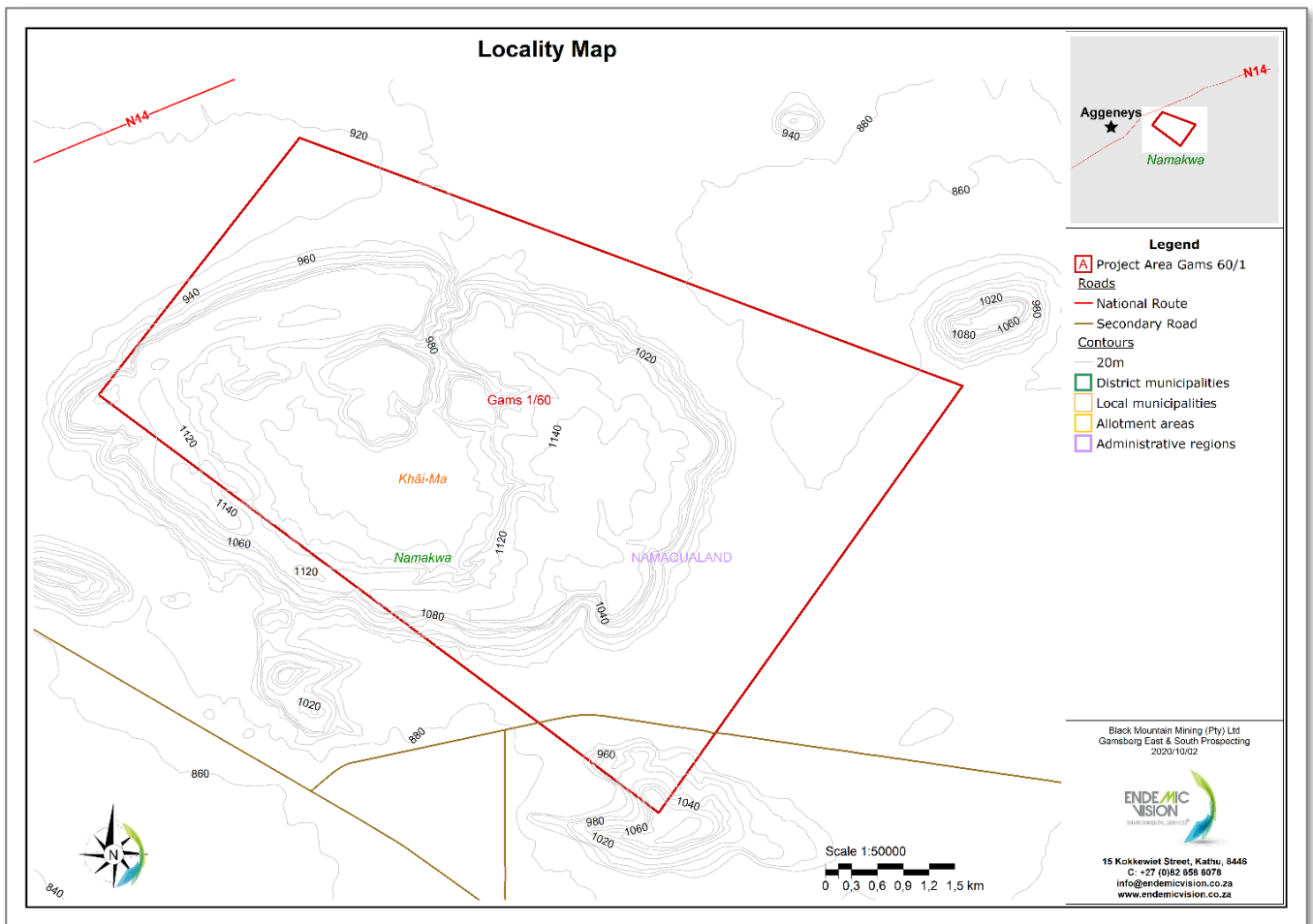


Figure 1: Regional location of the proposed Gamsberg East and South prospecting area

The prospecting area of interest is located on BMM property, Portion 1 of the farm Gams 60 within the Khâi-Ma Local Municipality and Namakwa District Municipality, Northern Cape Province. The area is situated approximately 11 km East of the Aggeneys town in the Bushmanland area.

The following figure illustrates the setting of the proposed Gamsberg East and South prospecting area within the borders of the Khai-Ma local municipality.



**Figure 2: Local setting of the proposed Gamsberg East and South prospecting area within the Namaqualand administrative region**

The scope of the proposed Gamsberg East and South prospecting area is provided in the table below:

**Table 2: Property Scope**

<b>Property scope</b>	<b>Gamsberg East &amp; South Prospecting</b>
Total landholding size (Ha)	3 858
Application area (Ha)	3.53
Project footprint as a percentage of total landholding	0,1%
Project location description	The prospecting expansion area of interest is located on BMM property, Portion 1 of the farm Gams 60 within the Khâi-Ma Local Municipality and Namakwa District Municipality, Northern Cape Province. The area is situated approximately 11 km east from Aggeneys.
Distance from nearest town boundary (km)	10.69km east from Aggeneys
Distance from nearest residential settlement (km)	10.69km
Distance from the nearest neighbor (km)	1.29km
Project Central Location Coordinates (Decimal Degrees) South	Project Central Location Coordinates (Decimal Degrees) East
29,2473118	18,9884616
Project Corner Coordinates (Decimal Degrees) South	Project Corner Coordinates (Decimal Degrees) East
29,2153591	18,9624986
29,241068	19,0407131
29,2851811	19,0048354
29,2419363	18,9387229

**(a) Description of the scope of the proposed overall activity**

.....  
 Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site  
 .....



## 4. Description of the prospecting activity applied for

A summary of the development scope is provided in the table below:

**Table 3: Development Scope of the Project**

<b>Development scope</b>	
<b>Development objective</b>	Expansion of the exploration prospecting for base minerals (zinc and lead) on the property of Black Mountain Mining (Pty) Ltd as part of the existing mining right.
<b>Type of impact (industry)</b>	Prospecting
<b>Mineral Type</b>	Zinc and lead ore
<b>Impact Description</b>	The proposed prospecting programme involves both non-invasive and invasive prospecting methods. Initially, prospecting activities will be non-invasive and restricted to a desktop study which will include a literature survey, aerial photograph and satellite image interpretation, ground validation of targets, geophysical surveys, interpretation and modelling of data. Subsequent phases will be of the invasive type and entail the re-drilling of historical drill sites, new drill sites on existing road footprint and one additional drill site on greenfield to confirm continuity of mineralization and potential deposit size.
<b>Impact Period</b>	2021- 2026
<b>Total impact footprint</b>	3.53 ha
<b>Existing infrastructure</b>	Historical drill sites, management tracks, access tracks and laydown areas.
<b>Planned infrastructure</b>	<b>Access tracks:</b> Existing single-track gravel roads transecting the existing mining and historic exploration areas will be used as far as possible. Where roads do not exist, a single-track road will be planned. <b>Drill sites:</b> Cleared and demarcated area for drilling. Multiple drill holes per drill site. <b>Laydown areas:</b> Existing laydown area outside of mountain area. Temporary smaller laydown on approved sites.
<b>Affected Vegetation Types</b>	SKr 18 - Bushmanland Inselberg Shrubland Mountains Southern Slopes SKr 19 - Aggeneys Gravel Vygie Veld Mountain plateau Plateau quartz gravel Plateau fine grain quartz gravel Plains quartz gravel Plains quartz gravel intermediate Plains feldspar gravel Plains rocky Bushmanland Arid Grassland Flat sandy plains Hummocky sandy plains Calcrete gravel plains
<b>Affected Water Resources</b>	Non-perennial rivers, seeps and headwaters
<b>Affected Sensitive Habitats</b>	Biodiversity no-go zone (irreplaceable vegetation types/habitats as per Appendix G)
<b>Affected Heritage Resources</b>	No-go areas (SG1, SG4 and SG7) – as per Heritage specialist report

<b>Main Activities and Infrastructure</b>	
1	Construction of Roads
2	Non-invasive Prospecting
3	Invasive Prospecting: Drilling
4	Rehabilitation
<b>Project Life Cycle Phases Applicable</b>	
1	Plan & Design
2	Site Clearance
3	Operational
4	Closure

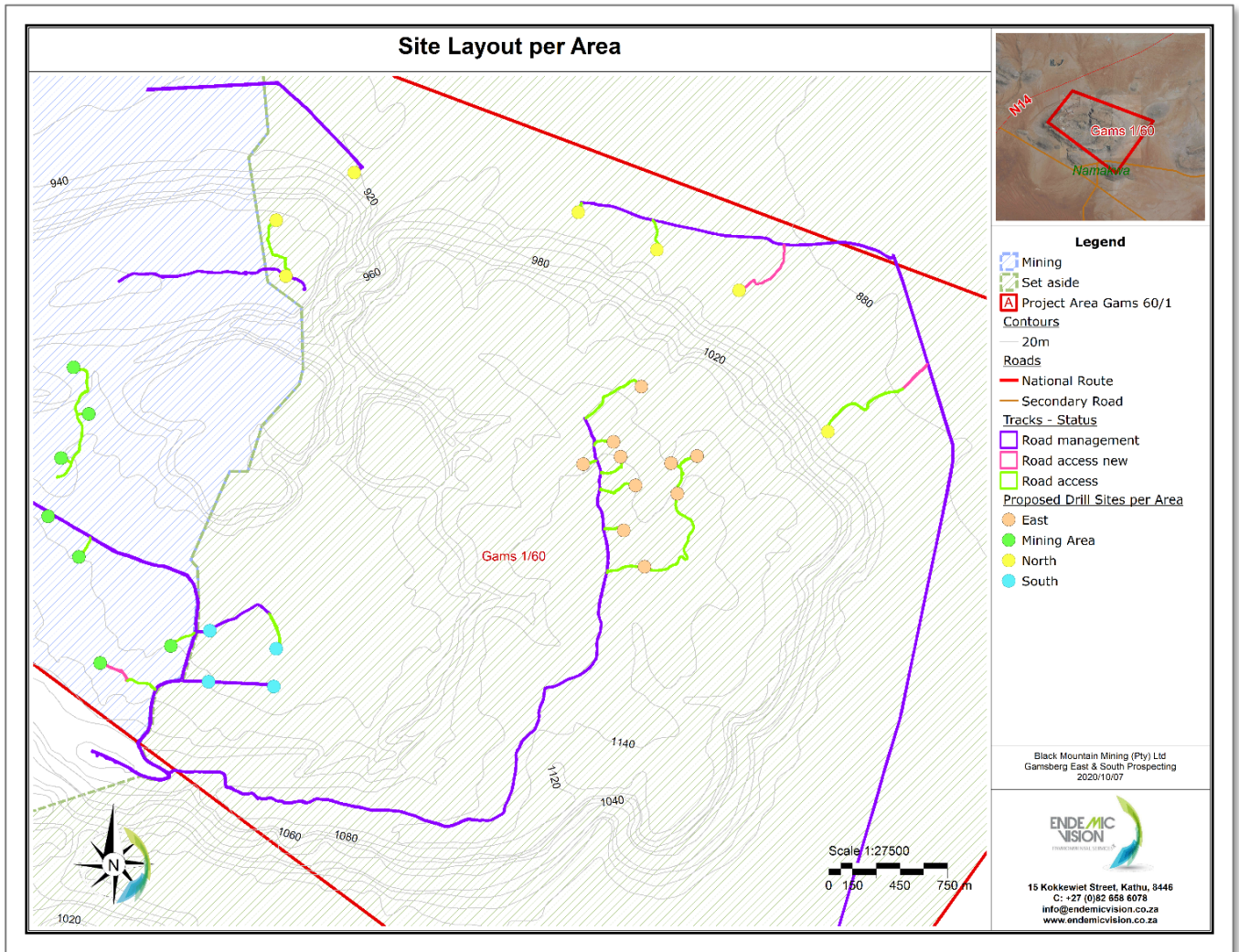
The objective of the prospecting works is to determine the possibility of accessing ore bodies for future underground mining. Activities will include the re-opening and utilization of previously existing access tracks / prepared roadways, passing & turning areas, use of existing demarcated laydown areas, access or clearance and drilling multiple boreholes on drill sites. Existing old drill sites and access roads will be utilized where possible.

There are four areas where BMM will focus the prospecting activities that will take place from 2021 to 2026 which include Gamsberg South, Gamsberg East, Gamsberg North and Gamsberg Mining Area.

The total footprint consists of roads and drill sites accumulating to 3.53ha.

**Table 4: Planned Footprint**

<b>Declared footprint</b>		
<b>Infrastructure type</b>	<b>Area (m<sup>2</sup>)</b>	<b>Area (ha)</b>
<b>All Access Tracks</b>	30530	30,5
<b>All Drill Sites</b>	4780,18	4,8
<b>Impact footprint</b>	35310,18	35,3



**Figure 3: Planned Site Layout per Area**

The proposed prospecting programme involves both non-invasive and invasive prospecting methods. Initially, prospecting activities will be non-invasive and restricted to a desktop study which will include historical records and existing data, geophysical surveys, interpretation and modelling of data. Any change in drill planning resulting from the initial testing will not exceed the scope, provision and impact outlined in this document.

Subsequent phases will be of the invasive type and entail the clearance and drilling on previously disturbed areas (historical drill sites and roads) and drilling of one additional drill site on a natural/ greenfield area. This is required to confirm the continuity of mineralization and potential deposit size. A total of 28 drill sites are planned. The construction of a drill site for this purpose on an average of 170m<sup>2</sup>.

**Table 5: Planned drill site**

<b>Drill site totals</b>			
<b>Infrastructure type</b>	<b>Planned number of drill sites</b>	<b>Total drill pad area (m<sup>2</sup>)</b>	<b>Total drill pad area (ha)</b>
<b>Drill site on existing disturbance</b>	27	4661,35	4,7
<b>Drill site on Greenfield</b>	1	118,83	0,1
<b>Total</b>	28	4780,18	4,8

**Table 6: Planned drill sites per area**




<b>Gamsberg number of drill sites per area</b>			
<b>Area</b>	<b>Existing Disturbance</b>	<b>New</b>	<b>Total</b>
<b>Gamsberg East</b>	9	1	10
<b>Gamsberg South</b>	4	0	4
<b>Gamsberg North</b>	7	0	7
<b>Gamsberg Mining Area</b>	7	0	7
<b>Total</b>	27	1	28

The drilling takes place using tracked diamond drill rigs as opposed to trackless machines and no percussion drilling will take place. Standard sizes diamond drilling (NQ and HQ diameter) will be used. Down-hole gyroscopic surveys will be done every 50m in each hole to ensure holes intersect the desired targets. The applicant’s sampling and logging procedure standards will be applied to mark, log, photograph and sample the core. Advanced directional and wedge drilling techniques will be applied to drill several holes per drill site.

**Table 7: Planned drilling schedule**

<b>Gamsberg total drilling by work phase (preliminary, subject to change)</b>					
	<b>Phase 1 / Year 1</b>	<b>Phase 2 / Year 2</b>	<b>Phase 3 / Year 3</b>	<b>Phase 4 / Year 4</b>	<b>Phase 5 / Year 5</b>
<b>Drill pads (no.)</b>	10	10	8	0	0
<b>Number of Boreholes (no.)</b>	70	70	50	40	40
<b>Meters of drilling (m)</b>	50 000	50 000	50 000	50 000	50 000

Three different types of roads are recognized:

-  Management roads, which are permanent roads used for site management;
-  Access tracks, which are existing disturbed tracks in different stages of natural rehabilitation; and
-  New access tracks, which are new disturbances planned.

In locations where historic roads are not available, new access roads will be constructed. A total of 1.9 km of new access tracks will be made.

Note that the impact footprint does not include the management tracks (as seen in the map), since these are considered permanent infrastructure features that existed before this development and are essential for the site’s management. These management tracks will not be rehabilitated as part of this project.

**Table 8: Planned Tracks**

<b>Tracks totals</b>			
<b>Infrastructure type</b>	<b>Length (m)</b>	<b>Total Area (m<sup>2</sup>)</b>	<b>Total Area (ha)</b>
<b>Access tracks</b>	11 990	26 050	26,1
<b>New Access Tracks</b>	1 884	4 480	4,5
<b>Total</b>	13 875	30 530	30,5

**Table 9: Track development schedule**

<b>Access tracks by work phase (preliminary, subject to change)</b>					
	<b>Phase 1 / Year 1</b>	<b>Phase 2 / Year 2</b>	<b>Phase 3 / Year 3</b>	<b>Phase 4 / Year 4</b>	<b>Phase 5 / Year 5</b>
<b>Reinstating Existing Tracks (m<sup>2</sup>)</b>	11 995	11 995	2 059	0	0
<b>New Track (m<sup>2</sup>)</b>	0	2 400	2 000	80	0

No drill camps will be constructed for this project.

No additional laydown areas will be constructed. Existing roads and previously disturbed drill sites will be used.

Water supply will be through overland PVC pipes taken from Jo-Jo tanks. The Jo-Jo tanks will be placed on previously disturbed areas.

#### **4.1. Listed and specified activities**

Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) requires, upon request by the Minister that an Environmental Management Plan (EMP) be submitted and that the applicant must notify and consult with Interested and Affected Parties (I&APs). Section 24 of the NEMA requires that activities, which may impact on the environment, must obtain an Environmental Authorization (EA) from a relevant authority before commencing with the activities. Such activities are listed under Regulations Listing Notice 1 Government Notice (GN) 327 and Listing Notice 3 GN 324 (2017) of NEMA. The activities (listed and not listed) that require environmental authorization in terms of the EIA Regulations of April 2017 are indicated in the following table.

**Table 10: Applicable Listed Activities for the Project**

<b>Listed Activities</b>	
<b>Applicable Listing Notice</b>	<b>Activity referenced in listing notice</b>
<b>NEMA LISTING NOTICE 01 (GNR983)</b>	<p>20. Any activity including the operation of that activity which requires a prospecting right in terms of section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including—</p> <p>(a) associated infrastructure, structures and earthworks, directly related to the prospecting of a mineral resource; or</p> <p>(b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing;</p> <p>but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in Listing Notice 2 applies.</p>
<b>NEMA LISTING NOTICE 01 (GNR983)</b>	<p>22. The decommissioning of any activity requiring –</p> <p>(i) a closure certificate in terms of section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or</p> <p>(ii) a prospecting right, mining right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure.</p> <p>but excluding the decommissioning of an activity relating to the secondary processing of a –</p> <p>(a) mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource; or</p> <p>(b) petroleum resource, including the refining of gas, beneficiation, oil or petroleum products; –</p> <p>in which case activity 31 in this Notice applies.</p>
<b>NEMA LISTING NOTICE 01 (GNR983)</b>	<p>27. The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-</p> <p>(i) the undertaking of linear activity; or</p> <p>(ii) maintenance purposes are undertaken following a maintenance management plan.</p>
<b>NEMA LISTING NOTICE 03 (GNR985)</b>	<p>12. The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken following a maintenance management plan.</p> <p>g. Northern Cape-</p> <p>(i) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or before the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</p> <p>(ii) Within critical biodiversity areas identified in bioregional plans;</p> <p>(iii) Within the littoral active zone or 100 meters inland from the high watermark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or</p> <p>(iv) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had equivalent zoning.</p>

**(ii) Description of the activities to be undertaken**

Describe Methodology or technology to be employed, including the type of commodity to be prospected/mined and for a linear activity, a description of the route of the activity

The following section presents a detailed description of all the activities associated with the proposed Gamsberg East and South Prospecting area.

**Table 11: Sequence of project activities and descriptions**

<b>Project activities according to project sequence</b>	<b>Detail description</b>
<b>Non-invasive Prospecting</b>	Initially, prospecting activities will be non-invasive and restricted to a desktop study which will include a literature survey, plus aerial photograph and satellite image interpretation, ground validation of targets, geophysical surveys, interpretation and modelling of data.
<b>Clearing Indigenous Vegetation</b>	Planned drill sites and roads will be demarcated. Indigenous vegetation clearing includes the removal of specimens and seed. Millennium seed banking, as well as on-site storing of protected species, will be undertaken before site clearance. Concurrent transplantation, as well as nursery transplantation of protected species, will take place. Rescued specimens will be kept at the BMM nursery with back-up specimens in the Karoo Botanical Gardens.
<b>Reinstating Existing Tracks</b>	Vehicles will use existing mine and historical exploration access roads as far as possible. Cut-off drains will be installed along the southern access road.
<b>Construction of new tracks</b>	New tracks will be created as a 4-meter-wide single-track gravel road without any bulldozing. Where large rocks limit vehicle access, these will be manually removed. T turning points will be created and no turning circles will be used. Tracks will be single with clearly defined areas of road widening will be done to allow vehicles to pass each other.
<b>Clearing Soils</b>	The excavation of a sump will not be required. Topsoil will be cleared for each drill hole. Topsoil will be cleared and stockpiled on PVC liners for rehabilitation where soil impacts are unavoidable (drill holes). Clearing of soils will be limited as far as possible.
<b>Ablution facilities</b>	Temporary ablution facilities will be placed at drill sites. These facilities will be contained on the demarcated drill sites used for drilling or laydown and not be placed in the veld.
<b>Storage of equipment</b>	Equipment, excluding rigs, will be placed on scaffolding. No equipment over 50kg will be placed directly on the ground. Rubber mats will be used for the remaining site area. A primary laydown area will be used outside the mountain on existing disturbance. Approved disturbed drill sites will be used as temporary laydown areas.
<b>Invasive Drilling Prospecting:</b>	Drilling of 270 boreholes will take place by means of diamond drill rigs to confirm continuity of mineralization and potential deposit size. The location of the drill sites will be GPS located and pegged. The drill sites were selected with guidance from external specialists to minimize impact on sensitive areas. These sites are inspected and photographed prior to any disturbance.
<b>Resource Use: water</b>	Water supply will be from Pella water drift orange river pump station to Gamsberg Zinc Mine then delivered via PVC pipes laid overland to JoJo tanks, aqua dams with PVC pipes take-offs to the drill sites. Watercarts will also be used where necessary. Water supply will not exceed 150 000 liters of total storage.
<b>Generation of hydrocarbon spills</b>	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 authorized disposal site. A diesel bowser will be used for rig refueling. Spillages will be prevented as far as possible and cleaned up in the event that it occurs. Vehicle maintenance will occur off-site. Commercial oil spill kits will be kept at each site to be used in the event of any spillages.

<b>Project activities according to project sequence</b>	<b>Detail description</b>
<b>Generation of drill sludge</b>	A drill sludge containment and water recycling unit will be used as well as decanting drums to contain drill sludge. No drill sump will be dug on site. Spillage will be prevented as far as possible and cleaned up in the event that it occurs. Drill sludge will be disposed at the nearest demarcated waste rock dump.
<b>Generation of Dust</b>	The main source of air pollution in the area is dust generated on access roads. There are no significant dust impacts from drilling as water regulated drilling will take place. No percussion drilling is planned on the current prospecting plan.
<b>Disturbance: Noise</b>	Noise produced by current operations is limited to noise emanating from the mining activities and traffic noise. The effect of this industrial noise on any dwelling place in the region is negligible.
<b>Rehabilitation</b>	Decommissioning will take place concurrently, as each drill site is closed. Concurrent rehabilitation will take place with direct transplantation of plant specimens to already impacted areas where appropriate. Rehabilitation procedures set out in the BMM rehabilitation monitoring plan and the Gams SE quantum report will be implemented.
<b>Monitoring</b>	BMM rehabilitation monitoring procedures will be implemented for a minimum period of 10 years and includes a pre-impact baseline.
<b>Rehabilitation maintenance</b>	Rehabilitation maintenance will take place based on the results of the annual rehabilitation monitoring.



**a) Policy and Legislative Context**

The applicable policy and legislation context are indicated in the table below.

**Table 12: Policy and legislative context**

<b>Policy &amp; Legislative Context</b>		
<b>Applicable legislation and guidelines used to compile the report</b>	<b>Reference where applied</b>	<b>How does this development comply with and respond to the legislation and policy context</b>
<b>Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002, as amended) (MPRDA)</b>	Application for amendment of section 102 mining right	A Prospecting Right Application has been submitted to the DMR by the Applicant. The application was accepted by the DMR and final BAR compiled for submission and approval. The final BAR was submitted on 06/08/2018. The application was approved, and an Environmental Authorization was received on 08/03/2019. An appeal was successfully lodged against the decision on 05/08/2019. A revised BAR is compiled for submission and approval according to the appeal decisions.
<b>National Environmental Management Act, 1998 (Act No. 107 of 1998)</b>	The Basic Assessment Report and Environmental Management Programme for Environmental authorizations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) in respect of listed activities that have been triggered by applications in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002, as amended) (MPRDA)	An Environmental Authorization was received on 08/03/2019 for this project. An appeal was lodged against the decision on 19/02/2019. The DEFF (Formerly DEA) has decided on the appeal on 05/08/2019 against the Environmental Authorization. A revised BAR is compiled for submission and approval according to the appeal decisions.
<b>National Water Act, 1998 (Act No. 36 of 1998)</b>	No groundwater will be abstracted for prospecting activities.	Black Mountain Mining (Pty) Ltd: Gamsberg Zinc Mine has an existing water use license. License number 14/D82C/ABCGIJ/2654 issued on 2016/04/14. An application was submitted for a water use license (section 21c&i) on 03/06/2019. A water-use license for section 21c&I activities was received on 11/12/2019 accordingly.
<b>National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004)</b>	Presence of nationally protected trees and other flora	The application is compliant with NEMBA where it recognizes published critical biodiversity areas and listed vegetation types in its risk assessment and biodiversity offset calculations. EMP will regulate the applicant to apply for tree removal permit from the DEFF and an integrated Flora Permit from DENC prior to the potential removal of any sensitive and/or protected species.
<b>National Environmental Management Act, 1998 (Act No. 107 of 1998): Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations GNR1147, 2015</b>	Financial provision, rehabilitation and closure	Financial provision and rehabilitation mitigation and monitoring require is presented in line with the requirements of the regulations.
<b>National Heritage Resources Act, 1999 (Act No. 25 of 1999)</b>	The activity may trigger the requirements under Section 38 of the NHRA. However, the requirements for permits are not known at this stage.	The South African Heritage Resources Agency (SAHRA) was contacted as part of the stakeholder engagement process. A final comment was received on 02 August 2018.

## b) Need and desirability of the proposed activities

*Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location*

The need for the project is primarily to secure the extension of the Black Mountain Mining (Pty) Ltd life of mine and to ensure that all possible mineral resources in the area have been sourced and utilized for Gamsberg Zinc Mine and the socio-economic development and employment of local people.

## g) Motivation for the overall preferred site, activities and technology alternative

The proposed Gamsberg East and South Prospecting area are targeted due to the existing ore body that is known from within the Gamsberg inselberg from historic drilling and current mining.

The project aims to ensure the long-term viability of the company. The economic desirability of whether or not this is the most suitable area for prospecting can only be confirmed after initial non-intrusive geological surveys. No alternative other than drilling is possible to determine the presence and quality of the specific minerals in the area.

The drill layout plan presented in this report (V03) reduces the impact of the drilling project significantly.

## h) Full description of the process followed to reach the proposed preferred alternatives within the site

**NB!!** – This section is about the determination of the specific site layout and the location of infrastructure and activities on-site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout

Three different alternative drill plans are presented as V01, V02 and V03. The current drill plan, V03 is the preferred layout.

V01 included 114 prospecting drill sites on natural and disturbed areas, reinstatement of existing tracks and the construction of new tracks, with a total footprint impact of 17ha.

V02 was designed to decrease biodiversity impact while securing the best geological model and included:

- Reduction of the total impact footprint from 17ha to 13ha;
- Reduction of drill sites from 114 to 80;
- Multiple drill holes for each drill site to minimize the required amount of drill sites;
- Reduction to only two (2) drill sites located on the higher sensitivity Plateau Fine Quartz Gravel Habitats;
- Only 39 new drill sites of which 32 are planned partially on existing road disturbance;
- Adjustment in mitigation measures; and
- Shifting the main impact away from the irreplaceable habitats to areas with more options to be offset or already secured for offsetting.

The V03 revision of the drill plan is to avoid any activities within the sensitive areas and only utilize previous exploration drilling pads and existing/rehabilitated roads to avoid and/or minimize impacts within the set-a-side area through appropriate restriction.

V03 avoid environmental impacts as far as practically possible employing the following measures:

- Minimal new tracks will be developed, and most existing exploration roads will be utilized;
- Minimal new drill pads will be utilized. Most proposed drill pads as included in the revised exploration optimization plan will be conducted on previously disturbed exploration drill pads;
- Seven (7) of the proposed sites are placed within the mining area and not within the set-aside area;
- There will only be a single drill pad on a greenfield area where no previous disturbance exists. This site was created to avoid the high sensitivity quartz patch area where the desktop drill plan had placed a drill pad;
- There will only be a single drill pad within the area of sensitivity >10,000. However, this drill pad is on an existing (historical) exploration pad and track;
- No new impact on very high sensitivity habitat;
- Increase of drill holes per drill site to minimize the number of drill sites;
- Updating of mitigation measures;
- Use of scaffolding and rubber mats to reduce biodiversity/soil impact significance; and
- Reduction of impact footprint by over 60%.

The list of team members involved in the alternative assessment is listed below:

**Table 13: Alternative Assessment Team**

Present	Company	Details
<b>Mark Botha</b>	Independent Specialist	Biodiversity Offset Specialist
<b>Dr Phil Desmet</b>	Independent Specialist	Ecologist, Botanist
<b>Chrizette Neethling</b>	EndemicVision	Environmental Assessment Practitioner
<b>Alan Johnson</b>	BMM	Exploration Geologist
<b>Westley Price</b>	BMM	Senior Geologist
<b>Koos Smit</b>	BMM	Biodiversity Manager
<b>Markus Schaefer</b>	BMM	General Manager – Exploration VZI & Africa
<b>Hermien Uys</b>	BMM	Head of Legal – VZI international
<b>Pieter Venter</b>	BMM	Environmental Manager

The scope changes from V01 to V03 are presented in the tables below.

**Table 14: Access track totals as presented within each version**

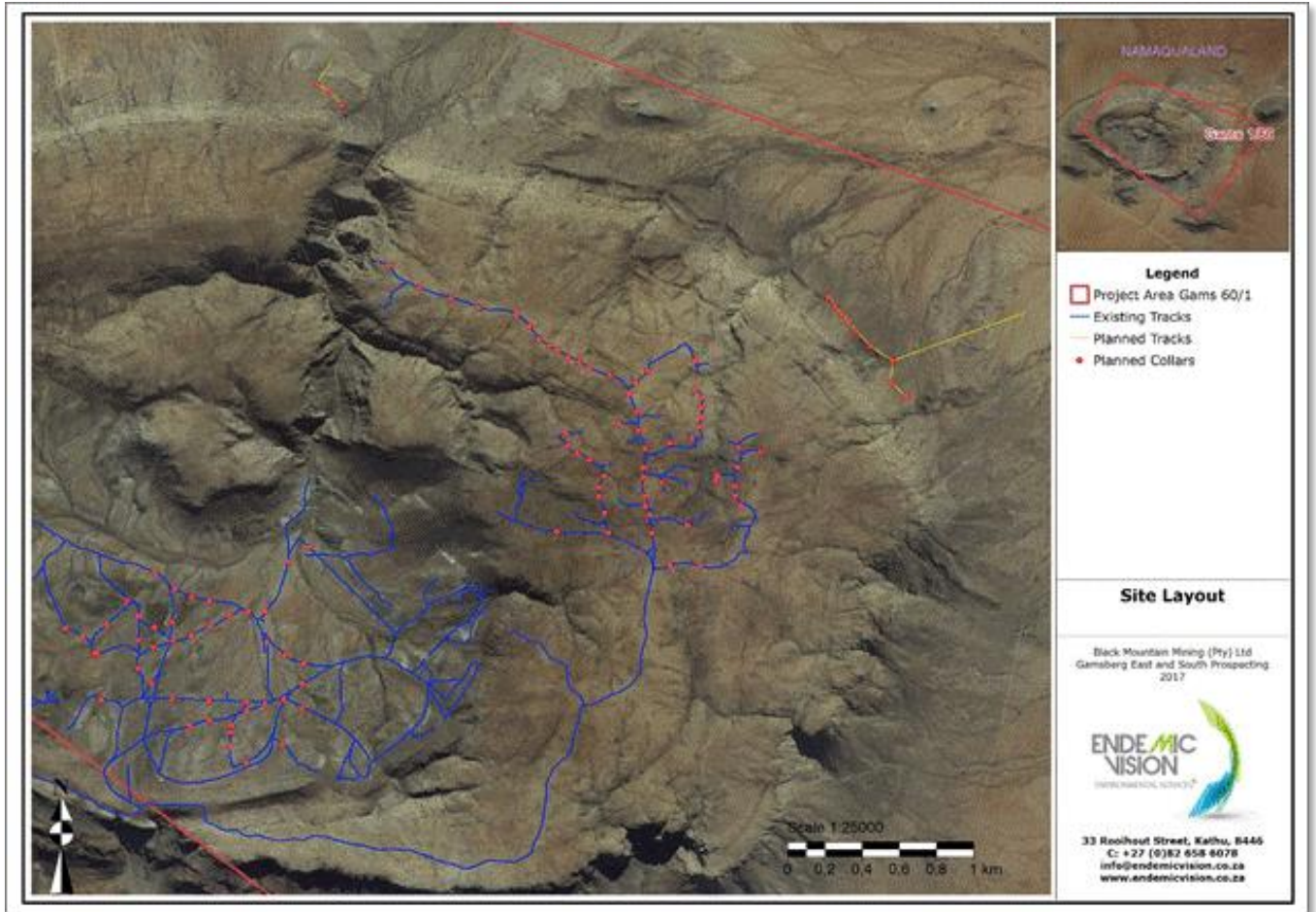
Access tracks totals						
	V01		V02		V03	
Infrastructure type	Length (m)	Area (m <sup>2</sup> )	Length (m)	Area (m <sup>2</sup> )	Length (m)	Total Area (m <sup>2</sup> )
<b>Existing Access Tracks</b>	15 000	60 000	13 089	53 026	11 991	26 050
<b>New Access Tracks</b>	5 000	20 000	2 055	8 222	1 884	4 480
<b>Total</b>	20 000	80 000	15 144	61 248	13 875	30 530

**Figure 4: Drill site totals as presented within each version**

Drill site totals						
	V01		V02		V03	
Infrastructure type	# Planned Drill Sites	Total Area (m <sup>2</sup> )	# Planned Drill Sites	Total Area (m <sup>2</sup> )	# Planned Drill Sites	Total Area (m <sup>2</sup> )
<b>Drill Pad on Existing Disturbance</b>	114	25 650	41	9 225	27	4 661
<b>Drill Pad on Greenfield</b>			39	8 775	1	119
<b>Total</b>	114	25 650	80	18 000	28	4 780

**Figure 5: Total footprint as presented within each version**

Total Footprint			
	V01	V02	V03
<b>Infrastructure type</b>	<b>Total Area (m<sup>2</sup>)</b>	<b>Total Area (m<sup>2</sup>)</b>	<b>Total Area (m<sup>2</sup>)</b>
<b>Access Tracks</b>	144 350	112 000	30 530
<b>Drill Pads</b>	25 650	18 000	4 780
<b>Total</b>	170 000	130 000	35 310



**Figure 6: Site layout V01**

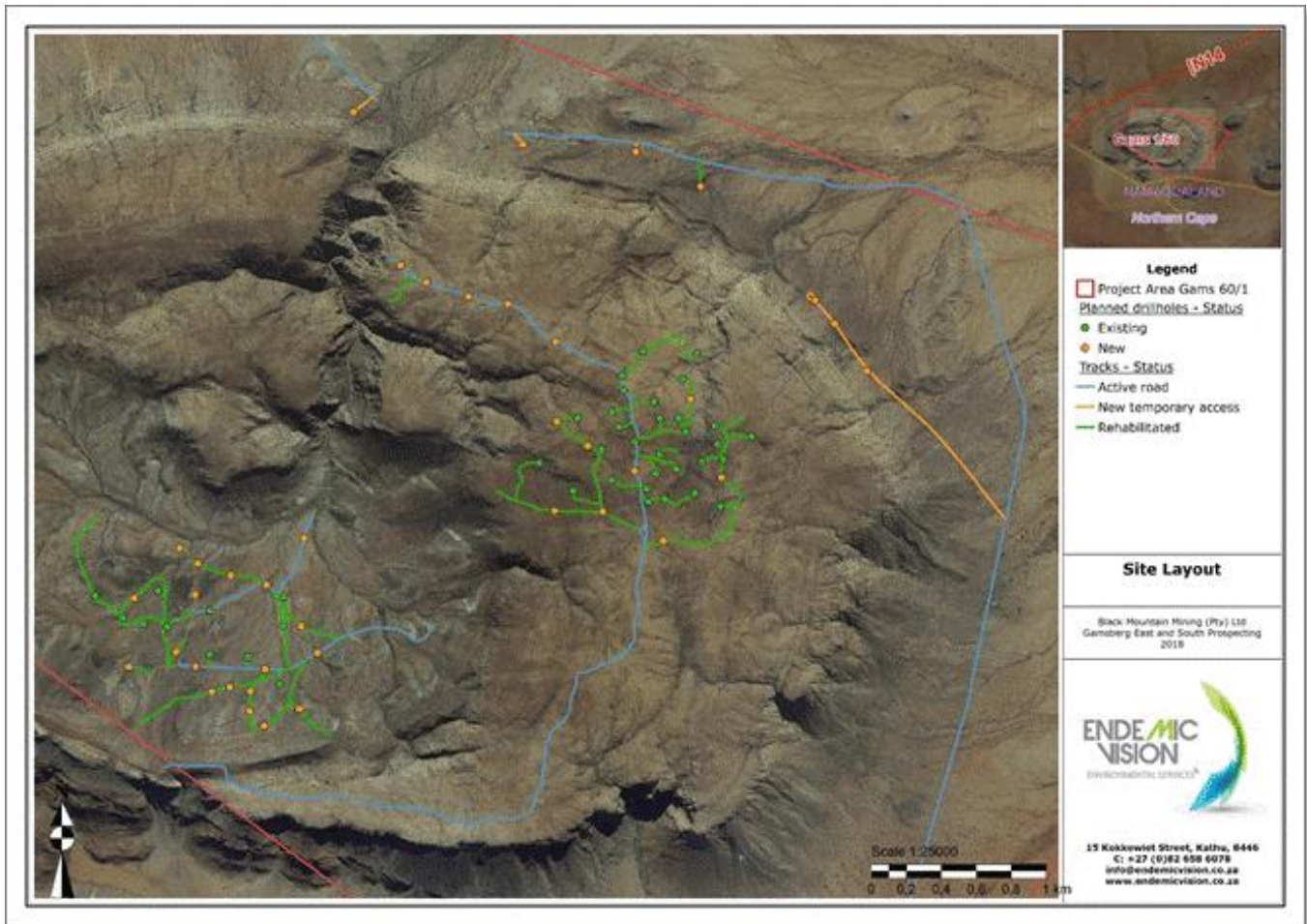


Figure 7: Site Layout V02

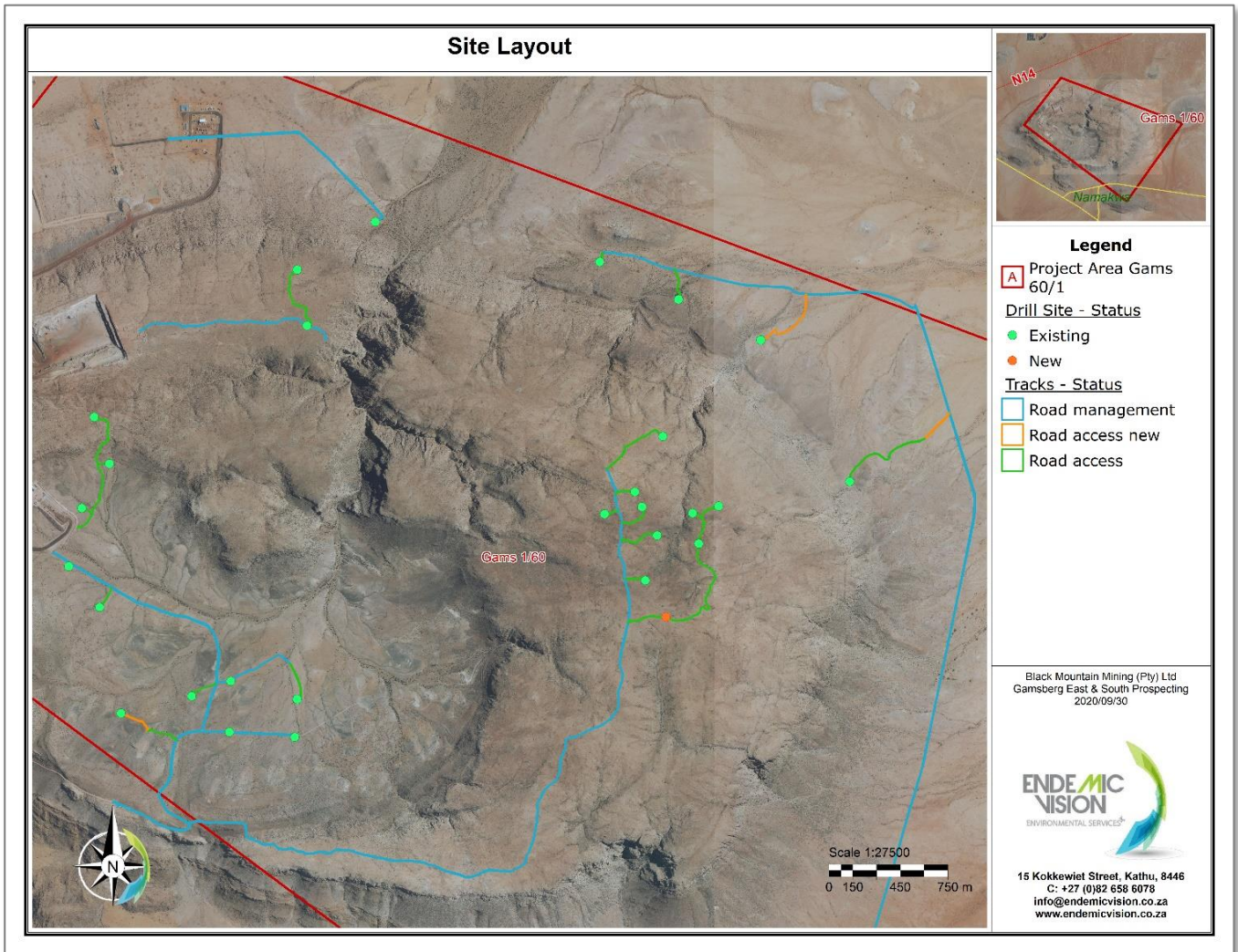


Figure 8: Site Layout V03

**i) Details of the development footprint alternatives considered**

With reference to the site plan provided as Appendix C and the location of the individual activities on-site, provide details of the alternatives considered concerning:

- (a) the property on which or location where it is proposed to undertake the activity;
- (b) the type of activity to be undertaken;
- (c) the design or layout of the activity;
- (d) the technology to be used in the activity;
- (e) the operational aspects of the activity; and
- (f) the option of not implementing the activity.

Details of the alternatives considered are presented below with comparisons between version 01 to version 03.

**Table 15: Alternatives considered**

Evaluation Criteria	Sumps	Water supply	Laydown areas	Drill sites	Roads
<b>Description of infrastructure</b>	Drill sludge containment and water recycling unit.	JoJo tanks, aqua dams and PVC pipes and watercarts for up to 150 000 liters storage.	V01: Two planned laydown areas. V02: Two planned laydown areas. V03: Laydown area on existing disturbance outside the mountain, and use of existing drill sites, to be drilled as temporary laydown areas.	V01: 225m <sup>2</sup> V02: 225m <sup>2</sup> V03: averaged at 170m <sup>2</sup>	4-meter-wide single-track gravel road not bulldozed with T turning points where existing take-off roads are and in identified areas widening for vehicles to pass.
<b>(a) the property on which, or location where it is proposed to undertake the activity;</b>	n/a	PVC pipes will be placed overland and along existing roads as far as possible.	V01 and V02: Use of existing previously impacted areas vs creating of new laydown areas. V03: All laydown areas will be on existing impacted areas.	V01: Drill sites on disturbed and natural greenfield areas. V02: Most drill sites on disturbed areas with 39 drill sites on natural greenfield areas. V03: Most drill sites on disturbed areas with only 1 drill site on natural greenfield area.	V01: Use of existing roads and creating new roads. 2ha new tracks planned. V02: Reduction in new roads from 2ha to 0,8ha. V03: 98% of all roads will be existing roads. Reduction from 0,8ha to 0,4ha.

Evaluation Criteria	Sumps	Water supply	Laydown areas	Drill sites	Roads
<b>(b) the type of activity to be undertaken;</b>	n/a	n/a	n/a	Drilling only be diamond drills. No percussion drilling will take place.	Driving or flying. Flying is not financially feasible.
<b>(c) the design or layout of the activity;</b>	Excavated sumps VS above ground sumps. Above ground sumps will be used.	Water storage and pipelines VS direct supply by water bowser. Water storage and pipelines are the preferred option with some water bowser support. Aqua dams VS Jo-Jo tanks for water storage. Jo-Jo tanks are the preferred option. Pipelines overland (shortest route) VS pipelines primarily along existing roads. Pipelines will be placed primarily along existing roads.	Previously impacted drill sites and take-off roads will be used for laydown areas.	V01: 114 drill sites with single borehole per site. V02: 80 drill sites with multiple boreholes per drill site. V03: 28 drill sites with multiple boreholes per drill site.	Instead of building roads as the crow flies to the drill sites roads are constructed to avoid sensitive biodiversity areas. Utilize CAS system to track, monitor, limit and report on vehicle movement including geo-fencing of no-go areas.
<b>(d) the technology to be used in the activity;</b>	Hydrocarbon management. Environmentally friendly solvents used. In-situ hydrocarbon bacteria inoculation of small oil spots as appose to soil removal.	Standard pumps will be used.	V01&02: Storing of materials or equipment stored directly on the surface. V03: Use scaffolding to store materials in excess of 50 kg. Use of rubber mats for remaining site area.	V01: Tracked drill rigs instead of trackless drill rigs. New technology drill rigs (smaller) instead of standard drill rigs (larger). V02: Utilization of advanced directional and wedge drilling techniques to drill several holes per site instead of expanding the drill site and moving the rig. SQUID geophysics will be used for more focused drilling. V03: Use scaffolding for all equipment, except rigs. Mesh instead of a solid cover. Metal frames for equipment storage. Rubber mats for remaining site area	Standard vehicles will be used on roads. Road construction will not make use of any machinery.



Evaluation Criteria	Sumps	Water supply	Laydown areas	Drill sites	Roads
<b>(e) the operational aspects of the activity; and</b>	Drying and removal of sludge from site VS immediate wet sludge removal.  Concurrent wet sludge removal will be done.	Standard acceptable operating procedures will be applied.	Standard acceptable operating procedures will be applied.	Drilling and concurrent rehabilitation instead of drilling and post drilling rehabilitation.  Night and day drilling instead of only day drilling to minimize the amount of equipment and people on-site at any given time. This will also shorten the drilling period.	Standard acceptable operating procedures will be applied.
<b>(f) The option of not implementing the activity</b>	<p>V01: The No-go Option was applicable where the no-go biodiversity and heritage areas were impacted. Any new drill sites are considered no go unless a biodiversity offset is secured according to the Biodiversity offset report.</p> <p>V02: The No-go Option were applicable, albeit for a smaller area where the no-go biodiversity and heritage areas were impacted. Any new drill sites are considered no go unless a biodiversity offset is secured according to the Biodiversity offset report.</p> <p>V03: The No-go Option is not applicable. No biodiversity offset is required for the new proposed drill plan. The impact footprint has been reduced by over 60%. Only one drill site is planned as a new site in undisturbed Aggeneys Gravel Vygie veldt.</p>				

**i. Details of the Public Participation Process Followed**

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or the use of their land)

The scope of the zone of influence of the project is limited to the property as held by Black Mountain Mine (Pty) Ltd. The socio-economic and stakeholder setting is tabled below.

**Table 16: Project overview - zone of influence**

<b>Project Overview - Zone of Influence</b>	
<b>Formal land-use zonation</b>	Mining
<b>Current land use</b>	Mining
<b>Existing Land Users</b>	Black Mountain Mining (Pty) Ltd
<b>Adjacent land users</b>	Farm Gams 60, Portion 4: Black Mountain Mining (Pty) Ltd Farm Achab 59: Black Mountain Mining (Pty) Ltd Farm Bloemhoek 61, Remaining extend: Albertus Roux Farm Kykgat 87, Portion 1: Tertius Visser Farm Bloemhoek 61, Portion 1: Black Mountain Mining (Pty) Ltd Farm Aroams 57, Remaining extend: Black Mountain Mining (Pty) Ltd
<b>Main stakeholder groups</b>	Adjacent landowners Local and District Municipalities Authorities: DWS, DENC, SAHRA, Land Affairs, DMR
<b>Main organized forums</b>	Farmers Union Succulent Society of South Africa (SSSA) Succulent Karoo Ecosystem Programme (SKEP)  Endangered Wildlife Trust (EWT)  Birdlife South Africa
<b>Significant receptors</b>	Aggeney's community & adjacent landowners

<b>Main Government commenting authorities</b>	
1	Department of Environment, Forestry and Fisheries
2	Department of Water Affairs
3	Department of Land Affairs
<b>Authorizing and competent authorities</b>	
1	Department of Mineral Resources
2	South African Heritage Resources Association

The diagram below sets out the approach for the engagement process for the proposed Gamsberg East and South Prospecting project. The detailed stakeholder engagement report is attached as Appendix E of this report.



**Figure 9: Public participation approach**

## 4.2. Summary of issues raised by I & Aps

Complete the table summarizing comments and issues raised, and reaction to those responses.

**Comments and issues received from Interested and Affected Parties since the commencement of DBARV03 (10 July 2020) are provided in the table below. Comments and issues received during the DBARV01 and DBARV02 process are captured within the FBAR submitted on 06 August 2018.**

**Table 17: Issues raised by stakeholders**

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
Mrs. Tania Anderson	Private	14/07/2020	<p>1. Can I get details of the biodiversity offset agreement and the list of endemic species to be included in the offset properties? I'd like to see a copy of the offset agreement.</p> <p>2. More information on progress with the biodiversity offset. How many properties with endemic species have been purchased to date and declared protected areas? Do they have a Biodiversity Management Plan/conservation management plan and are they being managed effectively according to the plans?</p> <p>3. Can I get a copy of the 2019 independent auditor's report on the biodiversity offset agreement compliance? Also, a copy of the independent performance audit of the performance of the purchased offset areas?</p> <p>4. Is the farm Gams 60 one of the properties that is included in the offset agreement and meant to be a conservation area and declared a Protected Area? If so, prospecting and future mining will likely reduce the size of this offset area and reduce populations of species of conservation concern, and an additional Protected Area will be needed to offset losses on Gams 60.</p> <p>5. I assume the updated search, rescue and protection plan and specific EA conditions will be included in the amended EMP for comment. Please send me a copy of the search, rescue and protection plan to see if all endemics will be successfully protected and to possible suggest mitigation measures.</p> <p>6. Can I get a report/review on the success of previous rescue and protection operations/translocation operations at Gamsberg as well as the survival rate of the rescued species? This will help to assess the effectiveness of this mitigation measure.</p>	14/07/2020 07/10/2020	<p>Thank you for your response regarding the Gamsberg South &amp; East Environmental Authorization Application. We acknowledge your correspondence and look forward to your continued correspondence and input. Melissa Lewis has been added to the stakeholder list accordingly.</p> <p>A formal response regarding your concerns will be communicated to you soonest.</p>	Concerns addressed. Response letter available on request

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
Rene de Kock	SANRAL	13/07/2020	Thank you for your email. In future, please forward all Environmental correspondence to Nicole Abrahams at abrahamsn@nra.co.za for comment. Please remove my name of your database.	14/07/2020	Removed from the database, Nicole Abrahams already consulted.	Resolved
Ina Basson	Pella Community	13/07/2020	Good day, Mem as the community of Pella and landowners have a problem, we as the community want them to attend a community meeting in pure Afrikaans so that we know what they want to do on our land please because that mine's don't complied to us.	14/07/2020	Added to stakeholder list. Assured that future communication can proceed in Afrikaans.	Comments noted. Gamsberg situated on BMM (Pty) Ltd property, located app. 30km from Pella
Natasha Higgitt	SAHRA	13/07/2020	Thank you for the notification. Please upload the documents to the original SAHRIS application and change the status of the case to SUBMITTED.	14/07/2020	Documents will be uploaded as the project proceeds	Continues as the project develops
Andrew Young	German society for "other" succulents - Plant Science	14/07/2020	<p>What are your concerns? -- Environmental impact on the succulent flora of inselbergs and surrounding land.</p> <p>Do you have information regarding the location or environmental features on-site? -- Knowledge of succulent flora, especially threatened species.</p> <p>On which aspects would you require additional information? -- Remediation plans concerning disturbance or removal of flora; plans for nursery care including survival rates.</p>	14/07/2020 07/10/2020	Thank you for your response regarding the Gamsberg South & East Environmental Authorization Application. We acknowledge your correspondence and look forward to your continued correspondence and input. A formal response regarding your concerns will be communicated to you soonest.	Concerns addressed. Response letter available on request

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
Seoka Lekota	Department of Environmental Affairs	15/07/2020	Please note that, the Directorate: Biodiversity Conservation hereby acknowledge receipt of Background Information Document (BID) on the above-mentioned project. However, the Directorate would only be able to comment on the proposed development during the submission of the Amended Environmental Management Plan for review.	20/07/2020	Thank you for your response regarding the Gamsberg South & East Environmental Authorization Application. We acknowledge your correspondence and look forward to your continued correspondence and input.	Continues as the project develops
Melissa Lewis	Birdlife South Africa	23/07/2020	<p>Referral to a letter dated 2 November 2017 from BirdLife South Africa -- Detailed comments.</p> <p>We look forward to reading and commenting on the amended EMPr Reports. We would like to reiterate several of our key concerns and indicate the aspects in respect of which we require additional information to inform our comments on the forthcoming reports.</p> <p>1. We note that the appeal decision requires that the original biodiversity offset implementation agreement be augmented or replaced, and we trust that the new agreement will be made available to stakeholders and will be referred to for implementation in the EMPr. We remain of the view that the areas identified for offsets should be secured by the applicant and declared as nature reserves or protected environments under the National Environmental Management: Protected Areas Act (Act No. 57 of 2003) before prospecting is authorized to commence. Please could we be provided with information regarding the steps that have thus far been taken to secure these areas and the systems that have been put in place for their management? We also request the most recent environmental audit reports for the existing mining operation, including information on the manner in which offset areas are being managed to compensate for the current mining footprint.</p> <p>2. We have previously raised concerns regarding this project's potential impacts on various threatened and/or range-restricted</p>	28/07/2020 07/10/2020	Thank you for your response regarding the Gamsberg South & East Environmental Authorization Application. We acknowledge your correspondence and look forward to your continued correspondence and input. A formal response regarding your concerns will be communicated to you soonest.	Concerns addressed. Response letter available on request

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
			<p>endemic avian species. We have, in particular, stressed the importance of considering both direct and indirect impacts on the Red Lark (<i>Calendulauda burra</i>), whose preferred habitat type is marginally present within the proposed prospecting area and extensively present in surrounding areas. The habitat of this species is increasingly threatened by renewable energy applications and developments (resulting in a need to consider cumulative impacts) and its very limited range is projected to be under significant threat from climate change within the next 2-3 decades. We, therefore, request to be provided with any avifaunal assessments that have informed the revised EMP, as well as information regarding the measures that the applicant is currently taking to monitor and conserve Red Lark populations in terms of its existing EMP.</p>			
	DENC	07/08/2020	<p>DENC asked for more information on the risk vs quality of the new drill plan and whether any harmful infrastructure will be left on-site or whether it will be necessary to go back to the drill site at a later stage leading to any other future impacts.</p>	07/08/2020	<p>BMM explained the exact process of the adapted plan. Although the amount of drill holes on one site leads to unfavorable angles of drilling, new and approved modelling technology makes the adapted plan possible. BMM reassured DENC that this is an adjustment they are happy to make. It was further explained that the risk of the drill holes collapsing has been taken into account and using the latest technology of directional drilling it is possible to drill at shallow angles. The hole will also be stabilized using environmentally friendly chemicals and cased off as far as possible using a steel casing.</p>	Resolved
	DENC	07/08/2020	<p>DENC also questioned whether the chemicals to be used during the drilling operation will be stated in the DBARV4.</p>	07/08/2020	<p>BMM explained that the drilling contractor is responsible for providing the list of chemicals</p>	Continues as the project develops

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
					to be used, which will then be approved or disapproved by BMM. This will thus only be available once the drilling contractor has been appointed. Drip trays and sheeting will be set up to contain any hazardous chemicals.	
	DENC	07/08/2020	DENC requested information on the location of the drill sites concerning the drainage lines on Gamsberg.	07/08/2020	EndemicVision confirmed that all sites already have WUL authorizations.	Resolved
Mark Botha	Independent Specialist DENC	07/08/2020	Mark Botha noted that a challenging aspect i.t.o. rehabilitation on Gamsberg is to balance the efforts of assessment of impacts on such a micro-scale while keeping an eye on the bigger picture in the region and what will be a sensible portion of impact assessment efforts for an appropriate offset outcome across the full suite of impacts. He also mentioned that it might be better not to link all the impacts such as the smelter and other impacts to this project to avoid additional challenges or appeals in this regard.	07/08/2020	Noted	Continues as the project develops
Elsabe Swart	DENC	07/08/2020	DENC also mentioned that there is a process underway, regarding the renewable energy aspect, with the working group which they call restricted land use areas. Criteria at this point include what is driving the threat in the area that is sensitive or in a CBA up to ecological support areas. Final criteria are not finalized yet. Elsabe Swart noted that she can have a look at the criteria and send it to BMM to incorporate and align which way BMM can go forward. She also noted that she will try to align the criteria so that they don't have to work with several criteria and rather align to the national process where the same process will happen on a provincial level.	07/08/2020	BMM noted that they will have to make sure they align with that criteria as well as in the scope of work for the broader plan and submit as part of the cumulative impact assessment accordingly.	Continues as the project develops
	EndemicVision DENC	07/08/2020	EndemicVision asked for verification on the contact details and correspondence from DENC. EndemicVision corresponded on the 10 <sup>th</sup> of July and the 28 <sup>th</sup> of July 2020 with the following DENC employees: Elsabe Swart, Enrico Oosthuizen, Onwabile Ndzumo, Monnet Grey, Cazlyn Davids, Ralph van der Poll, and Brian	07/08/2020	No acknowledgement was received in this regard. DENC informed that Onwabile Ndzumo is no longer the impact officer in the Namakwa District.	Continues as the project develops



Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
			Fisher. No read responses or acknowledgement of receipts were received from DENC. All other regulatory authorizations have responded to date. EndemicVision asked for confirmation that this correspondence was received		Nanine van Olmen are also no longer part of DENC, the acting director in her place is Mr Given Pieterse. The email details for Mr Given Pieterse were received, which is not working. The contact number is still outstanding. Mrs Elsabe Swart noted that Mr Abe Abrahams should indicate who the responsible person is for the acknowledgement of receipt.	
Peter Cloete	DENC	07/08/2020	Contact details for Mr Aviwe Nyakaza, newly appointed Impact Officer for the Namakwa Region, have been provided by Mr Peter Cloete from DENC for further correspondence regarding the Gamsberg South and East exploration application.	07/08/2020	Added to stakeholder list	Resolved
Elsabe Swart	DENC	11/08/2020	Concerning contingency on a departmental level, Director Abe Abrahams will have to provide guidance. The official recording of receipt of documentation needs to be resolved internally. In my opinion, it must be acknowledged through the Environmental Unit Pr4 as the Offset originates from a former DENC EA issued. For future acknowledgement of receipt, it should be with Pr5 (if the future offset aspects are registered with DEFF as workshopped previously) as offsets will be handed to Pr5 under Protected Areas. From where official receipt acknowledgement is captured for the record, it can be shared with relevant internal units as needed while recording tracking is done as well. Senior Management will have to nominate a Senior Manager to replace Nanine to ensure activities she attended in the past will still be addressed/attended to (coordination, Steering Committee, etc.). If they feel they cannot nominate a person, they should indicate how the interim period will be managed until such time someone is delegated. Central filing of meeting minutes, communications, negotiations, offset agreements, etc. must be resolved internally. I am unclear about how filing and server capacity will be after the merger process has been completed. Also, not clear how these need to be addressed before merger finalization -	11/08/2020	Noted	Continues as the project develops

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
			again guidance from Senior Management is needed on how they would want to handle it.			
	DENC	01/10/2020	Does scaffolding refer to floating lay down areas over the sites?	01/10/2020	Yes, minimizing contact with the ground. Platforms and PVC liners were used in 2010, reducing pollution impacts from hydrocarbons, sludge, and drill chips.	Resolved
	DENC	01/10/2020	Please align terminology across all documents – refer to restoration instead of rehabilitation. If you use rehabilitation, please define what this entails.	01/10/2020	Final report updated to include definitions.	Resolved
	DENC	01/10/2020	Will soil compaction from heavy machinery does not limit rehabilitation potential (with reference to soil chemistry not being a major limiting factor)?	01/10/2020	Compaction does affect rehabilitation potential. Loosening of the soil may be required where drill rigs stood. A detailed restoration plan is however not part of the scope of the offset recalculation but is a recommendation of the report.	Resolved
	DENC	01/10/2020	I presume dust from drilling will be a short-term issue (assuming the drilling takes place over a short time). Also, low dust generation on the gravels. Sustained dust generation from continued blasting activity is probably more of concern. Dust accumulation over years may not remain on the plains themselves but will probably transfer/become embedded in the surrounding soil due to years of build-up. Just to think of... Could affect return to the pre-mine state.	01/10/2020	There are no significant dust impacts from drilling as water regulated drilling will take place. This is also called diamond drilling as appose to percussion drilling. No percussion drilling is planned on the current prospecting plan. Dust impact is a mining impact and affects the plant diversity and vegetation structure. Dust impacts (by personal observation) is evident, specifically in C4 plants on Gamsberg. Dust impacts will increase as darker bedrock	Resolved

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
					material is mined later in the life of mine.	
	DENC	01/10/2020	The plan of the drilling. What is the purpose of the drilling activity? Will the existing drilling layout be sufficient, or will the mine have to go back to drill more later? If the proposed drilling results are positive, what is the vision of the mine going forward?	01/10/2020	<p>The aim is to find the existing orebodies. It is a known fact that there is an existing ore body. The level of confidence of this ore body is inferred, BMM aim to increase this to an indicated ore body. Using the existing knowledge of the orebodies, the proposed prospecting plan will be sufficient to deliver the target, however, if the shape of the orebodies significantly changes, the plan may need to be amended.</p> <p>Based on BMM's current knowledge, no new sites will be required, but if the orebody changes in size and shape due to new drilling, there might be a need for additional sites. This should not be considered a "piecemeal" approach, as BMM are using the knowledge they have at hand for planning, and cannot predict these possible changes in ore morphology</p> <p>Gamsberg is like a sock, the perimeter of the mountain is the edge of the sock, the ore is a sheath fold with Gamsberg North having the one side of the sock and overturn on the eastern side. The quality of ore varies in thickness and</p>	Resolved

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
					<p>concentration in metals. The mineralization only starts at 350meters at Gamsberg East and South. This makes it unpractical to consider open-pit mining on the eastern side.</p> <p>Ore dipping is also amenable to underground mining as appose to open-pit mining. With the current knowledge of the orebodies at Gamsberg East and South, open-pit mining will not be considered, but the possibility of underground mining would be preferred due to the depth and morphology of the respective orebodies.</p>	
	DENC	01/10/2020	How long will it take to publish the DBAR V03?	01/10/2020	The EAP will aim to publish the DBAR V03 within the next week.	Resolved
Natasha Higgitt	SAHRA	15/10/2020	Thank you for the notification. Please upload the documents to the relevant SAHRIS Case application and change the status of the case to SUBMITTED. Please inform me when this has been completed and provide the Case ID number.	15/10/2020	<p>CaseID: 11768</p> <p>The DBARV03 and accompanying documents have been uploaded to the case as requested.</p> <p>Please note that a final comment was issued for this project on 29/05/2018. Since this comment an updated Phase 1 Heritage Impact Assessment was conducted in 2019 and the DBAR have been updated to Version 03.</p>	Resolved

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
Andrew Young	Mesemb Study Group	09/11/2020	<p>Comments from the Mesemb Study Group. We welcome the detailed response letter dated 14/09/2020 from Vedanta Zinc International and recognize the work with Dr. Phillip Desmet and Mark Botha to revise the original proposals in light of the environmental concerns that we originally raised. The assessment report and environmental management plan is a detailed document that provides many reassurances regarding the proposed developments on Gamsberg. In particular we note the substantive revision to the drill plan for the Gamsberg east / south area and the work done to complete the baseline assessment of flora, transplantation plants etc. Together the mitigation measures proposed should help reduce the impact on indigenous flora, including threatened endemics, when compared to the original plans. We would like to highlight the following points that we believe are important to consider:</p> <ol style="list-style-type: none"> <li>1. Training of staff who will be working in / adjacent to (i.e. acting as a buffer zone) sensitive areas is of critical importance. Given the highly cryptic nature of some of the flora (meaning that they are very easily overlooked, even by experts), anyone working in the area should ideally have training in the field' rather than 'in the classroom' (it is not clear what is proposed).</li> <li>2. In addition to the measures being taken on-site to reduce the adverse impact of the mining activities, the importance of ex-situ conservation cannot be overstated. We therefore welcome the revised plans for the upgrade of facilities and the management plans for the nursery including the training of nursery staff. Whilst we understand that monitoring sheets are 'available' we would like to see regular updates from the nursery (number of specimens for each species, survival rates, propagation etc.) published online (ideally) as an example of best practice and openness. Have all the nursery infrastructure improvements been made on-time (September 2020), as stated in the response letter?</li> <li>3. The remediation of the site(s) is an important element of the revised application. The involvement of specialists in the development of the SRT protocol (V02) is a positive development. Similarly, the role of SANBI (Karoo Gardens) in</li> </ol>	09/11/2020 20/11/2020	<p>Thank you for your response regarding the Gamsberg South &amp; East Environmental Authorization Application. We acknowledge your correspondence. A formal response regarding your concerns will be communicated to you soonest.</p>	Concerns addressed. Response letter available on request

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
			<p>both seed collection and grow-on of donated plants is recognized as an important and positive step. We also welcome the proposed rehabilitation of those areas which have been negatively impacted by historical activities.</p> <p>4. Post-rehabilitation monitoring is planned for several points over at least a 10-year period. However, drone monitoring alone will not be sensitive enough to monitor the (re)establishment on much of the threatened and sensitive flora found on the Gamsberg which can be very cryptic. In addition, the timing of any such monitoring of the flora is critical. On-site (not remote) assessment of the flora therefore needs to be carried out by experts (or properly trained personnel), especially in the first few years following site remediation measures. Who will perform the monitoring and will the results be made available to interested parties., ideally after each assessment takes place? This will help ensure compliance, identify 'technical' issues arising and ultimately the identification of best practice.</p>			
Gerhard Visser	Pofadder Farmers Union	10/11/2020	<p>The following issues need to be address and need to be part of the EMPR. Security in the surrounding communities need to be urgently be installed due to influx of foreigners to the area. The increased water needed for this development can under no circumstance interfere with Vedanta's responsibility to supply the neighboring farmers with water should the mining activities on Gamsberg affect the underground water levels. As per Impact Management Agreement (2013) between the neighboring farmers and BMM. Our supply takes first priority.</p>	11/11/2020 20/11/2020	<p>Thank you for your response regarding the Gamsberg South &amp; East Environmental Authorization Application. We acknowledge your correspondence. A formal response regarding your concerns will be communicated to you soonest.</p>	<p>Concerns addressed. Response letter available on request</p>
Natasha Higgitt	SAHRA	12/11/2020	<p>A final comment has been issued to CaseID: 11768 The DBAR notes no-go heritage areas (SG1, SG4-SG7) and that the impact remains consistent for this third layout (V03) with the initial layout (V01) assessed in 2018 and 2019 as stated on page 63 of the report. Conditions provided in the second version of the layout (V02) are to be included in V03 of the layout as shown in Appendix I page 2 and 3. The 2019 report had not yet been submitted for comment and will be discussed below: Rossouw, L. 2019. Phase 1 Heritage Impact Assessment for the proposed exploratory drill holes on</p>	20/11/2020	<p>Thank you for your continued correspondence and assistance in this project. All conditions from the final comment will be included in the FBAR (V03)</p>	<p>Response letter available on request</p>

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
			<p>the Gamsberg inselberg on Portion 1 of the farms Gams 60, Khai-Ma Local Municipality, NC Province. Weathered Stone Age artefacts were identified at the drill site localities, all of low significance. The previously discussed "Inkruip" Bushman Massacre site was discussed in this report, noting that it is located 2.5 km from the closest drill site in the basin and 1.8 km from the nearest drill site on the top of the inselberg. Recommendations include the permanent no-go buffer for the Inkruip ravine. The following comments are made as a requirement in terms of section 3(4) of the NEMA Regulations and section 38(8) of the NHRA in the format provided in section 38(4) of the NHRA and must be included in the Final BAR and EMP:</p> <ul style="list-style-type: none"> <li>- 38(4)a - The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit has no objections to the proposed development;</li> <li>- 38(4)b - The recommendations of the specialists are supported and must be adhered to. Further additional specific conditions are provided for the development as follows: <ul style="list-style-type: none"> <li>- A report on the investigation of the final positions of the boreholes and access roads must be conducted by a qualified archaeologist and submitted to SAHRA for review and comment prior to the construction phase. No construction activities may occur without comments from SAHRA;</li> <li>- If the prospecting shows that full scale mining is feasible, a comprehensive study inclusive of relevant stakeholder consultation must be conducted as part of the EA and Mining Right Application process to investigate the Inkruip Massacre site. This is a neglected portion of South Africa's history and must be fully understood before any development may occur;</li> </ul> </li> <li>- 38(4)c(i) - if any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations) fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/ Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1) of the</li> </ul>			

Interested and Affected Parties	Company	Date Comments Received	Comments/ Issues	Date of response	Response	Consultation Status
			<p>NHRA and item 5 of the Schedule;                      - 38(4)c(ii) - if unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/ Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;                      - 38(4)d - See section 51(1) of the NHRA;                      - 38(4)e - The following conditions apply with regards to the appointment of specialists:                          i) if heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resourced prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA;                      - The Final BAR and EMPr must be submitted to SAHRA for record purposed;                      - The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application.</p>			



## 5. Baseline Environment

### 5.1. Type of environment affected by the proposed activity

.....  
*Its current geographical, physical, biological, socio-economic, and cultural character*  
.....

#### 5.1.1 Regional Context

#### 5.1.2 Climatic Context

The proposed Gamsberg East and South Prospecting study area falls within the NW region of Bushmanland. This area is marginal to the winter and summer rainfall zones in the NW Cape Province. Namaqualand to the west is a winter rainfall area where Gordonia to the east is a summer rainfall area. Gamsberg gets more rain in the summer months but gets very little rainfall overall, resulting in the desert condition. Extended droughts are common in the area. Some parts of Bushmanland did not have any rain for 10 years. Rainfall data are collected in Pofadder, approximately 60 km East of Gamsberg, which receives more summer rain and thunderstorms. The average rainfall from 1933 to 1984 was 105 mm with 278 mm being the highest recorded for one year. The average rainfall from 1986 to 2018 was 99 mm with 219 mm being the highest recorded for one year. The average rainfall from 1933 to 2018 was 103 mm with 278 mm being the highest recorded for one year. Moisture from cold fronts in the winter is captured on the southern side of the inselberg.

The temperatures in the Gamsberg area range between -2°C and 45°C, with the mean maximum temperature being 31.4°C in the summer and 17.6°C in the winter and the mean minimum temperature being 20.2°C in the summer and 10.8°C in the winter.

In the summer months, the prevailing wind direction is southerly and in the winter the direction is northerly. A north-westerly wind direction, which precedes rain in the summer months, is least common in the area. Wind velocities of up to 110 km/hr. have been recorded (Gamsberg Zinc Project EIA & EMP Amendment, 2008).

#### 5.1.3 Topography and Geology

Gamsberg is an oval-shaped inselberg about 5km wide and 7km long. Its elevation is approximately 220m above ground level and 1150m above mean sea level. The basin in the interior is about 65 m below the rim and drains through a ravine on the eastern side.

Incompetent schists and amphibolite of the Koeris Formation occur on the floor of the basin, while the Pella Formation form the quartzite vertical cliffs and flat plateaus. The exterior of the mountain is dominated by older schists and granitic gneisses. The mineralized layer which hosts sulphides of iron, zinc and leads with a diagnostic capping of gossan striking along a length of 5.3 km along the inner periphery of the basin is contained by the B member of the Gams formation.

#### 5.1.4 Soils, Land Capability and Land Use

The soils of the inselberg are mainly shallow and stony and of the Mispah soil form on the top and slopes of the Mispah, Augrabies and Plooyberg soil forms in the basin. The land capability is indicated as "wilderness" due to the shallow soil and rock in the area according to the Chamber of Mines guidelines (Chamber of Mines of South Africa, 2013). This area has not been used for agriculture and is rather left wild due to the hostile topography.

#### 5.1.5 Vegetation Context

The proposed Gamsberg East and South Prospecting project fall within the Nama Karoo Biome, which is a large, landlocked region within the central plateau of the western half of South Africa, extending into south-eastern Namibia.

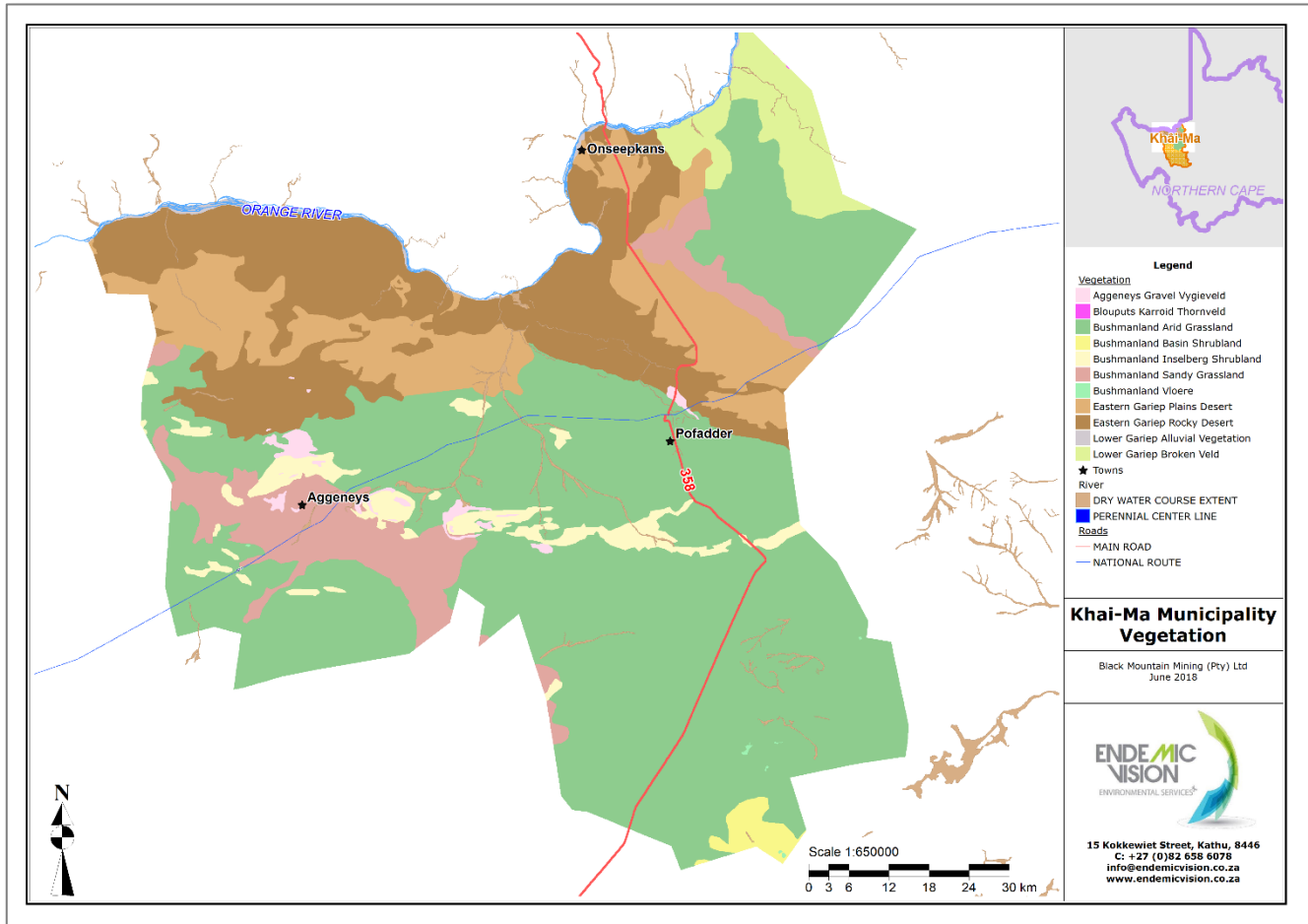
The Nama Karoo Biome predominately consists of extensive plains dominated by dwarf shrubs mixed with grasses, succulents, geophytes and annual forbs. Due to unpredictable rainfall seasonality and frequency and low winter temperatures, leaf succulents are not able to dominate the area. The dominance of perennial grasses is prevented by very dry summer months and dominance or trees are prevented by shallow soils in the area.

The project area falls within SKr 18 Bushmanland Inselberg Shrubland, SKr 19 Aggeney's Gravel Vygge Veld and washes (Appendix D3). Bushmanland lies between the Orange River in the north, Namaqualand in the west, Loeriesfontein in the south and Van Wyksvlei, Verneukpan and the Hartbees River in the east. It is dominated by a sea of sandy plains out of which rise steep, quartzite-capped hills. These ancient, rocky outcrops are known as inselbergs.

On the gravel plains and within the grasslands there are gravel patches with unique microflora, including species such as *Lithops*, *Conophytum*, *Titanopsis*, *Lapidaria*, *Dinteranthus* and *Avonia*. But it is the flat-topped inselbergs that are covered by a particularly rich variety of succulents and geophytes. The isolation of populations has led to species diversification within the dwarf succulent shrublands. The inselbergs are thus important refuge for plants and animals and act as stepping-stones for rock-loving species migrating east-west across the sand-covered plains of Bushmanland.

Succulents (Aizoaceae, Asphodelaceae, Crassulaceae, Didiereaceae, Euphorbiaceae and Zygophyllaceae), non-succulents (mainly Asteraceae) and sparse grassy undergrowth (*Aristida*, *Eragrostis* and *Stipagrostis*) are found on the steep slopes of the inselbergs.

More detailed mapping was undertaken by Desmet in 2013 (Appendix D3) of fine-grained quartz-patch habitat as a result of the proposed exploration which appears to be linked to the presence of a geological anomaly within the quartzite bedrock rock indicating a possible contact zone manifested in a higher degree of fracturing in the parent material. This anomaly resulted in the high density of small quartz pebbles that defines the habitat.

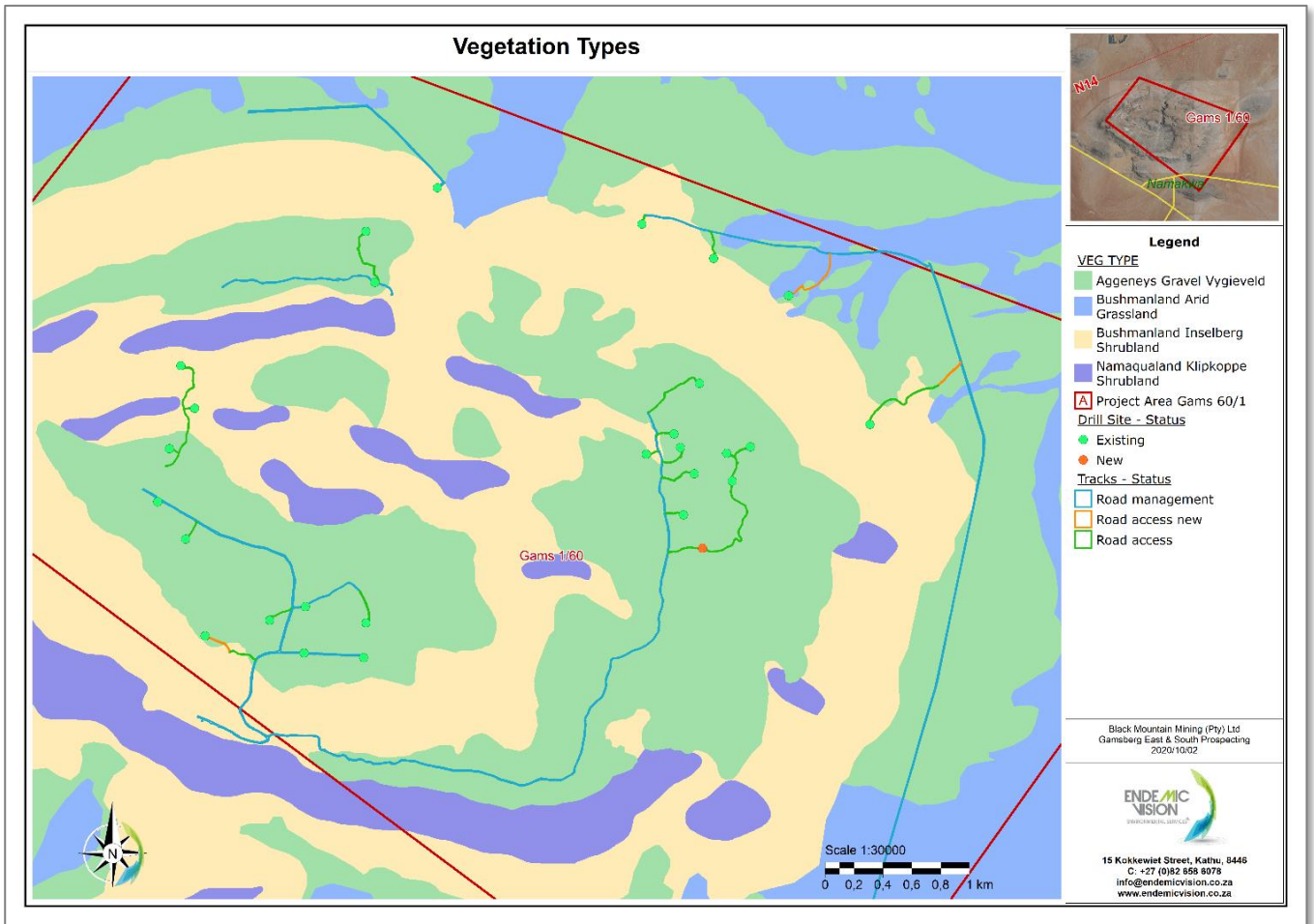


**Figure 10: Vegetation: Topographical map in a municipal context**

The proposed Gamsberg East and South Prospecting study area is in a unique position as a considerable amount of botanical work has previously been done in the study area and regionally. The previous EIA and the Bushmanland Conservation Initiative (BCI) generated amongst other products that are available to this project (Referenced in Appendix D3):

- 📍 A regional context study quantifying the floristic relationships in the region (Desmet, 2000);
- 📍 Regions of Floristic Endemism in Southern Africa (van Wyk, A. and Smith, G. 2001);
- 📍 The succulents of Northern Bushmanland: their distribution and implications for conservation (Desmet 2000);
- 📍 A fine-scale vegetation map of the whole Bushmanland Inselberg Region (BIR) mapping habitat features found on the Gamsberg at a regional scale (Desmet *et al.*, 2005); and
- 📍 Floral specialist study (Desmet, 2013).

**5.1.6 Site-specific Context**



**Figure 11: Fine scale biodiversity areas map for Gamsberg (BCI)**



**Figure 12: Avonia papyracea found in the project area**



**Figure 13: *Aloidendron dichotoma* stands in good condition - Gamsberg South project area**



**Figure 14: *Conophytum ratum* - specialist stone succulent (photo by P. Desmet)**

### 5.1.7 Fauna Context

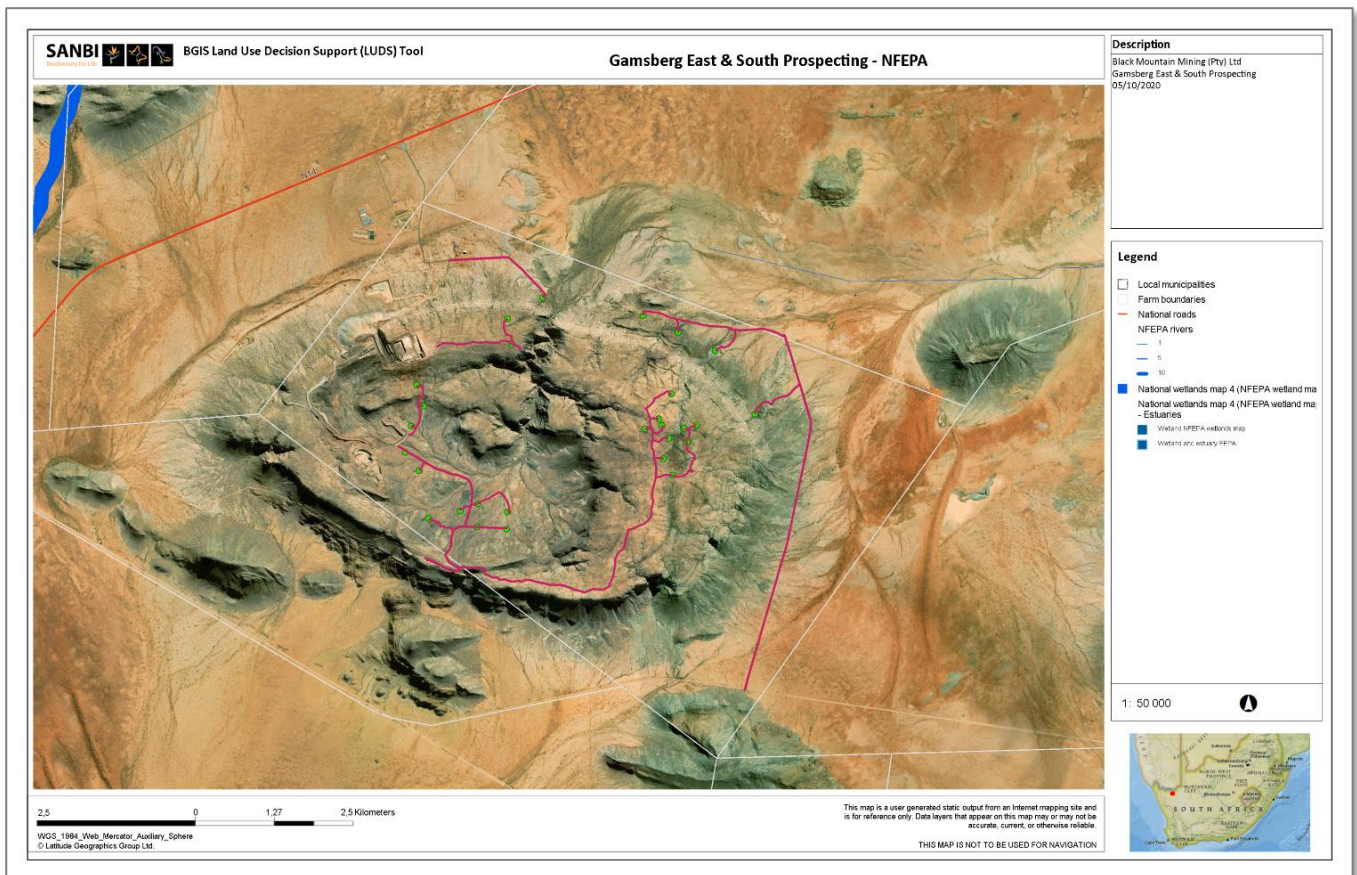
Gamsberg does not support a unique reptile or mammalian fauna. A unique ecosystem is however supported by the drainage through the ravine. The Rubber Frog (*Phrynomantis annectens*), Springbok Stream Frog (*Strongylpus springbokensis*) and Paradise Toad (*Bufo robinsoni*) require spatial protection. Threatened raptor species may also nest on the mountain which will result in these sites to also be protected. Threatened raptor species include the Martial Eagle (*Polemaetus bellicosus*) and Lanner Falcon (*Falco biarmicus*)

### 5.1.8 Hydrology

The depths of groundwater range from 100m below the surface on the inselberg to 60m below the surface on the plains. This results in the flow being towards the plains since the inselberg has a higher water table than the surrounding plains. Several springs are found at the base of the inselberg. The groundwater is a sodium chloride type with high levels of Fluoride F. The water from the springs is only used by the wildlife in the area.

The rainfall patterns, driving the hydrological cycles, indicate a relatively low rainfall of between 100mm and 200mm per year. The rainfall events are erratic and annual rainfall seldom results in river systems flowing. Extreme rain events or a good rainfall year with sufficient follow-up rain could result in the Aggeneys berge catchment flowing out towards the lower-lying plains.

Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA.



**Figure 15: NFEPA map indicating freshwater sources in the Gamsberg area**

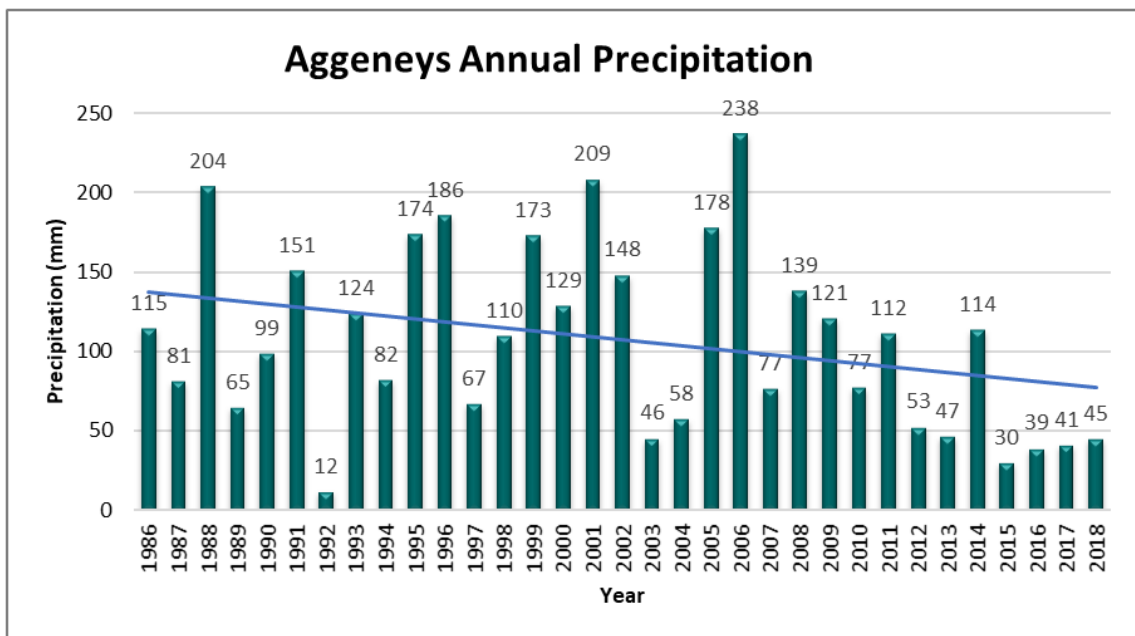
There are some non-perennial rivers in the project area.

In terms of surface hydrology categories by the Department of Water and Sanitation South Africa is divided into several drainage regions.

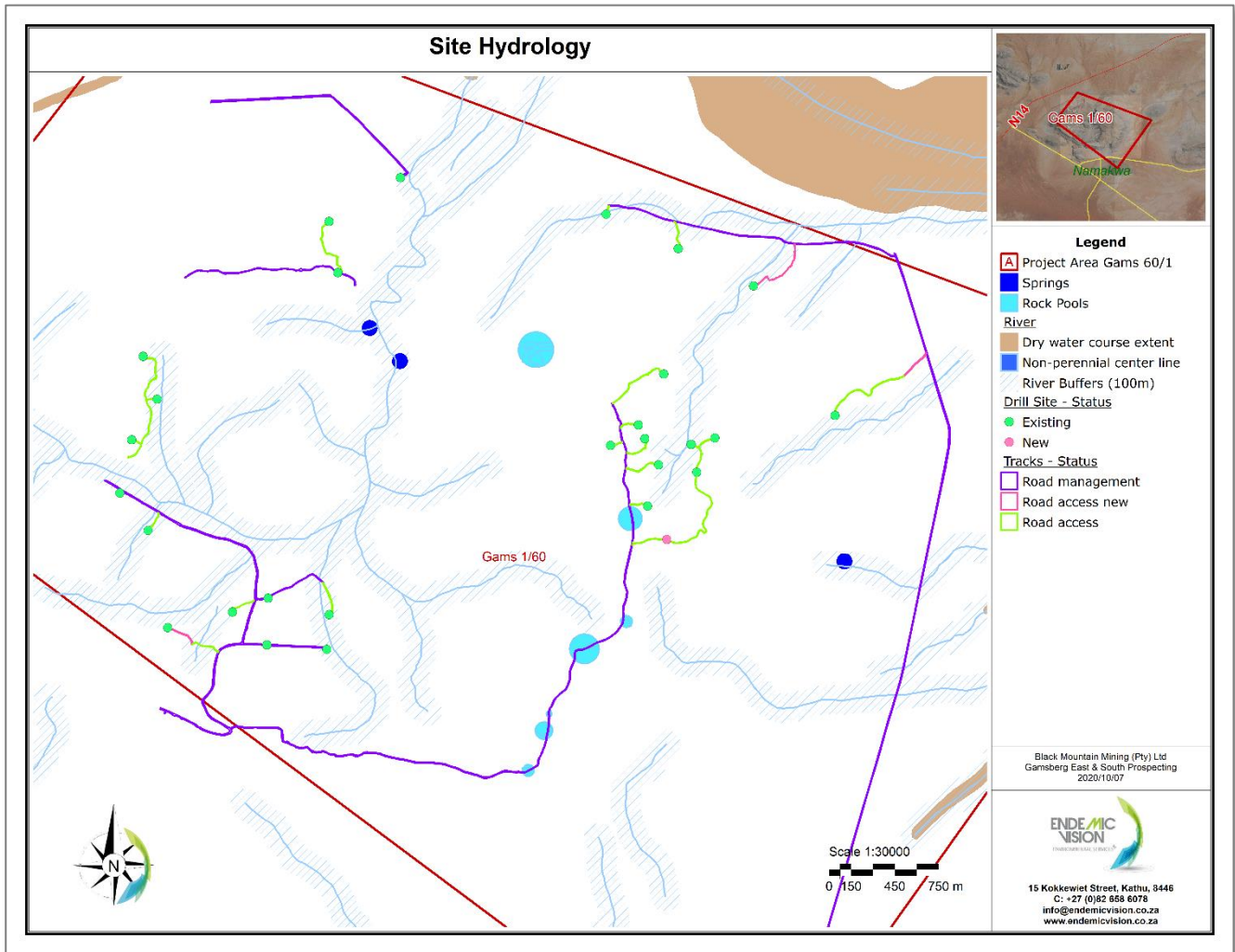
**Table 18: Water balance for the Pella meteorological station**

Month	Precipitation (mm)	Evaporation (mm)	Difference (mm)
January	6.2	550.5	-544.3
February	18.1	452.4	-434.3
March	21.6	418.6	-397
April	18.6	300	-281.4
May	4.5	206.4	-201.9
June	2.9	148.0	-145.1
July	3.7	166.8	-163.1
August	2.8	224.7	-221.9
September	4.2	302.3	-298.1
October	5.7	408.9	-403.2
November	7.9	467.1	-459.2
December	10.1	534.0	-523.9
Mean annual	106.5	4271.0	-4164.5

The data showed in the table above clearly displays the evaporation exceeding the precipitation values for every month of the year.



**Figure 16: Time series rainfall**



**Figure 17: Map indicating surface water in the Gamsberg area**

Indicator habitats, such as pans and headwaters, exist with little understanding on Gamsberg and should be monitoring across the mine site and control sites located within the offset area (Desmet, P. 2013 Botanical Specialist Report).



**Figure 18: Orthomosaic of the natural drainage lines in the project area**

### 5.1.9 Heritage Resources

Minimal work had been undertaken in the region before the project. Cultural Resource Management reports from the surrounding region refer to the Later and Middle Stone Age sites occurring. A rock painting site is described near Black Mountain Mine, while reference was made to a rock engraving seen in the landscape in the 1870s which is yet to be relocated. Stone Age traces can be expected to cluster around particular kind of features in the landscape such as waterholes and springs and the shelter of hills while widely dispersed isolated artefacts might occur. Colonial traces are also expected to be sparse and ephemeral. Farmers were known to practice transhumance or seasonal movement between this region and Namaqualand.

The Southern slope of Gamsberg is richer in sites and seen as more sensitive. Higher sensitivity stems from the possibility of this area being the site of an incident in which a group of San were cornered and shot, part of what historians now characterize as a genocide against the indigenous people of the region. Unfortunately, all previous studies as well as the study conducted in March 2018 for this project, has failed to identify the exact location of this site.

Tangible archaeological or heritage traces are scarce within the inselberg itself and within the basin. This is a generally highly eroded, extremely rocky area resulting in a hostile environment.

### 5.1.10 Socio-economic status

Generations of Bushmanland communities have grown up in the area occasional seeking out work from mission stations and seasonal crop picking in the Upington/ Kakamas area. Education levels in the area were generally low and young children would often leave school to seek out work.

The population for Namakwa District Municipality according to a 2016 Census is approximately 115 488 which is a <1% decrease from 2011. The population density is less than 1 person/square mile.

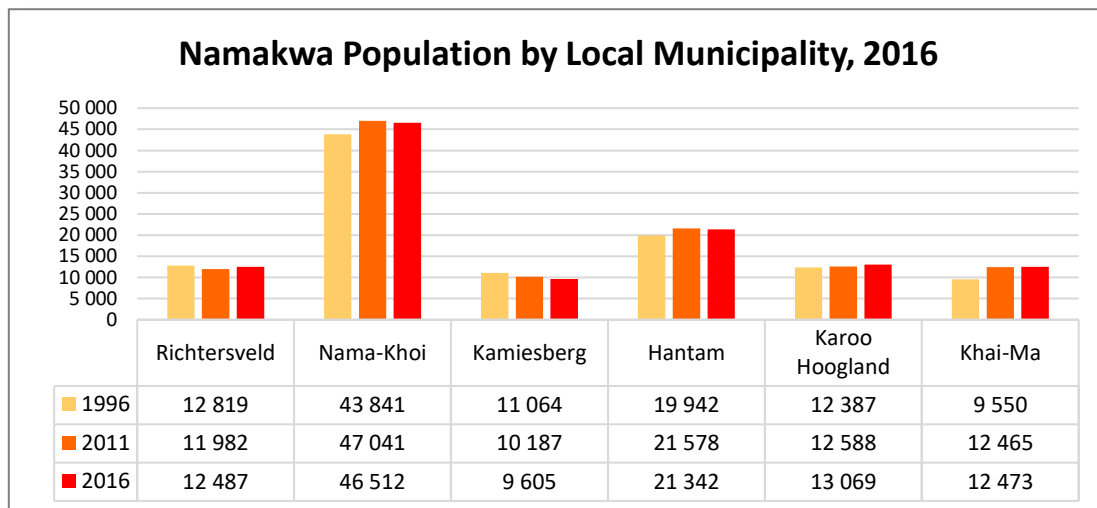


Figure 19: Namakwa population by local municipality 2016

In the Khai-Ma municipality, the largest increase in population can be found which is an increase of more than 20%. The Khai-Ma municipality had a population of approximately 12 473 people according to the 2016 census, which equates to a population density of less than 1 person/square kilometer.

Afrikaans is the language of choice in the area with English and Xhosa are spoken to a lesser extent. The population was limited to a few widely spaced farms before the opening of the mine with Pella and Pofadder being the nearest population centers at the time. There has however been a substantial shift in population totals from rural to urban areas.

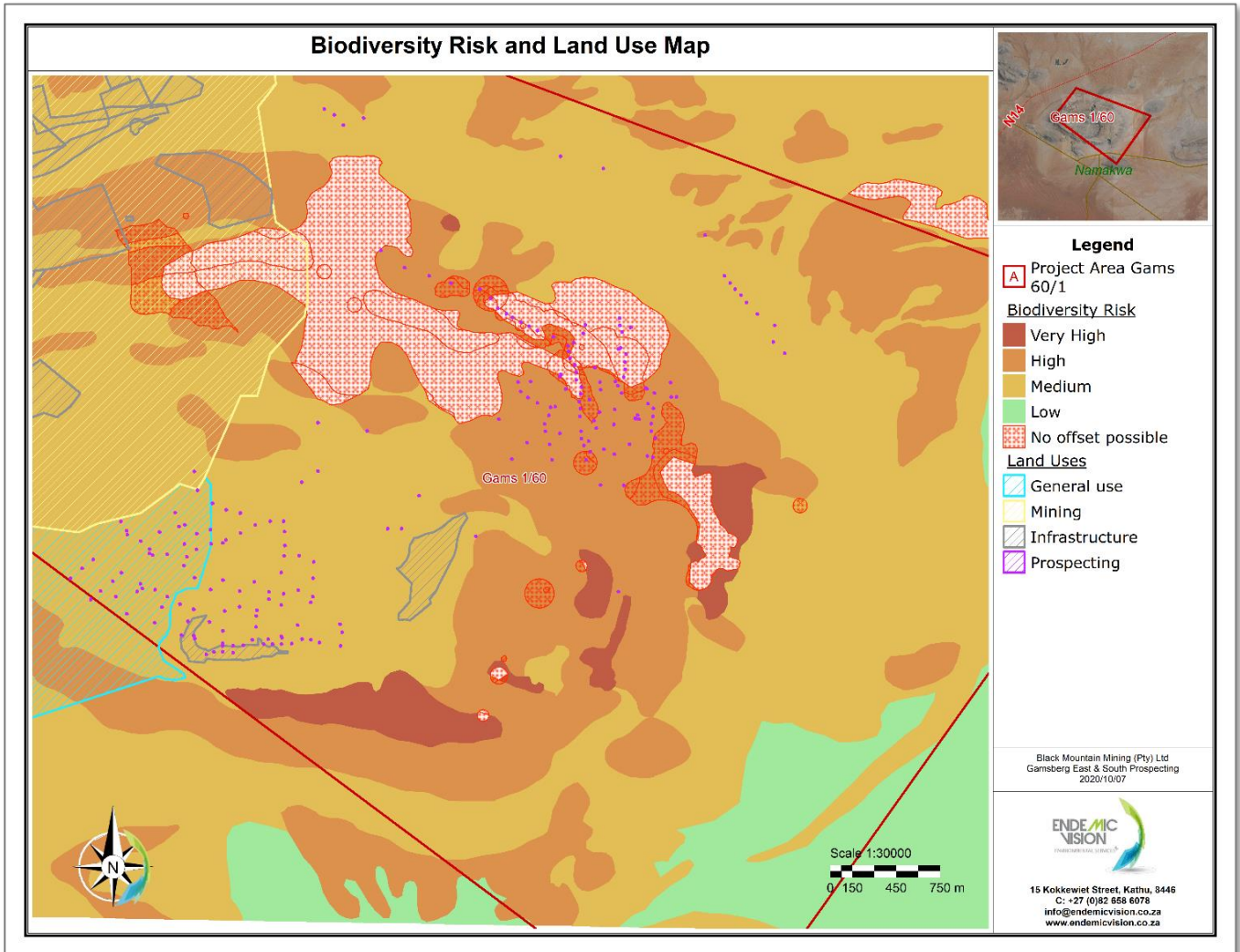
The Khai Ma Municipality has a relatively young population with over 80% of the population younger than 50 years of age. The gender distribution is almost equal, and the majority of the population falls within the Colored ethnic group (>88%).

### 5.1.11 Description of the current land uses

The proposed Gamsberg East and South Prospecting project area is zoned mining with no farming activities taking place and limited free-roaming wildlife utilizing the area. The land use in the application is mining and surrounding area is grazing (sheep, cattle and goats). There is evidence of historic bulk sampling and prospecting activities.

The area demarcated for prospecting is currently part of set aside area for Gamsberg Zinc Mine and considered as conservation land use in terms of the BMM Biodiversity Management Plan.





**Figure 20: BMM biodiversity risk and land use map**

**5.1.12 Description of specific environmental features and infrastructure on the site**



**Figure 21: Existing management tracks on Gamsberg**



**Figure 22: Existing single-track take-off roads from historic drilling on South Gamsberg**



**Figure 23: Evidence of previously impacted areas as a result of prospecting (not rehabilitated)**



**Figure 24: Evidence of previously impacted areas as a result of prospecting (rehabilitated)**



**Figure 25: Gamsberg east reference vegetation (No previous impacts)**

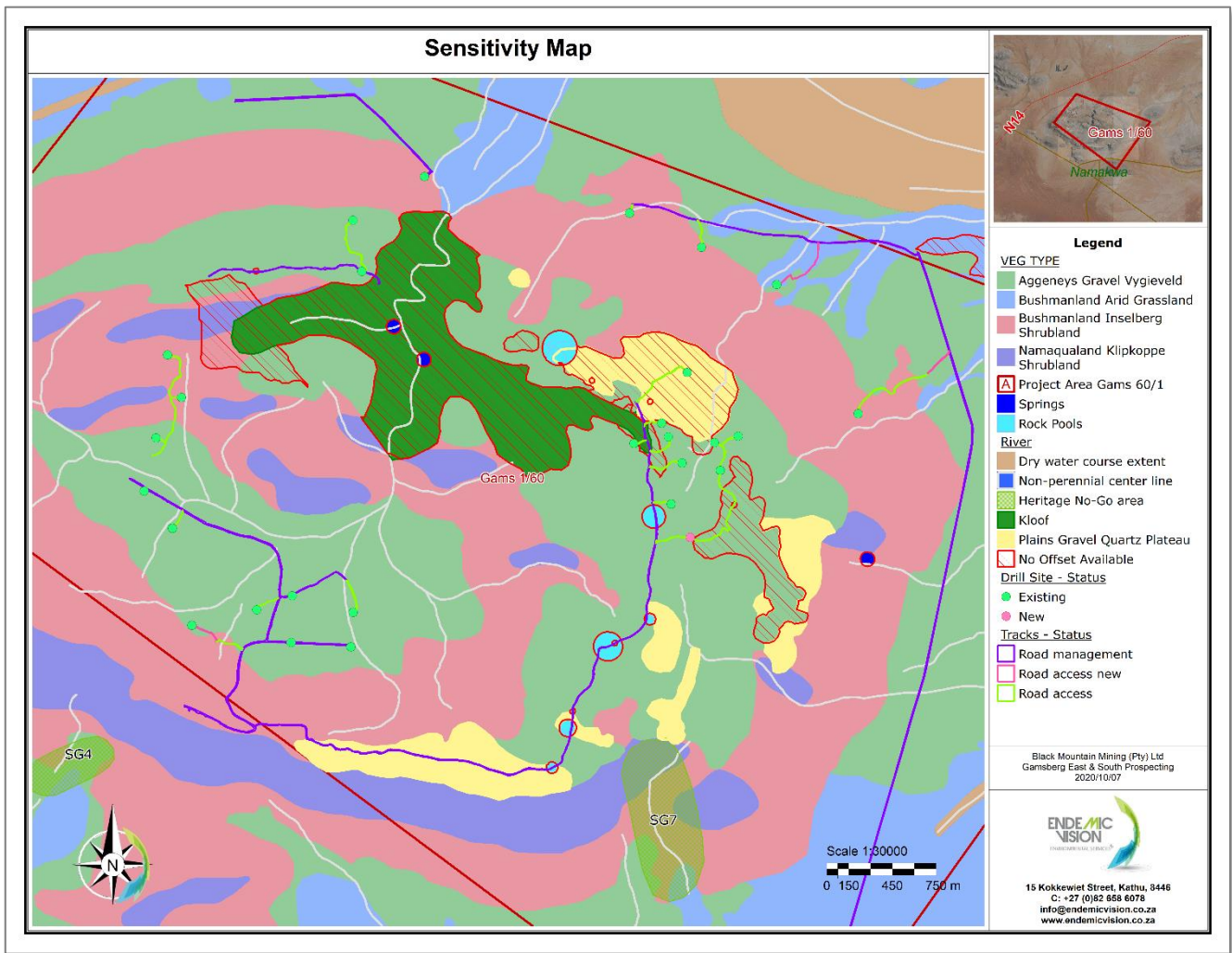


**Figure 26: Gamsberg south reference vegetation (No previous impacts)**

### 5.1.13 Environmental and current land use map

.....  
 Show all environmental and current land use features  
 .....

Please refer to the sensitive habitats map for the site; the Vegetation Types map and the site map (Topo cadastral map) indicating services infrastructure indicating the environmental and land use features associated with the proposed Gamsberg East and South Prospecting area. Below is the ecological sensitivity map supporting the maps mentioned above.



**Figure 27: Ecological sensitivity map**

## 6. Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed

Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated

This section identifies and evaluates the actual and potential environmental consequences associated with the proposed prospecting activity. The potential for mitigation of negative impacts and enhancement of positive impacts to enable sustainable development principles are adhered to.

**Table 19: Summary of impacts according to aspect as applicable to the project lifecycle**

<b>Summary of Impacts Applicable for Assessment</b>	
<b>The following aspects were identified as potentially significant</b>	
<b>Biodiversity Disturbance</b>	Site clearance for new access roads to the drill sites, drill site clearance for drilling during the invasive prospecting phases of the programme; Destruction and/or disturbance of on-site fauna, flora, sensitive species and sensitive areas; and Activities within the watercourse could result in disturbance to the natural geomorphology and safety hazards during rainy periods.
<b>Water Pollution</b>	Hydrocarbon spillage as the main source of groundwater pollution. Surface water - stormwater run-off from exposed areas and drill sludge.
<b>Waste Management</b>	Potential water and soil pollution resulting from improper waste storage and management (drill sludge, hydrocarbon spillage).
<b>Air Emission</b>	Dust emission resulting from site clearing, soil stripping and construction activities (including dust generated by vehicle movement).
<b>Resource Use</b>	Prospecting for the associated minerals; Topsoil - Soil disturbance and compaction and topsoil stockpiling resulting in soil erosion; Surface water (where affected as dirty water runoff); and Potential destruction of heritage resources (if applicable).
<b>Noise / Vibration</b>	Noise as a result of construction, operation and vehicle movement resulting in disturbance of fauna/livestock / wildlife.

## 7. The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks

*Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined to decide the extent to which the initial site layout needs revision*

Standard evaluation methods are applied as defined below.

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives under study for meeting a project need. Assessment of impacts will be based on EIA Regulations (Nema EIA Regulations, 2014). The various environmental impacts and benefits of this project are discussed in terms of impact status, probability, duration, scale/extent and magnitude/severity.

The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrices use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the potential impacts will be determined through a synthesis of the criteria below:

### Impact Status

The nature or status of the impact is determined by the conditions of the environment before construction and operation. A discussion on the nature of the impact will include a description of the cause of the effect, the aspect that will be affected and how it will be affected. The nature of the impact can be described as negative or positive.

**Table 20: Impact of Nature Rating**

RATING	DESCRIPTION	RATING
Positive	A benefit to the receiving environment	(+ve)
Negative	A cost to the receiving environment	(-ve)

### **Probability This describes the likelihood of the impact actually occurring.**

- Improbable:** The possibility of the impact occurring is very low, due to the circumstances, design or experience.
- Probable:** There is a probability that the impact will occur to the extent that provision must be made, therefore.
- Highly Probable:** It is most likely that the impact will occur at some stage of the development.
- Definite:** The impact will take place regardless of any prevention plans, and there can only be relied on mediatory actions or contingency plans to contain the effect.

### **Duration: The lifetime of the impact.**

- Short term:** The impact will either disappear with mitigation or will be mitigated through natural processes in a period shorter than any of the phases.
- Medium-term:** The impact will last up to the end of the phases, whereafter it will be negated.
- Long term:** The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
- Permanent:** Impact that will be non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a period that the impact can be considered transient.

**Scale: The physical and spatial size of the impact**

- Site:** The impacted area extends only as far as the activity, e.g. footprint.
- Local:** The impact could affect the whole or a measurable portion of the above-mentioned properties and adjacent properties.
- Regional:** The impact could affect the area including the neighboring residential areas.

**Magnitude/ Severity: Does the impact destroy the environment or alter its function.**

- Low:** The impact alters the affected environment in such a way that natural processes are not affected.
- Medium:** The affected environment is altered, but functions and processes continue in a modified way.
- High:** Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

**Significance** This is an indication of the **importance of the impact** in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

- Negligible:** The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
- Low:** The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
- Moderate:** The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
- High:** The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The ratings of the identified impacts were undertaken quantitatively as provided from section (vi) above. A risk matrix will be used to determine the significance of the impacts. The magnitude of the impact, the extent of the impact, the reversibility of the impact, the duration of the impact and the probability of the impact occurring were taken into consideration. The assessment has been conducted without implementing any mitigation or management measures and then with the implementation of management and mitigation measures. During the process, a score was determined to divide the significance of the impacts into negligible, low, moderate and high.



The following scale is used to determine the significance score of the impact.

**Table 21: Impact of significance rating**

Aspect	Description	Weight	Significance Rating	Weight	Score Color	
Duration	Short term	1	(Duration, Scale, Magnitude) x Probability	Negligible	Grey	
	Medium-term	3				
	Long term	4				
	Permanent	5				
Scale/Extent	Site	1		Low	<40	Green
	Local	2				
	Regional	3				
Magnitude/Severity	Low	2		Moderate	<60	Orange
	Medium	6				
	High	8				
Probability	Improbable	1		High	>60	Red
	Probable	2				
	Highly probable	4				
	Definite	5				

For the baseline vegetation impact assessment, specialist conducted a high-level desktop assessment to determine the botanical setting in which the Gamsberg East and South project is located. The various resources used to determine the significance and sensitivity of the environmental considerations include:

- 📍 The Gamsberg Database;
- 📍 Geographic Information System maps;
- 📍 SANBI's PRECIS herbarium record database;
- 📍 SANBI's NFEPA maps;
- 📍 Biodiversity Offset specialist report for prospecting;
- 📍 Specialist reports of the 2013 Gamsberg EIA; and
- 📍 Heritage and Paleontological specialist report for prospecting.

Existing botanical knowledge of the site, the detailed botanical assessment of 2013, the biodiversity offset report based on botanical assessment and botanical independent audit report was used to guide the risk assessment. The site visit was undertaken in August and September 2017, March and April 2018 to fill data gaps. Additional infield assessment was conducted by Phil Desmet in August 2020.

For Heritage and Paleontological impact assessments, a high-level desktop study was conducted to determine the environmental setting in which the Gamsberg East and South Prospecting project is located. Extensive research into the SAHRIS database was conducted and historic maps were reviewed. A field assessment was also conducted on the 28<sup>th</sup> of March 2018 and specialist report generated for this assessment.

For the faunal impact assessment, specialist conducted a desktop assessment to establish the species previously recorded within the study area and to determine the species expected to occur in the region. The various resources used include:

- 📍 The International Union for Conservation of Nature (IUCN) Red List; and
- 📍 The Convention on International Trade in Endangered Species (CITES)
- 📍 Specialist fauna report (Ground Truth 2012).

A site visit was conducted in May 2009 and invertebrate surveys were conducted in 2009 and 2012 for the specialist report.

For the offset recalculation assessment (Appendix G) a site assessment was conducted 13, 14 and 17 August 2020. 28 Drill sites were assessed in person by Philip Desmet (botanist), Westley Price (Vedanta exploration geologist) and Neil MacDonald (BMM Environmental Officer). 21 of these sites located within the set-aside areas of the eastern Gamsberg. Drill pad footprint

of 20m x 20m was agreed upon and the layout of new access roads was recorded. A qualitative ecological assessment of each drill pad site and access track was made. Ecological attributes noted included:

- ④ Signs of attempted restoration (e.g. rock packing, erosion control, brush packing, etc.);
- ④ Species present within the footprint area particularly species of conservation concern (Neethling and van Tonder, 2015); and
- ④ Presence of ecological processes (e.g. erosion, fossorial animal activity, ants/termite activity).

The date of the disturbance was recorded for each site. ArcView GIS was used to map the footprint, which was overlain on the fine-scale vegetation map for Bushmanland and the Gamsberg East and South Biodiversity Sensitivity map. These maps were used to assess the relative sensitivity of each drill site and the overall activity impact on biodiversity.

The following direct impacts on plants/habitats/vegetation were considered:

- ④ Loss of habitat as a direct result of prospecting activities and associated infrastructure (Habitat Loss); and
- ④ Reduced ecological functioning (degradation) of affected habitat as a result of prospecting and associated infrastructure due to soil erosion, and the continued self-propagation of this impact into natural areas away from the impact footprint area.

## 8. The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

.....  
*Provide a discussion in terms of the advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties*  
.....

- ④ The potential impact on paleontological resources:
  - ④ A Paleontological Impact Assessment of the proposed Gamsberg East and South Prospecting area has been conducted to identify any paleontological or fossil resources in the subsurface which may be impacted. No particular sensitive areas were identified. It is considered unlikely that significant fossil occurrences will be found due to the sparse and patchy distribution of fossils in the subsurface and the impact intensity is thus considered low for the initial layout (V01) as well as the current layout (V03).
  - ④ The impact of finding fossils or the loss thereof will be permanent and will result in long term cumulative impact which can be both partly negative and partly positive.

- ④ The potential impact on heritage resources:
  - ④ A Heritage Impact Assessment of the proposed Gamsberg East and South Prospecting area has been conducted to identify any cultural, heritage and/or archaeological features which may be impacted on. No indications of any heritage-related structures or artefacts were identified within the study areas. It is not anticipated that any heritage sites will be impacted upon and sub-surface finds are also unlikely.
  - ④ The construction phase and operational activities would result in a low negative impact of medium-term on archaeological resources pre-mitigation. The residual impact will be reduced in significance after mitigation. This impact remains constant for V01 and V03 of the layout.

- ④ Impacts on plants, habitat or vegetation  
Major impacts include habitat loss and sensitive species loss. Impacts were predicted to be significant even with extensive mitigation regarding the initial layout (V01). Impacts are reduced significantly in the current layout (V03). The following possible impacts can result from the prospecting:

- ④ Habitat loss is a direct negative impact resulting from the construction and operational phase. The likelihood of restoring the original ecosystems is low, V03 reduces the impact on irreplaceable habitat significantly;
- ④ Reduced ecological function and habitat degradation due to run-off from a stream or surface flow diversion and dust generation in a low impact considered for this project;
- ④ The impact of dust deposition on habitat and species are considered low for this project;

- ④ Prospecting operations will increase the number of people and may have an impact on vegetation due to collection of flora, litter, and creation of off-road tracks, strict mitigation measures will, however, make this impact insignificant;
  - ④ The spread of alien and invasive species is considered a low impact for this project;
  - ④ Impacts on landscape-level ecological processes by disruption of ecosystem processes and habitat fragmentation, disruption of meta-population processes, reduction of ecological corridor function, and reduction of ecological refuge function must be taken into consideration, this impact is also reduced in V03 due to a smaller impact footprint and reduced road construction;
  - ④ Loss of sensitive populations (e.g., Lithops and *Conophytum*), which show high specificity for niche environments is an important impact which will be reduced significantly with the placement of the current (V03) drill layout plan where irreplaceable habitats will be mostly avoided; and
  - ④ Loss of species variations of unique genetic forms found on Gamsberg is reduced with V03 drill layout plan where the footprint is reduced by more than 60% and habitats with special species are avoided; and
- ④ Loss of vegetation richness, composition and diversity through site clearance and fragmentation, which has a reduced impact in V03 due to scaffolding that will be used to reduce the soil surface impact and reduced impacts on natural / greenfield sites within the new drill plan layout.

The residual impacts include the cumulative reduction of the conservation area and conservation land capability of Gamsberg and other important habitat patches fragmented by drill sites and roads. This could lead to total species richness and diversity decline which cannot be fully mitigated in-situ due to the island effect of inselbergs. Species associated with the fine-grain quartz patches could also be significantly impacted beyond viable population limits. Permanent loss of all-natural habitats impacted can however be avoided by implementing the recommended mitigation measures as stated in DBARV03.

#### ④ **Disturbance of on-site fauna**

The following key impacts are noted:

- ④ Direct loss of fauna and faunal habitat through site clearance and road construction is an impact which is reduced in V03 with a smaller impact footprint;
- ④ Direct loss of fauna due to increased road kills, hunting, trapping, poaching of animals, etc. is considered a low impact for this project since it will take place within the mine boundaries;
- ④ Increased habitat fragmentation is reduced in the V03 layout with the optimal layout of roads and drill sites;
- ④ Disturbance of habitat through unnatural factors such as fires, off-road driving, increased movement of people, etc. are considered a low impact for this project due to strict controls within the mine boundaries;
- ④ Indirect loss of aquatic features and fauna due to groundwater/surface water impacts is reduced with the smaller impact footprint of V03;
- ④ The impact from water contamination and air pollution are considered low for this project; and
- ④ Impacts from increased noise and use of artificial lighting are considered low for this project.

#### ④ **Impacts on communities, individuals or land use nearby**

The following impacts are regarded as community impacts:

- ④ Potential water and soil pollution resulting from deep drilling, hydrocarbon spills and soil erosion which can be reduced through mitigation; and
- ④ Noise due to prospecting activities is considered a low impact for this project.

#### ④ **Water quality and availability**

Limited quantities of hazardous goods (fuel, oil and lubricants) will be stored on site. A diesel bowser will be used for storage of diesel on site for re-fueling. The transportation, handling and storage of such materials may result in spills and further water quality impacts in the event of spills when carried by storm water to the water courses.

100 000 l of water may be used per day for the prospecting activities and use must not exceed the general authorization volume for the area. Water management should be implemented to prevent unnecessary spillage and waste of water. Water will be supplied by Sedibeng Water Board from the Pella drift Orange River Pump Station to Gamsberg Zinc Mine. Water is then piped and delivered via JoJo tank, aqua dams and pipes or watercarts for up to 150 000 liters storage. No groundwater will be extracted for prospecting activities. Water will only be extracted from boreholes for monitoring purposes.





Possible pollution sources include all areas cleared of vegetation. The eroded soil particles may be carried by storm water to watercourses which will result in an increase in the Total Suspended Solids (TSS) and Total Dissolved Solids

(TDS) of the watercourses. The storage of hazardous goods, temporary ablution facilities and discharge of drill fluids may also lead to surface- and groundwater pollution if not managed properly.

#### **Visual impact**

The proposed Gamsberg East and South Prospecting activities is not expected to result in localized visual impacts due to the adjacent open pit mine and locality.

#### **Positive impacts**

-  While no significant short-term positive impacts are expected with the proposed Gamsberg East and South Prospecting activities, in the event that viable mineral reserve is confirmed, and pending the outcome of detailed social and environmental impact assessment processes, a positive socio-economic benefit must be investigated and optimized. Based on existing and historical mining activities which are known from within the larger region it is anticipated that similar conditions will prevail for this proposed Gamsberg East and South Prospecting project;
-  The finding and recovery of fossils could have a positive impact on paleontological resources ranging from regional to international in extent depending the nature of the finds, regarding that mitigation measures are taken to look out for any resources;
-  Rehabilitation of impacted areas that have been impacted and not properly rehabilitated in the past is seen as a positive impact; and
-  Prospecting will mostly be undertaken by contractors, personnel of Black Mountain Mining and specialists but some temporary employment opportunities for local and/regional communities will be available.

## 9. Possible mitigation measures that could be applied and the level of risk

With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered

Please refer to Appendix E (Stakeholder Engagement Report) for full list of all issues raised. The key issues raised, and mitigation measures applied to address each concern are presented below.

- Measures to protect flora are not proven to be effective (appeal decision):
  - The protection of biodiversity is addressed comprehensively in the BAR and EMP;
  - Measures to protect fauna and flora are stipulated in the Fauna (Appendix D4) and Flora Report (Appendix D3);
  - Protected plant species must not be removed unless the necessary permission is granted by the Department of Environment, Forestry and Fisheries (DEFF);
  - All development footprint areas and areas affected by the proposed development must remain as small as possible and must not encroach onto the surrounding sensitive areas and associated buffer zones;
  - All areas with habitat rich and high concentration of flora and fauna should be avoided;
  - V03 drill layout reduced the impact footprint by over 60%;
  - Only one (1) drill pad is planned on the highly sensitive habitat on existing disturbance for V03 of the layout;
  - Only one (1) drill pad is planned on natural / greenfield area in the revised V03 layout; and
  - A platform, including scaffolding and rubber mats, must be used at each drill site to minimize disturbance to the soil surface and limit compaction.
  
- The transplantation of flora may not be effective (appeal decision):
  - To mitigate mortality, certain species will not be transplanted to a nursery, but directly to affected areas in similar habitats and SANBI will assist with seed collection in the field and maintenance and storage of seed;
  - Rescue operation of all listed species suitable for translocation within the development footprint that cannot be avoided should be conducted. Affected individuals should be trans-located to a similar habitat outside the development footprint and marked for monitoring purposes;
  - The Gamsberg Search, Rescue and Transplantation Protocol have been compiled and are submitted for commenting as part of DBARV03;
  - BMM is committed to ensure full implementation of the updated Gamsberg Search, Rescue and Transplantation Protocol;
  - BMM will implement the Nursery Management Plan.
  - Trained nursery staff will assist the Biodiversity Officer and employees during demarcation and identification of threatened and protected species; and
  - The number of species, propagation numbers and survival rates can be made available to public and interested parties.
  
- Offset areas should be determined to be appropriate to species that are endemic to the Gamsberg. The existing offset agreement should be augmented, or a new offset agreement should be entered into between BMM and DENC (appeal decision):
  - The Gamsberg offset recalculation report has been revised and are included as part of DBARV03 (Appendix G);
  - Any new impacts on highly sensitive or irreplaceable habitats have been excluded in the revised drill layout V03;
  - The impact footprint has been reduced by over 60% in the revised drill layout V03;
  - Issues limiting the ability to achieve the biodiversity offset agreement goals, need to be addressed within a broader biodiversity plan for the mine and the region as a whole;
  - Any additional proposed prospecting impacts on the specific habitat features will not easily be offset by simply continuing with the original scope of the Offset. However, it seems crucial to pursue securing the remaining three required properties from the original offset;
  - The completion of the original offset requirements should however be required within a stipulated time period (not more than 3 years) to avoid any doubt about compliance with the original Authorization;

- ④ If the offset is completed with the optimal portfolio of properties, as set out in the Offset Agreement, and a measure (or several measures) to compensate for the impacts which are not possible to offset or additional impacts which have occurred but were not predicted is implemented by DENC and independently audited, then we suggest that no additional offset measures are required for Gamsberg prospecting impacts outlined in version 3;
  - ④ If there is no likelihood of meeting the terms of the original offset agreement, and BMM have demonstrated best endeavors in the manner set out in the agreement, then a new suite of biodiversity outcomes and compensation measures must be set out and agreed upon that considers properties elsewhere within the Bushmanland protected area development zone;
  - ④ To compensate for non-offsetable habitat impacts, a broader approach of securing habitat within Bushmanland protected area development zone should be pursued. Only once all options within this zone have been exhausted should habitats outside this zone be considered; and
  - ④ Currently the set-aside areas have no long-term protection mechanism. When consolidating the 2014 biodiversity offset agreement or as a suspensive RA condition for a future large-scale development at the site, this must be addressed. This could be done through a title deed restriction and servitude in favor of an appropriate conservation authority. The servitude should require prior informed written consent from the holder before BMM can continue with any activity which may result in further biodiversity loss.
- ④ A report on the investigation of the final positions of the new boreholes and new access roads must be conducted by a qualified archaeologist and submitted to SAHRA for review and comment prior to the construction phase (SAHRA final comment on DBARV03):
- ④ A Phase 1 heritage impact assessment report was conducted on 18/07/2019 by Paleo Field Services;
  - ④ Findings from the report stated that there is a low impact on heritage resources and that no further mitigation measures are required, if BMM stays within the current footprint; and
  - ④ The drill layout V03 is presented in this report, with minimal newly impacted areas.
- ④ Training of staff who will be working in/adjacent to sensitive areas is of critical importance. Given the highly cryptic nature of some of the flora, anyone working in the area should ideally have training 'in the field' rather than 'in the classroom' (Mesemb Study Group comment):
- ④ BMM's Biodiversity Officer, with the support and input from external specialists will compile a dedicated training program for BMM and its associated Business Partners' employees who will participate in the execution of the proposed exploration activities;
  - ④ Training will include: classroom training; in-field training; awareness of No-Go Area; and utilization of the onsite nursery for plant identification;
  - ④ The marking and demarcation of threatened and protected species prior and during exploration will be conducted and plants recorded will be marked and demarcated for weekly monitoring and photographic evidence; and
  - ④ All approved drill sites will be physically demarcated using temporary fencing as a constant reminder to all staff as to which areas are approved and which are to be avoided.

### 9.1. Motivation where no alternative sites were considered

Alternatives have been considered in the assessment of alternatives (refer to Part A, section h).

### 9.2. Statement motivating the alternative development location within the overall site

.....  
*Provide a statement motivating the final site layout that is proposed*  
.....

The final layout is presented below.

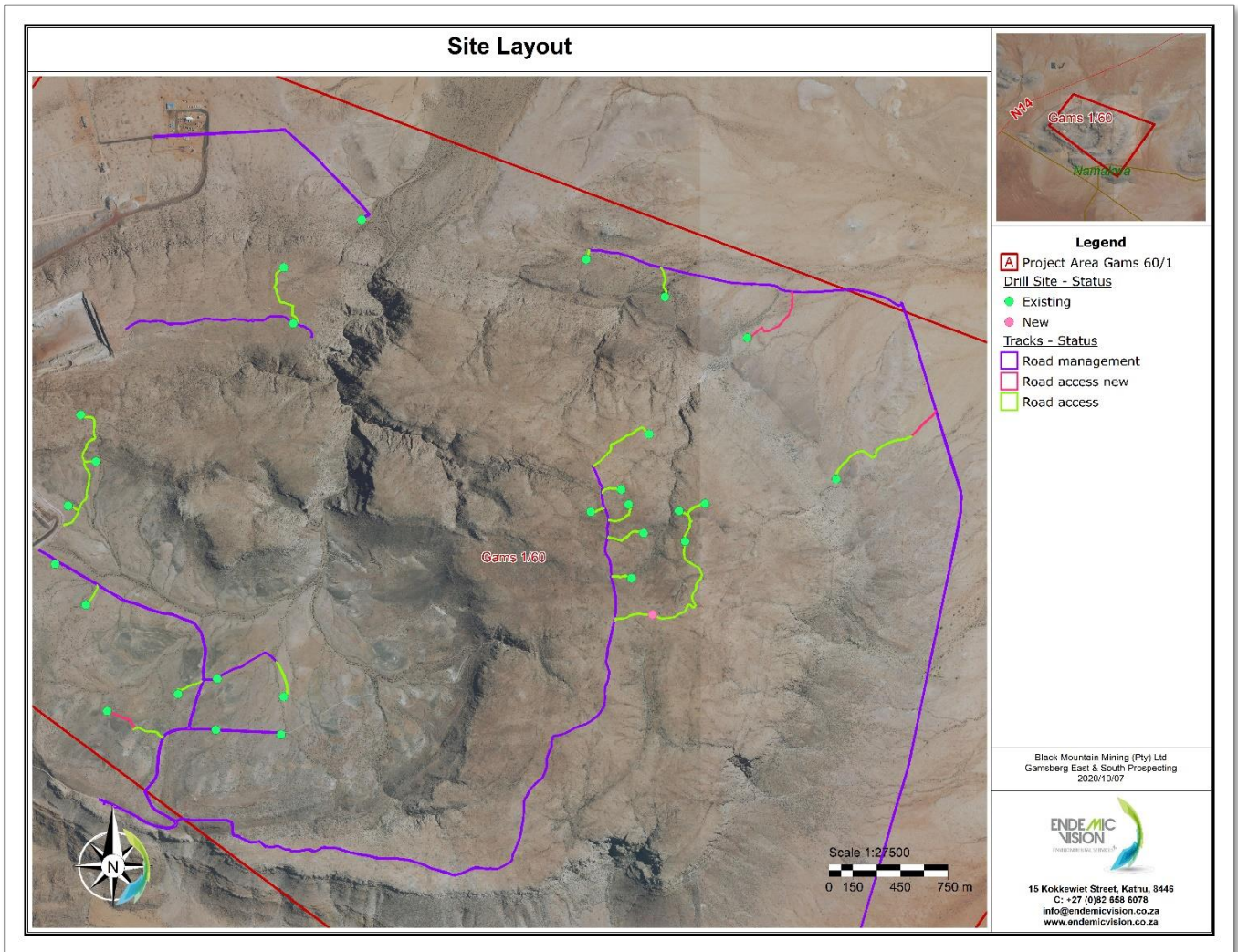


Figure 28: Site layout

### **9.3. Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity**

.....  
*Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures*  
.....

Methodology of all specialist studies are described in full in section (vi).

The ratings of the identified impacts were undertaken in a quantitative manner as provided from section (vi) above. A risk matrix was used to determine the significance of the impacts. The magnitude of the impact, the extent of the impact, the reversibility of the impact, the duration of the impact and the probability of the impact occurring were taken into consideration. The assessment has been conducted without implementing any mitigation or management measures and then with the implementation of management and mitigation measures. During the process, a score was determined to divide the significance of the impacts into negligible, low, moderate and high.

The identification of management measures and impact management objectives were developed to ensure that adverse socio-economic impacts are minimized and socio-economic benefits are maximized. Measures were further defined to avoid, prevent, limit or manage any impacts. Closure objectives were further measured against Section 28 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and Regulation 52(2)(f) of the MPRDA regulations.

A key issue identified was sensitive habitats. The risk map was used to guide geo-spatial decision making where irreplaceable vegetation types and habitat types were affected.

For the offset recalculation report (Appendix G) in field assessments were conducted to identify the best optimized drill layout plan. Planned drill pads and roads were mapped and overlain on the Gamsberg sensitivity map and fine-scale habitat map generated by Phill Desmet. The sensitivity map ranks areas from a low to an irreplaceable sensitivity.



## 9.4. Assessment of each identified potentially significant impact and risk

*This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties*

This section identifies and evaluates the actual and potential environmental consequences associated with the proposed drilling activity. The potential for mitigation of negative impacts and enhancement of positive impacts (DEAT, 2003) to enable sustainable development principles are adhered to.

### Legal Risks

High legal risks are encountered where additional authorizations are required before drilling. Specifically, in terms of pre-construction permits required for provincially protected flora, nationally protected trees, NWA S 21 c&i, regulation 704 and NEMA performance and rehabilitation monitoring obligations.

Many of the pre-construction permissions have been obtained or application submitted. There is however a high risk of transgressing permit conditions. With mitigation measures in place, these risks are reduced to negligible.

**Project Phase:** Plan & Design and Operational

**Table 22: Impact Assessment of activities BEFORE mitigation**

Activity	Impact Description	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Clearing Indigenous Vegetation	Unlawful activity: Impacting protected species without permission	Long term	Site	Medium	Improbable	11
Construction of Roads	Unlawful activity: Affecting a water resource without permission	Long term	Site	High	Improbable	13
Invasive Prospecting: Drilling	Unlawful activity: transgressing regulation 704 specifications	Long term	Site	High	Probable	26
Monitoring	Compliance: transgressions resulting in penalties and fines	Long term	Site	High	Definite	65

## Flora Risks

Flora risks are encountered at protected specimen level, population level, species level and genetic level due to unique genetic characteristics of specimens found on Gamsberg. Functionally, vegetation cover and species composition are altered and must be restored as far as possible. The special species list below has a risk of affecting populations and variations of the species represented on site.

Flora impacts are all high risk impacts due to the high diversity, unique composition and specialized flora communities on Gamsberg, some of the impacts can be reduced with intensive rehabilitation efforts. Specialist stone succulent species, such as *Conophytum ratum*, that only occur in this form on Gamsberg is highly vulnerable to disturbance and the impact is far reaching as these populations represent the regional, and in some cases, global extent of this species variation.

Vegetation cover can be returned to some degree, depending on condition of post-impacted soils, but for specialist species, avoidance is the only true mitigation measure.

### Project Phase: Site Clearance, Operational

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Clearing Indigenous Vegetation	Change in species composition	Direct Negative Moderate	Permanent	Local	High	Definite	<b>75</b>
Clearing Indigenous Vegetation	Loss of vegetation cover	Direct Negative High	Long term	Site	High	Definite	<b>65</b>
Clearing Indigenous Vegetation	Loss of species	Direct Negative High	Long term	Site	High	Definite	<b>65</b>
Clearing Indigenous Vegetation	Loss of populations	Direct Negative High	Long term	Regional	High	Highly Probable	<b>60</b>
Invasive Prospecting: Drilling	Loss of irreplaceable vegetation types	Direct Negative High	Long term	Regional	High	Definite	<b>75</b>
Invasive Prospecting: Drilling	Changes in vegetation composition: Alien species encroachment	Indirect Negative Moderate	Short term	Local	Medium	Probable	<b>18</b>

The following impact statement support the above assessment and is the final assessment in terms of loss of irreplaceable vegetation.

Prospecting activities will result in the loss of natural habitat/populations/individuals and self-propagation/persistence of degradation processes (soil erosion) leading to further loss of habitat/populations/individuals outside of the direct impact area.

Without mitigation, irrespective of the current vegetation status/ecological condition and trend of the activity footprint, the impact of this activity will be high given the exceptional biodiversity context of the site. With avoidance and increased mitigation, the risk can however be reduced to low.

### **Impact Significance:**

- 👇 The activity is located in an area with very high biodiversity sensitivities;
- 👇 However, all sites, but one, are previously impacted by exploration and mining activities; and
- 👇 Based on the field assessment it is unlikely that most sites will revert to a pre-disturbance natural state (equivalent species diversity and vegetation cover) within a 50-year period without further intervention.

**Without mitigation**, irrespective of the current vegetation status/ecological condition and trend of the activity footprint, the impact of this activity will be HIGH given the exceptional biodiversity context of the site.

**With mitigation**, however, if the recommended mitigation measures are successfully implemented especially with regard (1) to minimising impact during drilling (e.g. using scaffolding around the drill rig) and (2) better post impact restoration and abatement of degradation processes, then the medium to long term impact of this activity should be LOW.

### Residual Impact:

- 👇 Permanent loss of all-natural habitats impacted can be avoided by implementing the recommended mitigation measures;
- 👇 With the recommended site management and restoration measures applied even physical impacts of prospecting on the landscape (e.g. Access track “twee spoor”) can be restored within a 50-year timeline;
- 👇 The likelihood of restoring the original ecosystems impacted to a state that is near-natural that includes species of conservation concern, and where self-propagation of degradation process is abated, is HIGH.

## Ecological Risks

Ecological risks relate to habitat fragmentation; changes in ecological processes and restoration potential of the sites and changes in soil functionality on which ecological processes is founded.

Vegetation cover loss relate to human and vehicle traffic that will remove plants even though no bulldozing has taken place.

**Project Phase:** Site Clearance, Construction, Operational

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Invasive Prospecting: Drilling	Ecological system impacts: habitat fragmentation	Direct Negative High	Short term	Local	High	Definite	55
Clearing Indigenous Vegetation	Ecological system impacts: Ecological process & function deterioration/ breakdown	Direct Negative Moderate	Long term	Site	Medium	Definite	55
Construction of Roads	Ecological system impacts: habitat fragmentation	Direct Negative High	Long term	Site	High	Definite	65
Clearing Indigenous Vegetation	Changes in surface water quality runoff	Direct Negative Low	Medium term	Site	Medium	Probable	20
Disturbance: Traffic	Loss of vegetation cover	Direct Negative High	Long term	Site	Medium	Definite	65
Clearing Indigenous Vegetation	Loss of sensitive habitats	Direct Negative High	Long term	Site	High	Definite	65

## Faunal Risks

Faunal disturbances are mainly due to noise, light and traffic. Loss of faunal habitats and possible persecution of protected specimens due to traffic is the greatest risks. All faunal risks can be reduced through mitigation measures to low or insignificant levels.

**Project Phases:** Site Clearance, Construction, Operational

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Disturbance: Noise	Disturbance of fauna engagement patterns	Direct Negative Low	Short term	Site	Medium	Probable	16
Clearing Indigenous Vegetation	Loss of habitats	Indirect Negative Moderate	Medium term	Site	Medium	Definite	50
Disturbance: Light	Disturbance of fauna engagement patterns	Direct Negative Moderate	Long term	Local	Medium	Probable	24
Disturbance: Noise	Disturbance of fauna engagement patterns	Direct Negative Moderate	Long term	Local	Medium	Probable	24
Disturbance: Traffic	Persecution of fauna - road kills	Indirect Negative Moderate	Medium term	Site	Medium	Definite	50

## Heritage Risks

Tangible archaeological or heritage traces are scarce within the inselberg itself and within the basin. Pre-cautionary measures are however still applicable. Risk to heritage resources are low to insignificant.

**Project Phases:** Site Clearance, Operational

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Invasive Prospecting: Drilling	Loss of heritage artefacts or archaeological resources	Direct Negative High	Permanent	Local	High	Probable	30
Invasive Prospecting: Drilling	Loss of paleontological resources	Direct Negative Low	Permanent	Local	Low	Improbable	9

## Land-use Risks

Current land use for the area to be prospected is conservation in terms of the BMM Biodiversity Management Plan and the Biodiversity offset agreement. There is a risk that the area affected will not have conservation land capability after rehabilitation and this should be monitored post drilling.

**Project Phases:** Closure and Post Closure

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Rehabilitation	Change in land use potential	Indirect Negative Low	Permanent	Site	High	Definite	70

## Dust Related Risks

Dust is a major concern in terms of mining on Gamsberg sensitive habitats. Dust risks are however a low risk item in terms of prospecting. There is a minor cumulative impact of prospecting dust adding to the mining dust impacts.

Element: Dust

Project Phase: Operational

**Activity:** Generation of Dust

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Generation of Dust	Changes in air quality - dust	Direct Negative Low	Short term	Site	Low	Definite	20
Generation of Dust	Loss of habitats	Direct Negative High	Long term	Regional	Medium	Improbable	13
Generation of Dust	Social: Health and Safety of individuals on site	Indirect Negative Low	Short term	Site	Medium	Highly Probable	32
Generation of Dust	Changes in air quality - dust	Direct Negative Low	Short term	Site	Low	Definite	20
Generation of Dust	Ecological system impacts: Ecological process & function deterioration/ breakdown	Indirect Negative High	Long term	Site	Medium	Improbable	11
Generation of Dust	Loss of habitats	Direct Negative Moderate	Short term	Local	Medium	Improbable	9
Generation of Dust	Loss of species	Direct Negative High	Permanent	Regional	High	Probable	32

## Noise Risks

Noise is seen as a low risk activity in terms of prospecting. Mining takes place within close proximity and third-party receptors are relatively far from the drill sites.

Project Phases: Operational

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Disturbance: Noise	Disturbance: noise	Direct Negative Low	Short term	Site	Low	Definite	<b>20</b>
Disturbance: Noise	Disturbance: noise	Direct Negative Low	Short term	Site	Low	Definite	<b>20</b>

## Rehabilitation Risks

The risk to rehabilitation is increased costs and unsuccessful rehabilitation because of delayed, poor or unplanned rehabilitation as well as the risk that the end land-use committed to as part of the authorization process is not achieved.

It should be noted that in the case of rehabilitation, the final residual score is a positive rating as rehabilitation completed correctly will result in positive environmental impacts.

**Project Phases:** Site Clearance; Rehabilitation; Monitoring and Closure

Project Phase	Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Site Clearance	Clearing Indigenous Vegetation	Costs: increase in rehabilitation costs	Indirect Negative Moderate	Long term	Site	High	Highly Probable	<b>52</b>
Rehabilitation	Lack of Monitoring	Costs: Increased management costs	Indirect Negative Low	Long term	Site	High	Highly Probable	<b>52</b>
Rehabilitation	Maintenance	Costs: shift in rehabilitation costs	Indirect Positive Moderate	Long term	Site	High	Highly Probable	<b>52</b>
Monitoring	Maintenance	Changes to landscape: transformation	Direct Positive Low	Short term	Site	Medium	Highly Probable	<b>32</b>
Closure	Monitoring	Change in land use potential	Indirect Positive Low	Long term	Site	Medium	Highly Probable	<b>44</b>

## Soil Risks

Changes in topsoil because of structural of soil/ gravel layers as well as organic matter and soil organisms result in cumulative topsoil loss. Compaction will definitely take place and only limited reduction in risk can be achieved through mitigation by limiting future compaction to impacted areas. This will however result in increased loss of soil functionality on these sites. Compaction on these habitats cannot be remedied by means of ripping.

**Project Phases:** Site Clearance; Operational; Rehabilitation

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Generation of hydrocarbon spills	Contamination of Soil - loss of soil function	Direct Negative Moderate	Short term	Site	Medium	Definite	40
Generation of drill sludge	Contamination of Soil - loss of soil function	Direct Negative Moderate	Short term	Site	Medium	Definite	40
Invasive Prospecting: Drilling	Changes in soil functionality: compaction	Direct Negative High	Long term	Site	High	Definite	65
Disturbance: Traffic	Changes in soil functionality: compaction	Direct Negative High	Long term	Site	High	Definite	65
Disturbance: Traffic	Changes in soil functionality: loss of topsoil	Direct Negative High	Long term	Site	High	Definite	65

## Geohydrology Risks

The risk of ground water quality is negative when drilling takes place, but positive when monitoring and maintenance of ground water is done directly after drilling until ground water quality is restored.

**Project Phases:** Operational; Monitoring and Closure

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Invasive Prospecting: Drilling	Changes in ground water quality	Indirect Negative High	Permanent	Regional	Medium	Definite	70
Maintenance	Changes in ground water quality	Indirect Negative Low	Permanent	Regional	Medium	Probable	28

## Hydrology Risks

Surface water risks are moderate to low. With mitigation measures these risks are reduced to low.

**Project Phases:** Site Clearance; Construction; Operational; Rehabilitation and Closure



Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Construction of Roads	Changes in surface hydrological patterns and processes	Indirect Negative High	Permanent	Site	Medium	Definite	60
Clearing Indigenous Vegetation	Changes in surface hydrological patterns and processes	Direct Negative Low	Long term	Site	Low	Probable	14
Disturbance: Traffic	Changes in surface hydrological patterns and processes	Direct Negative Low	Short term	Site	Low	Probable	8
Construction of Roads	Changes in surface hydrological patterns and processes	Direct Negative Low	Long term	Site	Low	Highly Probable	28
Generation of hydrocarbon spills	Changes in surface water quality runoff	Indirect Negative Low	Long term	Site	Medium	Definite	55
Invasive Prospecting: Drilling	Changes in surface water quality runoff	Direct Negative Low	Medium term	Site	Low	Highly Probable	24

## Waste Risks

Waste risks consider the accumulation and management of waste and littering while prospecting. BMM has standard procedures and facilities to manage waste and the risk is considered insignificant.

Project Phases: Operational

Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Generation of Waste	Changes in aesthetical value of the area	Direct Negative Low	Short term	Site	Low	Probable	8

## Health and Safety Risks

Health and Safety risks is not a description of the health and safety requirements as put forth in the mine health and safety act, but rather where human/animal health and safety are jointly affected.

**Project Phases:** Operational, Decommissioning

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Duration	Scale	Severity	Initial Probability	Initial Score Before Mitigation
Health and safety	Operational	Open boreholes may result in injuries	Human and wildlife injuries	Direct Negative Moderate	Short term	Site	Medium	Probable	16
Health and safety	Site clearance	Open boreholes may result in injuries	Human and wildlife injuries	Direct Negative Moderate	Short term	Site	Medium	Probable	16

## 9.5. Summary of specialist reports

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

The specialist studies and recommendations incorporated in the report are indicated in the table below.

**Table 23: Summary of specialist reports**

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations in the EIA report (marked with an x where applicable)	Reference to applicable Report section with specialist recommendations
<p>Paleontological impact assessment (Pether, 2013) (Appendix D1)</p>	<p>Mitigation measures to limit loss of paleontological resources</p> <ul style="list-style-type: none"> <li>➊ All staff must be informed of the need to watch for potential fossil occurrences;</li> <li>➋ Inform staff of procedures to be followed in the event of fossil occurrences;</li> <li>➌ Excavations must be monitored by on-site personnel under the supervision of the Environmental Site Officer (ESO);</li> <li>➍ Liaise on nature of potential finds and appropriate responses;</li> <li>➎ A professional paleontologist must be appointed to respond to queries about any possible or definite fossils found. In the event of a significant fossil find, a paleontologist will supervise the excavation of the fossils and record the contexts. This paleontologist must undertake the recording of the stratigraphy and sedimentary geometry of the exposures, must attempt sampling of the ambient small fossil content and must undertake the compilation of the detailed report; and</li> <li>➏ A permit will have obtained from SAHRA in the event of finds.</li> </ul>	<p>x Recommendations applicable to this project are listed in Appendix I</p>	<p>Baseline Environment: Type of environment affected by the proposed activity. Description of specific environmental features and infrastructure on the site. The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected. Assessment of each identified potentially significant impact and risk Summary of the key findings of the environmental impact assessment.</p>
<p>Heritage Impact Assessment (Gagher, 2018) (Appendix D2)</p>	<p>Mitigation measures to limit loss of heritage and cultural resources</p> <ul style="list-style-type: none"> <li>➊ Once the exact location of the proposed boreholes is available these should be investigated individually by a qualified archaeologist;</li> <li>➋ It is recommended that the development designs take into account the positive and negative characteristics of the existing cultural landscape type;</li> <li>➌ If mining activities are considered, the areas should be submitted to a full Heritage Impact Assessment;</li> <li>➍ Obscured, subterranean sites must be managed, if they are encountered. <ul style="list-style-type: none"> <li>➎ All operators of excavation equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and what procedure to follow;</li> <li>➏ Should any sub-surface remain of heritage sites be identified, all prospecting activities in the immediate vicinity (50m radius) should cease and the heritage practitioner should be informed as soon as possible;</li> <li>➐ In the event of obvious human remains the South African Police Services should be notified;</li> <li>➑ Mitigation measures, such as refilling, should not be attempted;</li> </ul> </li> </ul>	<p>x Recommendations applicable to this project are listed in Appendix I</p>	<p>Baseline Environment: Type of environment affected by the proposed activity. Description of specific environmental features and infrastructure on the site. The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected. The possible mitigation measures that could be applied and the level of risk. Assessment of each identified potentially significant impact and risk. Summary of the key findings of the environmental impact assessment.</p>

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations in the EIA report (marked with an x where applicable)	Reference to applicable Report section with specialist recommendations
	<ul style="list-style-type: none"> <li>📍 The area of the find and a 50m radius thereof should be marked off with hazard tape, placed under guard and public access should be limited; and</li> <li>📍 No media statements should be released until such time as the heritage practitioner has had sufficient time to analyze the finds.</li> <li>📍 It is recommended that the prospecting area be subjected to an updated heritage management plan that focus specifically on the identification and management of these sites (San massacre).</li> </ul>		
<p>Flora Specialist Report (Desmet, 2013) (Appendix D3)</p>	<p>Mitigation measures to limit loss of biodiversity</p> <ul style="list-style-type: none"> <li>📍 Reduce dust emission;</li> <li>📍 Manage surface water quality run-off in the basin; and</li> <li>📍 Protect all known regional populations of species at risk via Biodiversity Offset to buffer species against possible loss of or changes in source populations.</li> </ul> <p>Mitigation measures to limit the spread of alien and invasive species</p> <ul style="list-style-type: none"> <li>📍 All workers must be trained and educated on environmental sensitivities of the site and appropriate behavior especially with regard species introductions.</li> </ul> <p>The following obligations for monitoring and conservation carried by the mine are noted and incorporated by Black Mountain Mining (Pty) Ltd environmental management team.</p> <ul style="list-style-type: none"> <li>📍 An Alien Plant and Animal Monitoring and Control program is incorporated in Black Mountain Mining (Pty) Ltd management.</li> </ul> <p>Additional mitigation measures to consider</p> <p>No-go areas should be clearly demarcated on the ground and on mine plans. Development of a detailed biodiversity management plan to ensure that the proposed avoidance and mitigation measures associated with construction are effectively implemented (incorporated by the Black Mountain Mine Environmental Management team)</p> <ul style="list-style-type: none"> <li>📍 Consider location of watercourses and avoid in the siting of prospecting infrastructure;</li> <li>📍 Avoid constraining the movement of biodiversity on the prospecting site through ecologically sensitive mine design and architecture; and</li> <li>📍 It is recommended that a biodiversity offset be developed for those habitats where the proposed impacts are significant.</li> </ul>	<p>x Recommendations applicable to this project are listed in Appendix I</p>	<p>Baseline Environment: Type of environment affected by the proposed activity. Description of specific environmental features and infrastructure on the site. The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected. The possible mitigation measures that could be applied and the level of risk. Assessment of each identified potentially significant impact and risk. Summary of the key findings of the environmental impact assessment.</p>
<p>Fauna Specialist Report (Ground Truth, 2013) (Appendix D4)</p>	<p>Measures to manage the potential disturbance of on-site fauna.</p> <ul style="list-style-type: none"> <li>📍 The footprint should be reduced as far as possible;</li> <li>📍 Sensitive areas, i.e. aquatic systems and habitats supporting key faunal species should be avoided;</li> <li>📍 All disturbed areas must be rehabilitated during all phases of the project to reinstate natural habitat. If applicable, a rehabilitation plan should be designed by an appropriate specialist which includes erosion control structures and revegetation measures with indigenous species only;</li> <li>📍 Personnel and contractors must be prohibited from having domestic dogs and cats on the premises. A feral dog and cat control programme must be implemented where monitoring indicates any presence of domestic animals on site;</li> </ul>	<p>x Recommendations applicable to this project are listed in Appendix I</p>	<p>Baseline Environment: Type of environment affected by the proposed activity. Description of specific environmental features and infrastructure on the site. The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected. The possible mitigation measures that could be applied and the level of risk.</p>

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations in the EIA report (marked with an x where applicable)	Reference to applicable Report section with specialist recommendations
	<ul style="list-style-type: none"> <li>➡ The movement of people and vehicles must be restricted and controlled, and areas should be clearly demarcated;</li> <li>➡ Speed limits must be implemented and enforced;</li> <li>➡ Maintain roads and implement dust control measures as far as practical on management roads;</li> <li>➡ Light pollution must be kept to a minimum so as to not interfere with insect life cycles and nocturnal vertebrates as far as safety does not decrease. Low pressure sodium vapor lights/ LED lights with wavelengths of limited attractiveness to insects, facing inwards to the mine, are recommended;</li> <li>➡ Drill holes must be temporarily plugged directly after drilling to fulfil access and safety requirements;</li> <li>➡ Once drilling is completed permanent capping must be installed that will fulfil the departmental requirements for access, surface water ingress, safety, stability and monitoring (where applicable);</li> <li>➡ The loss of the sensitive faunal habitats must be avoided (e.g. breeding areas, raptor nests); and</li> <li>➡ A concurrent rehabilitation plan for sites, roads and laydown areas should be in place before drilling commence, implemented concurrently during drilling and monitored for compliance.</li> </ul>		<p>Assessment of each identified potentially significant impact and risk. Summary of the key findings of the environmental impact assessment.</p>
<p>Reassessing the Flora Baseline and Offset Requirement of the Proposed Gamsberg SE Prospecting (Botha &amp; Desmet, 2020) (Appendix G)</p>	<p><b>Required Mitigation Measures</b> As prospecting will occur in the set-aside's of the original offset, it is required to implement additional mitigation measures to ensure that the impacts of the prospecting achieve a low significance rating. Mitigation measures include pre-, during and post-prospecting activities, and cover both the drill sites and access to the drill site areas. These mitigation measures are included as suspensive conditions in the RA.</p> <p><b>Mitigation Measures Addressing Legal Risks</b> 1. Prior to the commencement of the drilling campaign, a Prospecting Environmental Management Guideline document must be drawn-up that collates and includes all existing information and experience relating the minimization, mitigation and management of the environmental aspects of prospecting in sensitive environments on the mine;</p> <ul style="list-style-type: none"> <li>➡ The document must be written by a competent ecologist in collaboration with the mine exploration geologist and environmental manager;</li> <li>➡ The document needs to be reviewed by an independent ecologist before being signed-off by the mine GM and included in the EMPR;</li> <li>➡ Prior to the commencement of prospecting, a signed letter from the drilling contractor to the mine GM needs to acknowledge acceptance of the guideline document and a written undertaking to implement the guidelines;</li> <li>➡ The drilling contractor contract milestones and deliverables need to be conditional to implementation of the guideline document as the blueprint for drilling implementation. Clear and effective sanctions need to be explicit in the contract for transgression of (1) the Prospecting Environmental Management Guideline and (2) the impact footprint as</li> </ul>	<p>x All items to be included</p>	<p>Conditions for inclusion in the EMP.</p>

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations in the EIA report (marked with an x where applicable)	Reference to applicable Report section with specialist recommendations
	<p>defined by this assessment - (Set_aside_Disturbed_footprint_Sept_2020_v1_20200903.shp);</p> <ul style="list-style-type: none"> <li>ⓧ The guideline document needs to be specific as to the roles and responsibilities of all parties involved (mine, contractor, DENC, DMR, etc.) in terms of pre-drilling planning, drilling implementation, site management and inspection, and post drilling management and restoration activities and monitoring;</li> <li>ⓧ The guideline needs to include an implementation monitoring and independent review components that includes:                             <ul style="list-style-type: none"> <li>ⓧ Each drill site needs to be photographed pre-, during and post drilling as a record of the site conditions;</li> <li>ⓧ Sites need to be visited weekly by the mine environmental officer and a weekly report submitted to the mine environmental manager and head geologist that details progress with implementing the Prospecting Environmental Management Guideline, issues arising and how these were addressed; and</li> <li>ⓧ Provision must be made of 6-monthly independent environmental review of prospecting activities and rehabilitation program. Findings of the review need to be submitted to the mine environmental manager and head geologist in writing within 30 days of site visit.</li> </ul> </li> </ul> <p>2. Within 6 months of the commencement of the drilling campaign, a Prospecting Ecological Restoration Manual must be drawn-up that collates and includes all existing information and experience relating the existing restoration at the site, and presents a draft ecological restoration protocol to be implemented by the restoration contractor. This manual will be included as an addendum in the Prospecting Environmental Management Guideline document. What is ecological restoration is defined in Section 8.4;</p> <p>3. The granting of the prospecting permit must be conditional to the implementation of a site-wide restoration program that addresses ALL current and historic prospecting impacts within the Set Aside area of the Gamsberg with the exception of the barite mining in the crater. Thus, the rehabilitation program will address the impacts of this prospecting program as well as previous impacts most particularly persistent degradation processes such as soil erosion. Of high importance is the addressing of continued erosion and the closure and restoration of surplus tracks and removal of historic infrastructure (discarded equipment) and earth works (i.e. re-contouring to remove berms, pits, etc. to restore natural hydrological flows). The restoration program needs to be prioritized in order to focus on persistent degradation processes. It is acknowledged that currently disturbed sites will likely be the preferred candidate sites for future surface infrastructure relating to the pursuit of underground mining on Gamsberg East and South (e.g. ventilation shafts, management roads). Therefore, the restoration plan must make provision for an annual review that takes into account mine planning to assess those sites earmarked for development where restoration management will be adapted to take into account planned infrastructure provided persist degradation process have been abated.</p> <p>Mitigation Measures Addressing Flora Risks</p>		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations in the EIA report (marked with an x where applicable)	Reference to applicable Report section with specialist recommendations
	<p>Prior to prospecting commencement and implementation of the updated Search and Rescue and transplantation plan (EndemicVision 2020) needs to be executed and transplanted to the mine nursery. This will include only species of conservation concern that have re-colonized in previously disturbed areas that are earmarked for this prospect, specifically, <i>Conophytum calculus</i> (Old43 and Old42), <i>Conophytum ratum</i> and <i>Avonia quinaria</i> (Old42). Removal of species with underground storage organs (e.g. bulbs, <i>Tylecodon suffultus</i>) should not be attempted except where the actual drill rig is to be placed. With the use of scaffolding reducing soil surface disturbance and compaction, these species are best conserved in-situ. Transplanting is also not recommended given very low historic success with this activity;</p> <p>5. Recommendations for protocols to be included and elaborated in the management guideline document:</p> <ul style="list-style-type: none"> <li>④ Soil compaction reduces ability of plants to recolonize disturbed sites. Previous drill sites where scaffolding was used show very significant differences in the diversity and density of plants. Therefore, in the set-aside area it is mandatory for all drill sites to use scaffolding around the drill rig and vehicles, no equipment in excess of 50kg may be placed directly on the ground.</li> <li>④ Use existing roads (without further widening) to access sites, and avoid further clearing or bulldozing of tracks;</li> <li>④ Prior to drilling commencing at a site, the mine environmental officer together with the drill site manager need to demarcate drill site footprint and demarcate all access tracks and drill collars with high-visibility (removable) barriers to avoid accidental straying or footprint creep by contractors; and</li> <li>④ In the case where new tracks are being created, the mine environmental officer together with the drill site manager need to walk and demarcate track prior to vehicles accessing the site. Under no circumstances must new tracks be graded or modified in any way other than through the normal vehicle traffic.</li> </ul> <p>Additional mitigation measures:</p> <ul style="list-style-type: none"> <li>④ At site New09, the existing fence that runs parallel to the management track to leading to the site and the borehole pump at the mouth of the kloof needs to be extended along its current trajectory until the edge of the wash that exits the kloof. This fence needs to prevent ad-hoc vehicle traffic from venturing northwards from this road. This fence need only comprise steel droppers with 3-4 wires, but no mesh is required;</li> <li>④ The rehabilitation of the south access route needs to be completed before prospecting commences. This has been discussed at length in previous reports. Road erosion perpetuates unnecessary ecological degradation and is a human safety risk. The recent rain has demonstrated how rapidly erosion can destroy the road and this illustrates the importance of installing cut-off drains at 50m intervals. Prospecting shall not proceed until the road rehabilitation works have been inspected and signed-off in writing by ourselves; and</li> <li>④ Currently the future protection and conservation status of the set-aside areas post mining enjoys no long-term legal security. It is recommended that this be achieved through a title deed restriction and servitude in favor an appropriate conservation authority. Whilst it would be unreasonable to expect the implementation of this as a mitigation requirement for this project, we recommend that the implementation of the</li> </ul>		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations in the EIA report (marked with an x where applicable)	Reference to applicable Report section with specialist recommendations
	<p>title deed restriction and servitude be a mandatory requirement for any future large-scale project being developed by BMM at the site.</p> <p>Mitigation Measures Addressing Rehabilitation Risks The effectiveness of proposed mitigation actions around drill rigs is unclear. The restoration assessment (EndemicVision 2018b) noted that residual impacts still affect recovery potential, including drill sludge residue, soil structure impacts from erosion, inverted soil profiles, and irreversible compaction (not possible to mechanically address in the quartz habitats). Rock packing can be replicated after drilling, but quartz layering cannot be recreated. Additional mitigation measures (elevated perforated staging or platforms) are suggested to contribute to further minimizing impacts.</p> <p>Measures to be taken regarding the Biodiversity Offset This project has highlighted some important over-arching issues limiting the ability to achieve the biodiversity offset agreement goals that need to be addressed within a broader biodiversity plan for the mine and the region as a whole. These include:</p> <ul style="list-style-type: none"> <li>ⓧ Setting the precedent of further impacting a set-aside (regardless of the scale of this impact and the historical errors which created the circumstances) is problematic. This needs to be addressed in frank discussions between the parties, and properly regulated in provincial and national policy;</li> <li>ⓧ There is a growing risk to the implementation of the original offset (not primarily due to actions or omissions by BMM) that is more cause for concern than the scope and scale of impacts on Gamsberg set aside, and it is unclear if DENC will be able to discharge its obligations to manage the offset; and</li> <li>ⓧ The cumulative impacts on the unique biodiversity values of the Bushmanland region from the mine, and all associated infrastructure and developments (let alone the other renewable energy, infrastructure and economic developments) requires serious attention. This is not possible in project level EIAs or disconnected planning or economic development frameworks. As an appropriate legacy, BMM should invest in a regional strategy and implementation plan to secure the biodiversity and ecological processes of Bushmanland. This is currently being addressed by BMM through a broader long-term Biodiversity Strategic Plan.</li> </ul>		

Attach copies of Specialist Reports as appendices, marked **Appendix D1** (Paleontological Impact Assessment Report), **Appendix D2** (Heritage Impact Assessment Report, 2018), **Appendix D3** (Flora Impact Assessment), **Appendix D4** (Fauna Impact Assessment) and **Appendix G** (Reassessing the Flora Baseline and Offset Requirement of the Proposed Gamsberg SE Prospecting).

## 9.6. Environmental impact statement

### 9.6.1 Summary of the key findings of the environmental impact assessment

**Table 24: Summary of Impact Assessment WITH mitigation**

#### Legal Risks

Activity	Impact Description	Final Probability	Final Score Residual
Clearing Indigenous Vegetation	Unlawful activity: Impacting protected species without permission	Improbable	11
Construction of Roads	Unlawful activity: Affecting a water resource without permission	Improbable	13
Invasive Prospecting: Drilling	Unlawful activity: transgressing regulation 704 specifications	Improbable	13
Monitoring	Compliance: transgressions resulting in penalties and fines	Improbable	13

#### Flora Risks

Activity	Impact Description	Final Probability	Final Score Residual
Invasive Prospecting: Drilling	Changes in vegetation composition: Alien species encroachment	Improbable	9
Clearing Indigenous Vegetation	Change in species composition	Probable	30
	Loss of vegetation cover	Probable	26
	Loss of irreplaceable vegetation types	Probable	30
	Loss of species	Probable	26
	Loss of populations	Probable	30



## Ecological Risks

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Ecology	Site Clearance	Invasive Prospecting: Drilling	Ecological system impacts: habitat fragmentation	Direct Negative High	Probable	22
Ecology	Site Clearance	Clearing Indigenous Vegetation	Ecological system impacts: Ecological process & function deterioration/ breakdown	Direct Negative Moderate	Probable	22
Ecology	Site Clearance	Construction of Roads	Ecological system impacts: habitat fragmentation	Direct Negative High	Probable	26
Ecology	Site Clearance	Invasive Prospecting: Drilling	Changes in soil functionality: compaction	Direct Negative High	Highly Probable	52
Ecology	Site Clearance	Disturbance: Traffic	Changes in soil functionality: compaction	Direct Negative High	Highly Probable	52
Ecology	Site Clearance	Clearing Indigenous Vegetation	Changes in surface water quality runoff	Direct Negative Low	Improbable	10
Ecology	Site Clearance	Clearing Indigenous Vegetation	Loss of sensitive habitats	Direct Negative High	Probable	26

## Faunal Risks

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Fauna	Site Clearance	Disturbance: Noise	Disturbance of fauna engagement patterns	Direct Negative Low	Probable	16
Fauna	Site Clearance	Clearing Indigenous Vegetation	Loss of habitats	Indirect Negative Moderate	Probable	20
Fauna	Operational	Disturbance: Light	Disturbance of fauna engagement patterns	Direct Negative Moderate	Improbable	12
Fauna	Operational	Disturbance: Noise	Disturbance of fauna engagement patterns	Direct Negative Moderate	Probable	24
Fauna	Operational	Disturbance: Traffic	Persecution of fauna - road kills	Indirect Negative Moderate	Probable	20

## Heritage Risks

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Heritage	Site Clearance	Invasive Prospecting: Drilling	Loss of heritage artefacts or archaeological resources	Direct Negative High	Improbable	15
Heritage	Site Establishment	Invasive Prospecting: Drilling	Loss of paleontological resources	Direct Negative Low	Improbable	9

## Land-use Risks

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Land use	Closure	Rehabilitation	Change in land use potential	Indirect Negative Low	Probable	28

## Dust Related Risks

Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Generation of Dust	Changes in air quality - dust	Direct Negative Low	Improbable	4
	Loss of habitats	Direct Negative High	Improbable	13
	Social: Health and Safety of individuals on site	Indirect Negative Low	Improbable	8
	Changes in air quality - dust	Direct Negative Low	Probable	8
	Ecological system impacts: Ecological process & function deterioration/ breakdown	Indirect Negative High	Improbable	11
	Loss of habitats	Direct Negative Moderate	Improbable	9
	Loss of species	Direct Negative High	Improbable	16

## Noise Risks

Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Site Clearance	Disturbance: Noise	Disturbance: noise	Direct Negative Low	Definite	20
Operational		Disturbance: noise	Direct Negative Low	Definite	20

## Rehabilitation Risks

It should be noted that in the case of rehabilitation, the final residual score is a positive rating as rehabilitation completed correctly will result in positive environmental impacts.

Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Site Clearance	Clearing Indigenous Vegetation	Costs: increase in rehabilitation costs	Indirect Negative Moderate	Definite	65
Rehabilitation	Lack of Monitoring	Costs: Increased management costs	Indirect Negative Low	Definite	65
Rehabilitation	Maintenance	Costs: shift in rehabilitation costs	Indirect Positive Moderate	Definite	65
Monitoring	Maintenance	Changes to landscape: transformation	Direct Positive Low	Definite	40
Closure	Monitoring	Change in land use potential	Indirect Positive Low	Definite	55

## Soil Risks

Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Invasive Prospecting: Drilling	Changes in soil functionality: compaction	Direct Negative High	Highly Probable	52
Disturbance: Traffic	Changes in soil functionality: compaction	Direct Negative High	Highly Probable	52
Disturbance: Traffic	Changes in soil functionality: loss of topsoil	Direct Negative High	Highly Probable	52
Generation of hydrocarbon spills	Contamination of Soil - loss of soil function	Direct Negative Moderate	Improbable	8
Generation of drill sludge	Contamination of Soil - loss of soil function	Direct Negative Moderate	Improbable	8

## Geohydrology Risks

Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Operational	Invasive Prospecting: Drilling	Changes in ground water quality	Indirect Negative High	Probable	28
Monitoring	Maintenance	Changes in ground water quality	Indirect Negative Low	Definite	70

## Water hydrology Risks

Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Site Clearance	Construction of Roads	Changes in surface hydrological patterns and processes	Indirect Negative High	Improbable	12
Site Clearance	Clearing Indigenous Vegetation	Changes in surface hydrological patterns and processes	Direct Negative Low	Improbable	7
Site Clearance	Disturbance: Traffic	Changes in surface hydrological patterns and processes	Direct Negative Low	Improbable	4
Construction	Construction of Roads	Changes in surface hydrological patterns and processes	Direct Negative Low	Probable	14
Operational	Generation of hydrocarbon spills	Changes in surface water quality runoff	Indirect Negative Low	Improbable	11
Operational	Invasive Prospecting: Drilling	Changes in surface water quality runoff	Direct Negative Low	Improbable	6

## Waste Risks

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Waste	Operational	Generation of Waste	Changes in aesthetical value of the area	Direct Negative Low	Improbable	4

## Health and Safety Risks

Element	Project Phase	Activity	Impact Description	Impact Type Degree of loss	Final Probability	Final Score Residual
Health and safety	Operational	Open boreholes may result in injuries	Human injuries	Direct Negative Moderate	Improbable	8
Health and safety	Site clearance	Open boreholes may result in injuries	Human injuries	Direct Negative Moderate	Improbable	8

### 9.6.2 Final Site Map

.....  
*Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers. Attach as Appendix C*  
.....

### 9.6.3 Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;





No new impacts, risks or alternatives are applicable to the detailed list and tables of the alternatives, impacts (positive and negative), risks and mitigation measures described above.

### 9.6.4 Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr








.....  
*Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorization*  
.....

Impact management objectives will be developed to ensure that adverse socio-economic impacts are minimized, and socio-economic benefits are maximized. Measures will further be defined to avoid, prevent, limit or manage any impacts.

The objectives of the EMPr will be to:

-  Provide sufficient information and guidance to plan prospecting activities in a manner that would reduce both social and environmental impacts as far as possible;
-  Provide sufficient information to strategically plan the prospecting activities to avoid unnecessary social and environmental impacts;
-  Provide a management plan that is effective and practical for implementation; and
-  Ensure an approach that will provide the necessary confidence in terms of environmental compliance.

Through the implementation of the mitigation and management measures it is expected that:

-  Limited biodiversity and flora species loss will take place;
  -  Noise impacts can be managed through consultation and restriction of operating hours;
  -  Risks associated with crime can be mitigated through the avoidance of recruitment activities on site, recruitment of local community members through existing channels, and monitoring and reporting;
  -  The water and soil resource pollution can be effectively managed through containment;
  -  Water resource availability can be managed through groundwater monitoring strategies;
  -  Ecological impact can be managed through the implementation of pollution prevention measures, land clearance minimization, faunal disturbance by restricting working hours and rehabilitation; and
  -  Visual impact can be minimized through the consideration of the material used for temporary infrastructure and drill site infrastructure used.
-

## 10. Aspects for inclusion as conditions of Authorization

Any aspects which must be made conditions of the Environmental Authorization

The following aspects must be highlighted for consideration of the authorization:

- ④ That measures to restore flora, sensitive species and sensitive or irreplaceable habitats may be unsuccessful with rehabilitation;
- ④ That cumulative impacts and failure to fully comply with mitigation measures may affect the current offset requirements and the existing Biodiversity Offset Agreement; and
- ④ Biodiversity offset areas are not secure and future applications can make these null-in-void.
  - ④ Currently the future protection and conservation status of the set-aside areas post mining enjoys no long-term legal security. It is recommended that this be achieved through a title deed restriction and servitude in favor an appropriate conservation authority. Whilst it would be unreasonable to expect the implementation of this as a mitigation requirement for this project, we recommend that the implementation of the title deed restriction and servitude be a mandatory requirement for any future large-scale project being developed by BMM at the site.
- ④ Given the interesting nature of the Bushmanland biota, it would be worth BMM partnering with interested groups or institutions to better understand genetic variation and species distribution, and to what extent rescue and propagule storage for use in concurrent rehabilitation would be sensible.

## 11. Description of any assumptions, uncertainties and gaps in knowledge

Which relate to the assessment and mitigation measures proposed

The following assumptions, uncertainties and gaps are applicable to this project:

- ④ It is assumed that no new biodiversity offset agreement is necessary for this specific project as presented in the offset recalculation report;
- ④ It is assumed that the approved drill plan layout will be adhered to and no areas surrounding the demarcated roads and drill sites will be disturbed;
- ④ This report does not take any future prospecting or mining activities on Gamsberg into account when determining the risk of impact; and
- ④ It is assumed that all mitigation measures and conditions stipulated within this report will be adhered to.

The following additional assumptions have been made for the quantification of the 2020 v3 Gamsberg prospecting offset requirements. (Appendix G – Gamsberg East South Prospecting Reassessment):

- ④ It is assumed that any future mining under Gamsberg will not adversely affect the biota and ecosystem functioning on the surface;
- ④ The final footprint impact may be larger than anticipated due to dust, edge, unintentional and unforeseen impacts;
- ④ It is expected that no impacted area has the potential to be restored to or near their original condition within the life of the mine and its closure phase as the required ecological timeframes are greater than the span of the closure plans;
- ④ The effectiveness of proposed mitigation actions around drill rigs is unclear;
- ④ Impacts from mining operations, for example dust, may disrupt other ecological processes we are currently unaware of;
- ④ Ecological Impacts of current disturbed area, such as fragmentation by existing roads or degradation due to erosion, are unclear; and

The following assumptions are applicable to closure and rehabilitation costs:

- ④ It is assumed that no laydown areas will be used, but existing drill pads will function as laydown areas.
- ④ It is assumed that the listed mitigation measures will be successful and remaining residual impacts must be included in the restoration costs.
- ④ Concurrent rehabilitation will be incorporated into scope of works for the contracted company and be part of the payment schedule for the drill site or an external company will be appointed to undertake rehabilitation.
- ④ It is assumed that all rehabilitation work will be supervised by a restoration specialist, ecologist, or botanist and that this work will be captured for future reference.
- ④ It is assumed that rehabilitation and restoration efforts will be monitored for a minimum of ten (10) years.
- ④ Groundwater quality and quantity monitoring is addressed extensively by BMM operations for the whole Gamsberg project. For the scope of this assessment, post drilling borehole pollution monitoring and treatment only is included.
- ④ The biodiversity offset costs to allow for drilling in CBA 01 and CBA 02 areas are excluded from the closure and rehabilitation calculations.

## 12. Reasoned opinion as to whether the proposed activity should or should not be authorized

### 12.1. Reasons why the activity should be authorized or not

The option of not authorizing the activities will result in a significant loss to valuable information regarding the presence and quality of the minerals present on the property.

A major driver for approval of this assessment is the expansion of the life of mine for Gamsberg Zinc Mine and associated socio-economic benefits to the local community, province and national.

The major conflict with this is that the proposed Gamsberg East and South Prospecting is now required in areas declared as biodiversity sensitive (CBA01 and CBA02); is part of the existing biodiversity set aside area secured to authorize the Gamsberg Zinc Mine and declared as a conservation area in terms of the BMM Biodiversity Management plan.

According to the revised offset recalculation report (Appendix G) no biodiversity offset is however required for the revised (V03) project plan.

### 12.2. Conditions that must be included in the authorization

The following conditions should be considered for inclusion in the Authorization:

- ④ If any protected, specially protected flora or nationally protected trees are affected, the required authorization should be permitted before specimens are affected in any way;
- ④ The requirements of the Search, Rescue and Translocation Protocol, V02, 2019, as appendix H of the EMP V03, is a condition of the EMP;
- ④ The requirements of the offset recalculation report - Reassessing the Flora Baseline and Offset Requirement of the Proposed Gamsberg SE Prospecting (Appendix G), is a condition of the EMP;
- ④ Conditions and recommendations of the Paleontological Impact Assessment Report (Appendix D1) as listed for inclusion in Appendix I, are conditions of the EMP;
- ④ Conditions and recommendations of the Heritage Impact Assessment Report (Appendix D2) as listed for inclusion in Appendix I, are conditions of the EMP;
- ④ Conditions and recommendations of the Flora Impact Assessment Report (Appendix D3) as listed for inclusion in Appendix I, are conditions of the EMP;
- ④ Conditions and recommendations of the Fauna Impact Assessment Report (Appendix D4) as listed for inclusion in Appendix I, are conditions of the EMP;
- ④ Conditions and recommendations of the Environmental Authorization 19/02/2019 as listed for inclusion in Appendix I, are conditions of the EMP; and
- ④ Conditions and recommendations of the Appeal Decision 05/08/2019 as listed for inclusion in Appendix I, are conditions of the EMP.

In addition to the above, the following is specifically requested:



- ④ Address the issues limiting the ability to achieve the biodiversity offset agreement goals within a broader biodiversity plan for the mine and the region as a whole; and
- ④ The completion of the original biodiversity offset requirements should be required within a stipulated time period (not more than 3 years).

The offset report 2020 (Appendix G) form an important component for any Monitoring and Evaluation framework that should be used to check the impact of the dust, mitigation measures to contain impacts, and the spatial footprint of the prospecting and road construction.

### **13. Period for which the Environmental Authorization is required**

The life of project is anticipated to be for 5 years.

### **14. Undertaking**

.....  
*Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic assessment report and the Environmental Management Programme report.*  
.....

An undertaking by the EAP is provided for in Section 2 of the EMP (Part B) and is applicable to both the Basic Assessment Report and the Environmental Management Programme report.

## 15. Financial Provision

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

**Table 25: Summary of project context for calculation**

<b>Project Context</b>						
<b>Land holding</b>						
Project Name	DMR Ref	Year Approved	LoM	Property Name	Erf No.	Ownership
Gamsberg South & East	NCS 30/5/1/2/2/ (518) MR	2021	2026	Gamsberg	Gams 60, Portion 01	Black Mountain Mining Pty (Ltd)
<b>Drilling Status</b>						
Project Name	Access Roads	Total Approved #	Sites Drilled	Sites Planned for Drilling	Drill Sites rehabilitated	Rehabilitation Signed off
Gamsberg South & East	numerous	28	27	1	27	0
<b>Rehabilitation Status: Roads, Laydown areas and Drill Sites</b>						
Project Name	Total landholding (ha)	Approved footprint (ha)	Disturbed (ha)	Planned Disturbance (ha)	Rehabilitated (ha)	Balance (Disturbed-Rehab)
Gamsberg South & East	3 858.00	14.70	11.17	3.53	-	-

**Table 26: Summary of Project Financial Quantum**

<b>Financial Quantum Summary</b>						
<b>Financial quantum per closure and rehabilitation works</b>						
Project	Safety and Security	Pollution Control	Rehabilitation	Maintenance	Monitoring	Total
Gamsberg South & East	372 961.80	871 615.94	100 397.62	12 932.13	188 446.32	<b>1 546 353.82</b>

### 15.1. Explain how the aforesaid amount was derived.

The following section details the methodologies adopted to calculate the quantities, associated rehabilitation (clean closure) rates and eventually the final (clean) closure cost estimate

Please refer to the BMM Gamsberg East and South Financial Provision Cost Report appended to this submission that details methodologies and approach.

The financial provision provided in terms of section 41 and regulation 53 of the National Environmental Act (Act 107 of 1998) must be periodically reviewed and adjusted to conform to the relevant prospecting activities.

Concurrent rehabilitation costs occur annually as drilling progressed. Rehabilitation costs are incorporated both into the drilling program and the drilling operator contract.

The detail tables of the assessment are available in the financial provision report attached to this application.

## 15.2. Confirm that this amount can be provided for from operating expenditure.

.....  
*Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be.*

.....  
The rehabilitation costs are incorporated as part of the prospecting tender and secured in the budget to appoint drilling contractor before commencement and a financial guarantee is secured before commencement.

## 15.3. Specific Information required by the competent Authority

### 15.3.1 Compliance with the provisions of sections 24(4) (a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). The EIA report must include the: -

#### 15.3.1.1 Impact on the socio-economic conditions of any directly affected person.

.....  
*Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an Appendix*

.....  
No specific report was generated for the purposes of the socio-economic conditions. The directly affected persons in terms of this application is the proponent itself. BMM is both the landowner and developer of the property.

#### 15.3.1.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act.

.....  
*Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as **Appendix D2** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6. and 2.12. herein.*

.....  
A Heritage Impact Assessment of the prospecting area has been conducted to identify any cultural, heritage and/or archaeological features which may be impacted on.

## 16. Other matters required in terms of sections 24(4) (a) and (b) of the Act

.....  
*The EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix Z*

.....  
Not applicable.

# PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

## 1. Environmental management programme

### 1.1. Details of the EAP

.....  
*Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required.*  
.....

The requirement for the provision of the details and expertise of the EAP are included in Part A, Section (1) (a).

### 1.2. Description of the Aspects of the Activity

.....  
*Confirm that the requirement to describe the aspects of the activity that are covered by the environmental management programme is already included in PART A, section (1)(h) herein as required.*  
.....

The requirement to describe the aspects of the activity that are covered by the environmental management programme is included in Part A, Section (1) (h).

### 1.3. Composite Map

.....  
*Provide a map (**Attached as an Appendix C**) at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers.*  
.....





Please refer to **Appendix C** for the composite map.

## 2. Description of Impact management objectives including management statements

### 2.1. Determination of closure objectives

.....  
*Ensure that the closure objectives are informed by the type of environment described.*  
.....

Black Mountain Mining (Pty) Ltd currently commits to the following closure objectives:

1. To secure the effective and sustainable transfer of the municipal services of the town, Aggeneys, and the Pella-drift Water Board to the Khai-Ma municipality.
2. To ensure that the biodiversity and environment on the site is protected.
3. To make sure that the following commitments will be achieved as a minimum:
  -  The site will be made safe for both humans and animals;
  -  The site will be rehabilitated to be physically, chemically and biologically stable;
  -  The residual impacts will be managed to acceptable levels and will not deteriorate over time; and
  -  Closure will be achieved with minimal socio-economic upheaval.
4. To provide sufficient funds at the end of life of mine, to properly implement the closure plan, and also to make provision for possible premature closure, and post closure monitoring requirements.

Concurrent rehabilitation is required from the contracted company. Each drill site has to be cleaned from all evidence of pollution and made safe as part of decommissioning. All drill holes are capped and marked for safety of persons and animals on site.

Post drilling rehabilitation status evaluation will be evaluated and provide specific remedial measures for implementation until satisfactory rehabilitation has been completed.






## 2.2. Measures to rehabilitate the environment

---

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

---

The rehabilitation plan commences with the standardized implementation of a drilling method statement. This scope of this method statement addresses the following activities concerning drilling:

-  Pre-construction requirements;
-  Road construction;
-  Construction of river crossings;
-  Construction of drill sites; and
-  Construction of laydown areas.

The specific steps and methodology for these activities must be followed as detailed below.

### 2.2.1 Re-construction requirements

The planning phase considers the broad review of locations of sensitive species for protected flora permit applications.

The planning phase requires that all environmental pre-construction authorizations are in place for nationally protected trees, provincially protected plants, diverting or impeding the flow of a river (S21 c&i), of impacting within 100m of a river or 500 meters of a wetland as well as final submission of the heritage specialist verification of before drilling.

The planned impact footprint area must be demarcated, screened and plant populations profiled, mapped and seed collected to secure genetic diversity before search and rescue of the listed species take place. Specimens must be directly transplanted or secured in the BMM nursery to ensure future transplantation should direct transplantation fail.

Direct transplantation must be undertaken with the buffering of the specimens to ensure survival by following the Search and Rescue and transplantation plan, 2020.

The appointment of the most suitable drilling contractor, with environmental control officer support (preferably independent of the contractor) is essential. The contract should include, the EMP conditions of the contractor and BMM as clearly set out roles and responsibilities for each party.

Demarcation of the drill areas, roads and planned laydown areas (existing drill pads only) will take place and be mapped with the induction of areas and maps provided to the drilling contractor. Staying within dedicated footprints and maintaining them must be captured as a contractual commitment for drilling.

All new disturbances will be approved by the BMC Environmental and Biodiversity Departments before commencement.




Existing roads and river crossings will be used as far as possible with the construction of new roads being limited to less sensitive areas on the perimeter of the inselberg with consideration of the location of natural watercourses. Roads and river crossings are limited to a width of four (4)m and river crossings will be instated as single-track roads where the least amount of surface impact will be affected.

As far as possible drill sites will be located adjacent to existing roads to eliminate the need for additional roads between main roads and drill sites. The only new drill sites will be located on the less sensitive perimeter of the inselberg. Drill sites will be limited to 225m<sup>2</sup> and will as far as possible be located on previously disturbed areas.

There will be one laydown area within the basin of the mountain where a previously constructed concrete slab and fence already exists.

### 2.2.2 Road Construction

Construction of roads will consist of the following steps:

-  Site clearance
  -  The route of the new road is pegged out by the Geologist;
  -  All protected plant species are translocated by the Biodiversity Officers according to the existing Search and Rescue Protocol;

- Big boulders are removed from the track and used as roadside demarcation; and
- No topsoil is removed during site clearance for road construction.

#### Construction

- No grading is done during road construction; and
- Further road establishment is caused through continuous use of the road during the exploration activities.

#### Operation

- All vehicles and equipment are confined to demarcated roads and will comply with all existing and approved operating procedures;
- Dust generation will be limited by enforcing the approved speed limit of 40km/h; and
- Existing roads will be monitored and maintained for future environmental and biodiversity monitoring.

### 2.2.3 River Crossing Construction

#### Site clearance

- The route of the new road is pegged out by the Geologist;
- All protected plant species are translocated by the Biodiversity Officers according to the existing Search and Rescue Protocol;
- Big boulders are removed from the track and used as roadside demarcation; and
- Topsoil (river sediment) will be used to construct a 30cm high berm on each side of the river crossing to contain any accidental spillage which may occur while a vehicle crosses the river. This berm will not impede any water flow during a rain event.

#### Construction

- No grading is done during river crossing construction; and
- the river crossing is established through continuous use of the road during the exploration activities.

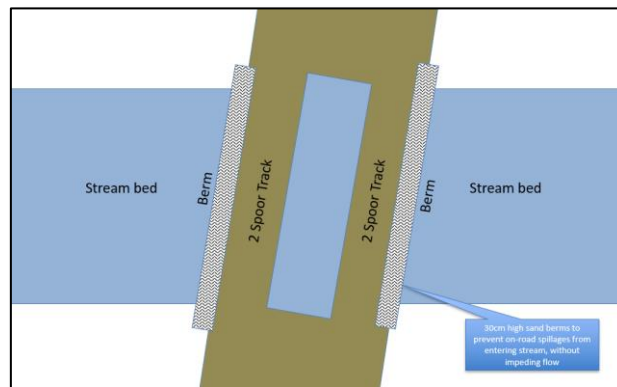


Figure 29: Construction of River Crossings

#### Operation

- All vehicles and equipment are confined to demarcated river crossings and will comply with all existing and approved operating procedures;
- Dust generation will be limited by enforcing the approved speed limit of 40km/h; and
- After each major rain event, river crossings will be inspected for erosion and repaired.
- Existing river crossings will be monitored and maintained for future environmental and biodiversity monitoring as per existing Biodiversity Risk Protocol for Pans and Rivers.

### 2.2.4 Drill Site Construction

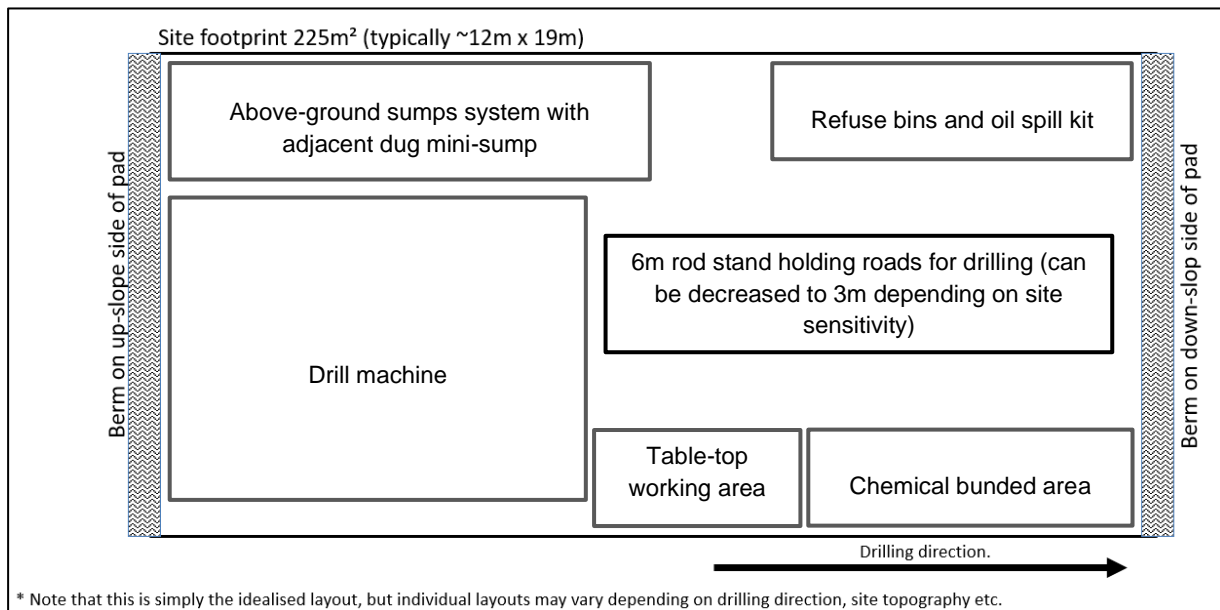
#### Site clearance and construction

- The position of the planned borehole is pegged out by the Geologist;

- 🌿 The geologist plans the site lay-out while adhering to the maximum allowable disturbed area of 225m<sup>2</sup>;
- 🌿 An inspection is done by the ECO and a site clearance report is signed off;
- 🌿 All protected plant species are translocated by the Biodiversity Officers according to the existing Search and Rescue Protocol;
- 🌿 Big boulders are removed from the site and placed to augment the surrounding environment;
- 🌿 Topsoil is removed for the construction of the drill hole and placed on PVC liners and protected from wind and water erosion;
- 🌿 Subsoil (where applicable) will be stored separately from topsoil on PVC liners and protected from interacting with the environment.
- 🌿 Removed topsoil will be stored and protected separately for replacement when drilling is completed and
- 🌿 As far as possible surface sumps (skips) will be used for the drilling process.

### 2.2.5 Operation

- 🌿 All chemicals used during the drilling operation is biodegradable and will be stored in an appropriately sized mobile sump;
- 🌿 Drills and other supporting vehicles or equipment will be restricted to the demarcated area and will not be allowed to impact on the surrounding environment;
- 🌿 All equipment will be stored on platforms or scaffolding to limit compaction and soil impacts.
- 🌿 A plastic lining is used under all drills to prevent any spillage from the drills coming into contact with the ground;
- 🌿 The plastic lining will be rolled at the edges to contain any spillages should they occur;
- 🌿 All drill sludge generated will be disposed of at the Gamsberg Zinc Mine waste rock dump; and
- 🌿 Upon completion of drilling all equipment is removed, the hole is capped, and subsoil/topsoil is replaced.



**Figure 30: Typical Drill Site Lay-out**

### 2.2.6 Laydown Area Construction

A large historic laydown area is available to place drilling equipment and water supply tanks on Gamsberg for distribution to the individual drill sites. The existing infrastructure consist of a concrete slab and small prefabricated building which is fenced off on the North-Eastern side of the basin will be used for this purpose.

Existing roads and old drill sites will be used as laydown areas. Temporary laydown areas may be utilized on newly disturbed drill sites during operations when required without enlarging the footprint of the drill site.

### **2.2.7 Drill site and road rehabilitation**

The complete rehabilitation plan will be implemented from 2021 – 2026 and include planning before drilling, concurrent and post drilling rehabilitation, monitoring and maintenance.

The plan will address rehabilitation planning, concurrent rehabilitation, drilling and pollution control, post drilling rehabilitation, monitoring and maintenance.

Concurrent rehabilitation will take place with direct transplanted of plant specimens to already impacted areas.

Each drill site has to be cleaned from all evidence of pollution and made safe as part of decommissioning. All drill holes are capped and marked for safety of persons and animals on site.

Post drilling rehabilitation status evaluation will be evaluated and provide specific remedial measures for implementation until satisfactory rehabilitation has been completed.

At three different intervals, site evaluations are required and the iterative process to adapt rehabilitation design for each site will be followed after the site evaluations.

Site evaluations will consider the following:

### **2.2.8 Planned rehabilitation schedule**

The schedule set out below will be implemented according to the impact footprint. The schedule is from 2020 (before drilling requirements) and includes three years after drilling. After the third year of monitoring and maintenance the prospecting rehabilitation should be handed over to the BMM environmental unit and make out part of the BMM rehabilitation monitoring and management.

The rehabilitation schedule incorporates all aspects that should be covered in terms of concurrent rehabilitation for the project life cycle.

The drilling program will guide the number of sites available for rehabilitation.

The drill tracks (take off roads) linked to each drill site is incorporated as part of the drill sites listed below.



**Table 27: Rehabilitation Plan Schedule**

ITEM	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
<b>REHABILITATION PLANNING AND BASELINE VERIFICATION</b>										
Demarcation of areas: drill pads (number)		10	10	8						
Demarcation of areas: roads (m <sup>2</sup> )		11995	14395	4059	80	0				
Site verification and staff training (number)		all	all	all	all	all	all	all	all	all
Transplantation, nursery spp, seed collecting (m <sup>2</sup> )	34009									
Site Evaluation - Baseline (m <sup>2</sup> )	34009									
<b>CONCURRENT REHABILITATION</b>										
Pre-clearance risk assessment, search and rescue	1707	1707	1366							
Site clearance and topsoil stockpiling	1707	1707	1366							
Direct transplantation	1707	1707	1366							
<b>DRILLING AND POLLUTION CONTROL</b>										
Drilling (no.of boreholes)		70	70	50	40	40				
Pollution control and clean-up (no.of boreholes)		70	70	50	40	40				
Closure of drill sumps (no.of boreholes)			70	70	50	40	40			
De-compaction (m <sup>2</sup> )			1707	1707	1366					
Safeguarding the drill site (no.of drill sites)		10	10	8						
Site Evaluation - Post Drilling (m <sup>2</sup> )			4707	5307	2381	35300				
<b>REHABILITATION - POST DRILLING</b>										
Detailed biophysical design from baseline and post drilling assessment (m <sup>2</sup> )			4707	5307	2381	20				
Soil sampling and amelioration			4707	5307	2381	20				
Re-vegetation - transplantation (after drilling, additional spp) (m <sup>2</sup> )				4707	5307	2381	20			
Re-vegetation - sowing (m <sup>2</sup> )				4707	5307	2381	20			
Site Evaluation - post rehabilitation assessment (m <sup>2</sup> )					4707	5307	2381	35300	35300	35300
<b>REHABILITATION MONITORING AND MAINTENANCE</b>										
Annual rain season monitoring for maintenance (m <sup>2</sup> )				4707	5307	2381	35300	35300		
Annual Maintenance (m <sup>2</sup> )					4707	5307	2381	35300	35300	35300

### 2.2.9 Rehabilitation implementation

The rehabilitation implementation plan requires habitat characterization by quantifying the landscape function, habitat complexity and vegetation structure to which restoration efforts will be geared. Species diversity is important to guide the re-establishment species selection. The baseline evaluation and site evaluation directly after drilling will provide the details that will inform the rehabilitation goals.



The following rehabilitation goals must be addressed to facilitate a detailed biophysical design of the specific site.

<b>Phase</b>	<b>#</b>	<b>Rehabilitation Goals</b>	<b>Aspect</b>
<b>Fundamental</b>	<b>1</b>	<b>Priority 01 Goals</b>	
	1.1	All infrastructure and waste must be removed from the site	Infrastructure
	1.2	Site footprint must be demarcated, and impacts must be contained;	Roads/Access
	1.3	The site must be safe for humans and the environment;	Safety
	1.4	The site must be physically and environmentally stable;	Soil erosion
	1.5	The site must be unpolluted;	Pollution
<b>Biophysical Design</b>	<b>2</b>	<b>Priority 02 Goals</b>	
	2.1	The site must be physically able to accumulate ecological resources (landscaping)	De-compacting Growth pockets Diversion berms
	2.2	The site must be chemically suitable for vegetation establishment	Lime application Organic compost
	2.3	The site must be structurally suitable for vegetation persistence;	Apron fencing Mulching/Brush packing
	2.4	Biological components must be present/enhanced to facilitate biological processes	Topsoil cover Compost Grass sowing
	2.5	Indigenous suitable pioneer species must be established to kick-start the system	Sapling transplanting
	2.6	A succession of sub-climax and climax species must be established	Tree/Shrub sowing
	2.7	Fauna interactions and ecological processes must be possible to accelerate rehabilitation	Linkage corridors
<b>Succession</b>	<b>3</b>	<b>Priority 03 Goals</b>	
	3.1	Evaluation of rehabilitation status	Rehab Assessment
	3.2	Design adjustments	Final Design
	3.3	Succession of sub-climax and climax species	Maintenance
	3.4	Fauna interactions and ecological processes must be possible to accelerate rehabilitation	Maintenance
	3.5	Monitoring and Maintenance (5yrs)	Planning

### 2.2.10 Rehabilitation monitoring

**Legal obligations** set on BMM in terms of the NEMA Financial Provision regulations 2015 require annual rehabilitation status reporting as well as auditable financial cost calculation for planned rehabilitation works.

The key drivers for the BMM rehabilitation monitoring are:

-  to give early warning of rehab methodology success;
-  to give an indication of ecological sustainability;

- to give effect to legal obligations in terms of rehabilitation status reporting; and
- to give effect to legal obligations in terms of financial cost calculations to rehabilitate.

Driver 2: Ensure rehabilitation benchmarks are achieved.

The data gathered using the rehabilitation monitoring protocol provides information on the relevant ecosystem output. The outputs are measured against the rehabilitation benchmarks in order to determine rehabilitation success. Subsequently, the information from the monitoring program can be used to control the effectiveness of the rehabilitation and guide maintenance and management measures. Rehabilitation benchmarks must be representative sites with statistically defensible data and achievable targets. Rehabilitation benchmarks must be approved by the regulator once it has been tested on site.

This monitoring protocol is set to benchmark measuring and requires a monitoring design that enables the identification of causes of detected change so as to address this adequately, i.e., there is a need for a next level of detail assessment or strong analytical or diagnostic power (e.g., Herrmann and Stottlemeyer, 1991; Messer et al., 1991; Spellerberg, 1991; Slocombe, 1992; Furness and Greenwood, 1993a; Greenwood et al., 1993; Underwood, 1995).

Two monitoring elements must be brought to play to adhere to the above as a driver for rehabilitation monitoring at Black Mountain Mine (BMM).

**Ecological sustainability monitoring:** Information from the monitoring program must detect changes in the ecosystem which ultimately show degree of ecological sustainability. Data is presented from inductive reasoning or pattern recognition.

**Rehabilitation effectiveness monitoring:** In an early stage, information from the monitoring program can be used to check whether remedial action is successful or not, and to evaluate the predicted or expected consequences of specific measures or activities. Data is presented to answer key questions (testing of hypotheses) concerning the ecological consequences ('effects') of human activities ('treatments'): the management decisions are considered 'uncontrolled experiments' (Underwood, 1995).

The objective is to do away with inefficient measures or activities with undesirable ecological side effects and replacing them by more efficient measures.

Ten (10) years of post-rehabilitation monitoring is required before final sign off can be considered. Monitoring should be conducted at years 1,2,3,5,7 and 10.

Rehabilitation monitoring consists of rehabilitation evaluation and rehabilitation monitoring.

**Rehabilitation evaluation** commences before search and rescue take place, directly after drilling has been completed and after rehabilitation has been completed.

**Table 28: Site Evaluation Parameters**

	Site Evaluations	Visual Assessment	Observation inspection	Soils	Habitat Evaluation	Vegetation Diversity	Special populations	Landscape Function
1	Site Evaluation - Baseline	Drone footage before impact: 5m,10m,20m,50m	Evaluation of existing impacts Safety, Pollution, Flora condition, Fauna activity, Soil impacts, Dust	Baseline soil samples to determine soil differentiation that may affect rehabilitation success	Five criteria with which to assess the conservation importance of habitats as applied for off-set is used to assess status	Representative plant diversity of site	Population density of gravel-patch specialist plant species and population sizes	Baseline and Site LFA assessment: total site zones + SSA of at least 25 point.
2	Site Evaluation - post impact monitoring	Drone footage after impact: 5m,10m,20m,50m	Evaluation of existing impacts Safety, Pollution, Flora condition, Fauna activity, Soil impacts, Dust		Five criteria with which to assess the conservation importance of habitats as applied for off-set is used to assess status	Representative plant diversity of site	Population density of gravel-patch specialist plant species and population sizes	Site LFA assessment: total site zones + SSA of at least 25 point.
3	Site Evaluation - post rehabilitation monitoring	Drone footage annually after rehab: 5m,10m,20m,50m	Evaluation of existing impacts Safety, Pollution, Flora condition, Fauna activity, Soil impacts, Dust		Five criteria with which to assess the conservation importance of habitats as applied for off-set is used to assess status	Representative plant diversity of site	Population density of gravel-patch specialist plant species and population sizes	Baseline and Site LFA assessment: total site zones + SSA of at least 25 point.

Rehabilitation monitoring is the collection of additional data as the site restore as set out in the BMM rehabilitation monitoring protocol.

Considering the fact that rehabilitation is progressive over time, different levels of assessment is proposed so that the most relevant data is collected at the different stages of rehabilitation.

It is proposed that three levels of assessment be conducted according to the diagrams presented below.

The first level of assessment is primarily desktop with aerial imagery interpretation of the sites supported by on-site scan of the area where required.

Site context and status in terms of the physical rehabilitation actions are checked in order to guide biophysical rehabilitation design.

The results of the phase 01 assessment provide enough information to calculate rehabilitation actions and costs.

### Phase 01 Assessment

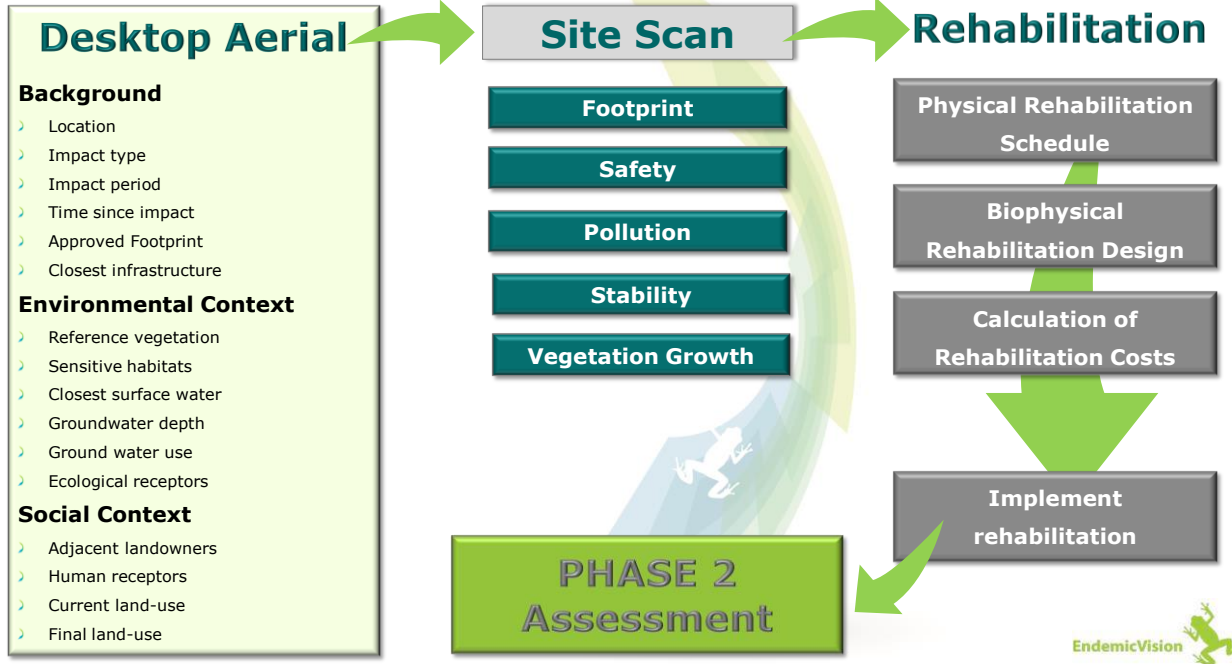


Figure 31: Phase 01 Assessment diagram

The second phase of assessment is a rapid quantitative assessment of the site applying key monitoring methods assessing vegetation (Line Intercept Method); habitat complexity (habitat complexity assessment) and water (ground water visual assessments). The results of this assessment indicate where additional amelioration is required or if phase 03 assessment should be completed.

Phase 02 assessment automatically include a re-assessment of phase 01 assessment items.

The third level of assessment is a detailed assessment to obtain quantitative comparative data to evaluate the success of the rehabilitation works. Vegetation diversity, landscape functional analysis and ground water chemical analysis

Phase 03 assessment automatically include a re-assessment of phase 02 assessment items.

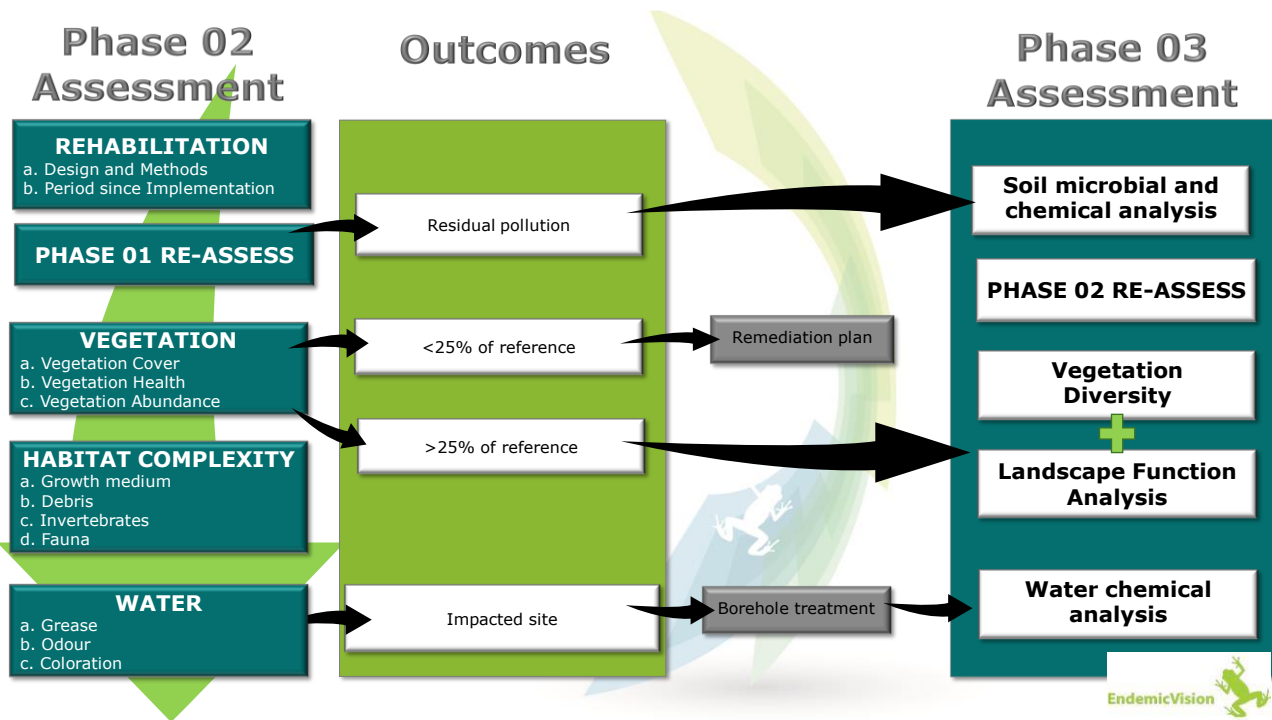


Figure 32: Phase 02 and Phase 03 assessment diagram

### 3. Impact Management Outcomes

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

**Table 29: Impact Management Outcomes**

Resource Use	Waste Management	Air Emission	Water Pollution	Noise / Vibration	Land Contamination	Biodiversity Disturbance	Socio Economic Changes	Element	Environmental Management Objective
	1							Waste	To minimize and manage waste generated in the proposed development area.
		1						Dust	Limit dust impacts from site clearance and traffic
						1		Ecology	Limit habitat destruction and fragmentation during site clearance and construction
						1		Ecology	Manage interaction with the environment during construction
						1		Ecology	To minimize ecological sensitive area impacted in the proposed development area.
							1	Economic	Maintenance and monitoring management
						1		Fauna	Limit faunal impacts because of traffic
						1		Fauna	Limit faunal habitat destruction and fragmentation during site clearance and construction
						1		Fauna	Manage interaction with fauna during construction
						1		Flora	Ensure vegetation protection through the project life cycle
						1		Flora	Protect sensitive species variations and populations.
						1		Flora	Manage Aggeneys Nursery to secure flora protection
						1		Flora	Manage alien invasive species
							1	Health and Safety	Limit injuries to individuals on site
								Heritage	Minimize the impact on archaeological and paleontological resources

Resource Use	Waste Management	Air Emission	Water Pollution	Noise / Vibration	Land Contamination	Biodiversity Disturbance	Socio Economic Changes	Element	Environmental Management Objective
								Heritage	Limit loss of heritage artefacts or archaeological resources during site clearance, road construction and earth works
						1		Land use	Restore land use value to sustainable land use or natural pre-determined state
1			1					Legislative	Ensure compliance to the National Water Act, 1998 (Act No. 36 of 1998) and applicable regulations
1			1					Legislative	Manage NWA regulation 704 and section 21 c and i water use risks
1								Legislative	Ensure authorization for clearance is obtained from SAHRA
						1		Legislative	Ensure legal compliance through monitoring
				1				Noise	Reduce noise impacts
						1		Rehabilitation	Manage rehabilitation sustainability through proper planning
					1			Soil	Prevent and manage soil contamination
1			1					Water - Hydrology	Reduce impact on surface hydrology and consequential secondary impacts
1			1					Water - Hydrology	Manage and limit the impact of mineral waste generation and accumulation on surface water
1			1					Water - Groundwater	Manage and limit impact on groundwater levels and quality

### 3.1. Impact Management Actions

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

**Table 30: Impact Management Actions**

#### 3.1.1 Legal Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<p><b>Ensure compliance to the National Water Act, 1998 (Act No. 36 of 1998) and applicable regulations</b></p>	<p>Unlawful activity: Affecting a water resource without permission</p>	<p>Various roads and boreholes are located within the 100m buffer zone of non-perennial rivers and required application for general authorization in terms of section 21 c and i must be applied for where required.</p> <p>Consider location of watercourses and avoid in the siting of prospecting infrastructure specifically.</p> <p>A GA regarding S21 c &amp; i will be sufficient for exploration based on risk assessment outcome. A GA was obtained from DWS.</p>		<p>Implement mitigation and rehabilitation measures as recommended by a suitable professionally registered person and as per Section 21 c and i risk assessment and management plan if and where applicable.</p>	<p>Implement a monitoring program as recommended by a suitable professionally registered person and Section 21 c and i General Authorization Conditions if and where applicable.</p>



Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<p><b>Manage NWA regulation 704 and section 21 c and i water use risks</b></p>	<p>Unlawful activity: Affecting a water resource without permission</p>	<p>Drilling in the regulatory buffer area of pans, rivers or rock pools must be avoided. Where such impacts cannot be avoided, an exemption application must be made.</p> <p>Section 21 c&amp;i application was made to the regulatory authority and a general authorisation for these water uses have been issued.</p>	<p>Water use in the instream and/or riparian habitats as applicable must not result in potential, measurable, cumulative detrimental decline in diversity of communities and composition of the natural, endemic vegetation.</p> <p>BMM must ensure concurrent rehabilitation to reduce surface areas where dirty water can accumulate.</p> <p>Storm water berms must be vegetated immediately to protect against wind and water erosion and possible failure.</p> <p>Concurrent rehabilitation must address water pollution control concerns.</p>	<p>In terms of rehabilitating a water use: (a) a systematic rehabilitation program must be undertaken to restore the watercourse to its condition prior to the commencement of the water use; (b) all disturbed areas must be revegetated with indigenous vegetation suitable to the area and (c) active alien invasive plant control measures must be implemented to prevent invasion by exotic and alien vegetation within the disturbed area.</p>	<p>In terms of monitoring, annual environmental audits for three years are required to ensure that the rehabilitation is stable; failing stability, remedial action must be taken to rectify any impacts. Regular monitoring and maintenance of storm water drainage facilities must be conducted at all times.</p> <p>Implementation of concurrent rehabilitation and rehabilitation monitoring of riverine habitat is required.</p>
<p><b>Ensure authorisation for clearance is obtained from SAHRA</b></p>	<p>Unlawful activity: Impacting protected species without permission; and Compliance: transgressions resulting in penalties and fines</p>	<p>Final comment from SAHRA must be in hand before drilling. Final comment received on 12/11/2020.</p>	<p>Instructions from SAHRA final comment must be implemented as part of the EMP.</p>	<p>A permit will have to be obtained from SAHRA for any archaeological or paleontological finds.</p>	
<p><b>Ensure legal compliance through monitoring</b></p>	<p>Compliance: transgressions resulting in penalties and fines</p>	<p>Sufficient resources and funds must be available to maintain the required monitoring, data analysis and management of this EMP throughout the project life cycle. An ECO must be tasked to ensure legal compliance through monitoring.</p>	<p>Monitoring must be outsourced where skills and expertise are not found in-house.</p>	<p>Where monitoring results deviate from required norms and standards, immediate actions plan to rectify root cause for change in element quality must be put in presented to management to resource, execute and monitor.</p>	<p>Monitoring records will be kept until financial grantee for rehabilitation is released.</p>

### 3.1.2 Dust Impact Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<p><b>Limit dust impacts from site clearance and traffic</b></p>	<p>Changes in air quality - dust; Loss of habitats;</p> <p>Social: Health and Safety of individuals on site;</p> <p>Ecological system impacts: Ecological process &amp; function deterioration/ breakdown; and</p> <p>Loss of species.</p>	<p>Travel on demarcated roads only.</p>	<p>Maintain slow speed limits to reduce dust on site and in area.</p> <p>Prevent wind erosion by rock packing, early re-vegetation, sowing and brush packing with damaged vegetation.</p> <p>Maintain roads and implement dust control measures as far as practical on management roads.</p>	<p>Dust impacts cannot be remediated.</p>	<p>Dust monitoring measures not applicable to prospecting as diamond drilling takes place. The following is however applicable to mining:</p> <ul style="list-style-type: none"> <li>- Dust monitoring is undertaken where this is a significant risk or impact on third parties.</li> <li>- BMM is required to ensure compliance to NEMAQA and dust regulations.</li> <li>- Implementation of a dust monitoring programme to assess impacts on floral biodiversity is important, is required and needs to be commenced at sites that are sensitive to dust impact, i.e., areas based on their proximity to certain mining activities and areas containing populations of plants which are deemed to be particularly sensitive to smothering by dust (e.g. <i>Conophytum ratum</i>).</li> </ul>

### 3.1.3 Ecological Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<p><b>Limit habitat destruction and fragmentation during site clearance and construction</b></p>	<p>Ecological system impacts: habitat fragmentation; Ecological system impacts: Ecological process &amp; function deterioration/ breakdown; Changes in soil functionality: compaction; and Changes in surface water quality runoff.</p>	<p>Use existing roads (without further widening) to access sites, and avoid further clearing or bulldozing of tracks.</p> <p>No dry watercourse, wetland, flood line or riparian vegetation will be fragmented by new road construction. Where this is inevitable, on-site environmental risk assessment by suitably competent person will be conducted to reduce impacts before construction.</p> <p>All construction staff will undergo an environmental induction from a suitably qualified person regarding the importance of footprint management.</p> <p>Fencing with steel droppers and 3-4 wires, without mesh, of roads in vicinity of threatened species to prevent accidental impact.</p>	<p>Roads are reduced to a single track, using existing take-off roads for turning points.</p> <p>A platform should be set up at each site. Use of scaffolding for all equipment in excess of 50 kg (including: chemicals, fuels, drill sludge, water supply, drilling equipment, temporary ablution, temporary staff facilities, waste bins, spill kits and spares) with the exception of the drill rig and vehicles. Use of rubber mats for the remaining area for operator work/traffic areas and service and refuelling vehicles. A detailed drawing of the platform and how it will work must be in place before the contractor may go on site.</p>	<p>Road verges will be restored to natural state as soon as possible after road construction. This would include storm water diversions and landscaping, replacement of topsoil, brush packing, seeding and/or planting.</p>	<p>Each drill site needs to be photographed pre-, during and post drilling as a record of the site conditions.</p>
<p><b>Manage interaction with the environment during construction</b></p>	<p>Ecological system impacts: habitat fragmentation; Ecological system impacts: Ecological process &amp; function deterioration/ breakdown; Changes in soil functionality: compaction; and Changes in surface water quality runoff.</p>	<p>Disturbance footprint is limited to the minimum required footprint and will be assessed before site clearance.</p> <p>No domestic animals are allowed on site.</p> <p>No fires (heating or cooking) are allowed on site.</p> <p>No fuel collection is allowed</p>	<p>Sites will be demarcated and prevent fauna / area interactions with drilling water or open boreholes.</p> <p>The construction site will be on level areas as far as possible and loose material will not result in excessive erosion, siltation and general disturbance down slope after a rain event.</p>	<p>Drilling will be completed in shortest possible time period to limit impact on ecological processes.</p> <p>Remediation will be completed directly after drilling before the next rain season.</p>	<p>Strict access control at mine security, no access by general community to Gamsberg Mining Right Area.</p> <p>If required Exploration will be accessed from the southern access ramp, which will be monitored on a daily basis.</p> <p>A feral dog and cat control</p>

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
		<p>on site.</p> <p>Prior to spp logging, seed harvesting and search and rescue from a site, the ECO together with the drill site manager will demarcate the drill site and road footprint with visibility (removable) barriers.</p> <p>At site New09, the existing fence that runs parallel to the management track leading to the site and the borehole pump at the mouth of the kloof needs to be extended along its current trajectory until the edge of the wash that exits the kloof. This fence needs to prevent ad-hoc vehicle traffic from venturing northwards from this road. This fence need only comprise steel droppers with 3-4 wires but no mesh is required.</p> <p>No-go areas will be clearly demarcated on the ground and on mine plans before search and rescue commence.</p>	<p>No hunting, snaring or collection of road kills are allowed.</p>		<p>programme must be implemented where monitoring indicate any presence of domestic animals on site.</p>

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<b>To minimise ecological sensitive area impacted in the proposed development area.</b>	Loss of sensitive habitats.	Avoidance will be applied to highly sensitive ecological areas (pans and CBA 01 / CBA 02 areas) as indicated on the sensitivity maps. Restrict movement and activities only to approved footprint areas. Where avoidance cannot be achieved, offset targets will be met according to the Biodiversity Offset Report before impacts take place.	In order to minimize the disturbed area and disturbance impact the project will be completed as soon as possible and return to a state of recovery before the next rain season.	<p>Rehabilitation of all disturbed areas will be conducted concurrently with locally collected specimens replaced to their specific habitats.</p> <p>The rehabilitation of the south access route needs to be completed before prospecting commences. This has been discussed at length in previous reports. Road erosion perpetuates unnecessary ecological degradation and is a human safety risk. Cut-off drains must be installed at 50m intervals to address the erosion of the south access route prior to the commencement of prospecting.</p>	Species relocation and rehabilitation efforts will be monitored in terms of habitat complexity to gauge the return of ecological processes. Monitoring will align with the existing BMM monitoring protocols in place.

### 3.1.4 Faunal Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<b>Limit faunal impacts because of traffic</b>	Persecution of fauna - road kills	Ensure that construction activities are staggered and vehicular activities are kept to a minimum.	Vehicle speed will be limited to 30km per hour in areas with indigenous vegetation to reduce probability of road kills.	Where more than one roadkill is encountered, the area will be investigated for fauna breeding or migration and an alternative route considered.	Road kills will be recorded for the project to give indication of fauna activity in the area. Recording will include species, date, area. Daily monitoring of vehicles movement is taking place via CASS system and all activities can only commence if vehicles are equipped with a CASS system. Vehicle speed are

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
					also monitored via the CASS system.
<p><b>Limit faunal habitat destruction and fragmentation during site clearance and construction</b></p>	<p>Disturbance of fauna engagement patterns; and Loss of habitats.</p>	<p>Avoid construction of new roads as far as possible. Re-use drill sites as far as possible. The V03 drill plan avoided excessive construction of new roads and drill sites.</p> <p>Avoid constraining the movement of biodiversity on the mine site through ecologically sensitive mine design and architecture.</p> <p>Sensitive areas, i.e. aquatic systems and habitats supporting key faunal species are avoided.</p>	<p>Reduce the number and width of roads required by proper planning and agreement to a single traffic management plan.</p>	<p>Road verges will be restored to natural state as soon as possible after road construction. This would include storm water diversions and landscaping, replacement of topsoil, brush packing, seeding and/or planting.</p>	
<p><b>Manage interaction with fauna during construction</b></p>	<p>Loss of habitats; and Persecution of fauna - road kills.</p>	<p>Site access will be controlled and no unauthorized persons will be allowed onto the site.</p> <p>All vehicles and machinery will adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.</p> <p>Vehicles access to site only allowed if vehicles are fitted with CASS system.</p>	<p>The collection, hunting or harvesting of any plants or animals at the site will be strictly forbidden. Personnel will not be allowed to wander off the demarcated construction site.</p> <p>If the site must be lit at night for security purposes, this will be done with low-UV type lights (such as most LEDs), which do not attract insects. Lights must also be placed in such a manner as to face inwards towards the mine as far as possible.</p>	<p>Any fauna directly threatened by the construction activities will be removed to a safe location by the ECO or other suitably qualified person.</p> <p>Faunal sweeps within habitats such as bush clumps will take place before clearing and any fauna located will form part of a search and rescue and relocated to safety.</p> <p>Any recording of snakes will be managed by Snake handlers and all snakes will be relocated safely.</p>	<p>Faunal encounters will be noted and reported as part of the rehabilitation monitoring to indicate return of these species after rehabilitation. Access to site, as well as speed limits are monitored with a CASS system and daily reports are submitted to the Biodiversity Department. will any transgression be recorded; a full investigation must be done.</p> <p>An animal monitoring program is also incorporated in Black Mountain Mine's management.</p>

### 3.1.5 Flora Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<p><b>Ensure vegetation protection through the project life cycle</b></p>	<p>Change in species composition; Loss of vegetation cover; Loss of species; Loss of populations; and Changes in vegetation composition: Alien species encroachment.</p>	<p>All vehicles and machinery will adhere to clearly defined and demarcated roads. No off-road driving to be allowed.</p> <p>Where roads do not exist, 4-meter-wide single-track gravel roads with T turning points and in identified areas widening for vehicles to pass will be brush cut.</p> <p>In the case where new tracks are being created, the ECO together with the drill site manager need to walk and demarcate track prior to search and rescue operations or vehicles accessing the site. Under no circumstances must new tracks be graded or modified in any way other than through the normal vehicle traffic.</p> <p>Temporary lay-down areas will be located within previously transformed areas or areas that have been identified as being of low sensitivity.</p> <p>Multiple boreholes will be drilled from one drill site. Re-use of existing boreholes and roads.</p> <p>No unauthorized site clearing or disturbance at the site without an ECO present.</p>	<p>Prior to prospecting commencement, implementation of the updated Search and Rescue and translocation plan needs to be executed. Pre-clearance inspections will be completed before search and rescue operations. Search and rescue of all listed species and species with high probability of survival for community reconstruction will be photo catalogued, geo-referenced and rescued for translocation and concurrent rehabilitation purposes. Implementation of Search, rescue and translocation must take place before site access is granted to the contractor.</p> <p>Use of scaffolding to reduce soil surface disturbance and compaction. A platform should be set up at each site. Use of scaffolding for all equipment in excess of 50 kg (including: chemicals, fuels, drill sludge, water supply, drilling equipment, temporary ablution, temporary staff facilities, waste bins, spill kits and spares) with the exception of the drill rig and vehicles. Use of rubber mats for the remaining area for operator work/traffic areas and service and refuelling vehicles. A detailed drawing</p>	<p>Temporary roads and storage areas will be investigated and rehabilitated after use, even if vegetation clearance were minimal.</p> <p>Concurrent rehabilitation will be implemented before the next rain season with specific site specimens replaced and buffered (watering, planting method and amelioration) to ensure vegetation cover and composition is returned as best possible.</p>	<p>Vegetation cover and composition will make out part of the baseline and rehabilitation monitoring program.</p>

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
		<p>Approved drill sites will be physically demarcated using temporary fencing as a constant reminder to all staff as to which areas are approved and which are to be avoided.</p>	<p>of the platform and how it will work must be in place before the contractor may go on site.</p> <p>Recommendations stipulated within the Fauna and Flora Specialist Reports must be adhered to during construction and operational phases.</p>		
<p><b>Protect sensitive species variations and populations.</b></p>	<p>Change in species composition; Loss of species; and Loss of populations.</p>	<p>Site clearance for new boreholes will be minimised to prevent impact on sensitive species.</p> <p>Sensitive habitats (pans and CBA 01 and CBA 02) will be avoided unless a biodiversity offset is secured before impact takes place. BMM has implemented significant avoidance measures with the V03 drill plan.</p> <p>Any nationally protected trees within close proximity of the development footprint to be identified and avoided or special permits obtained to remove the trees, meeting the obligations of such permits issued. BMM has applied for these permits in 2019.</p> <p>Water supply lines will be laid with least impact on sensitive vegetation.</p>	<p>Prior to prospecting commencement, the updated Search and Rescue and Transplantation plan must be executed.</p> <p>Search and rescue operations in sensitive areas will be implemented with specific focus on <i>Conophytum calculus</i> (Old43 and Old42), <i>Conophytum ratum</i> and <i>Avonia quinaria</i> (Old42). Removal of species with underground storage organs (e.g. bulbs, <i>Tylecodon suffultus</i>) will not be attempted except where the actual drill rig is to be placed.</p> <p>To mitigate mortality, certain species will not be transplanted to a nursery, but directly affected areas in similar habitats and the South African National Biodiversity Institute (SANBI) will assist with seed collection in the field and maintenance and storage of seed.</p>	<p>Rescued specimens will be used for concurrent rehabilitation.</p> <p>Only areas designated for long term protection and no further drilling will be rehabilitated.</p> <p><i>Ex-situ</i> propagation and seed production and banking of special species will be done at the BMM nursery and at least one other nursery.</p> <p>Water supply materials (pipes, wires, valves, fittings) must be removed when not use.</p>	<p>Specialist species monitoring and rehabilitation monitoring will take place on reference and drill sites before and after drilling.</p> <p>All workers must be trained and educated on environmental sensitivities of the site and appropriate behaviour especially with regard to species introductions.</p> <p>Marking and demarcation of sensitive and protected species prior and during exploration will be conducted and plants recorded will be marked and demarcated for weekly monitoring and photographic evidence.</p>



Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
			<p>BMM's Biodiversity Officer, with the support and input from external specialists will compile a dedicated training programme for BMM and its associated Business Partners' employees who will participate in the execution of the proposed exploration activities. Training will include: classroom training; in-field training; awareness of No-Go Area; and utilization of the onsite nursery for plant identification.</p>		
<p><b>Manage Aggeneys Nursery to secure flora protection</b></p>	<p>Loss of species; and Loss of populations.</p>	<p>Avoid loss of species and populations by reducing the total footprint where listed flora occurs. BMM has avoided significant areas in the V03 drill plan.</p> <p>Avoid mortality of nursery plants that must be used for rehabilitation by implementing the search and rescue plan as well as the nursery management plan.</p>	<p>Isolate and collect seeds from nursery plants for rehabilitation. Undergo vegetative propagation of plants for rehabilitation where possible. To ensure high rates of genetic diversity in the collection for any given taxon in the nursery, locality data for individual plant collections needs to be included in the nursery list so that it is clear that representative collections of taxa are both made and maintained (e.g., the plateau and plains forms of <i>Conophytum ratum</i>, or plants from different inselbergs in the Gamsberg area).</p>	<p>Efforts will be made to reduce mortality rates for individual species transplanted to the nursery.</p> <p>RO plant installed during nursery upgrade.</p> <p>Several species of conservation concern are not yet represented in the seed bank at the Nursery (e.g., none of the <i>Conophytum</i> species). Collection of wild seed from such taxa will be a priority.</p>	<p>Adequate identification of species collected and maintained in the nursery will be prioritized and done to ensure and achieve recovery of endemic and near-endemic species.</p> <p>The plant list also needs to be checked by a botanist or plant ecologist to confirm identification and spelling.</p> <p>The number of species, propagation numbers and survival rates can be made available.</p>

<b>Environmental Management Objective</b>	<b>Impact</b>	<b>Avoidance Measures</b>	<b>Reduction Measures</b>	<b>Remedial Measures</b>	<b>Monitoring Measures</b>
<b>Manage alien invasive species</b>	Changes in vegetation composition: Alien species encroachment.	Prevent and limit alien invasive species establishing on site by conducting concurrent rehabilitation and vegetating bare areas as soon as possible.	Regular alien clearing will be conducted using the best-practice methods for the species concerned. The use of herbicides will be avoided as far as possible.	<p>Reintroduce local indigenous seed and species during rehabilitation. Vegetate area with specimens rescued from site where possible.</p> <p>This will be done where areas were cleared and where alien species were removed.</p>	<p>Alien vegetation monitoring and maintenance plans will be in place for the site during operation and for the rehabilitated areas after operation has ceased.</p> <p>An alien plant monitoring program is also incorporated in Black Mountain Mine's management.</p>

### 3.1.6 Heritage Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<p><b>Minimise the impact on archaeological and palaeontological resources</b></p>	<p>Loss of heritage artefacts or archaeological resources; and Loss of paleontological resources</p>	<p>Once the exact location of the proposed boreholes is available the new drill sites will be investigated individually by a qualified archaeologist. This has been completed for the original extent of drill sites (V02) in 2019.</p>	<p>A professional palaeontologist must be appointed to respond to queries about any possible or definite fossils found. In the event of a significant fossil find, a palaeontologist will supervise the excavation of the fossils and record the contexts.</p>	<p>The appointed palaeontologist must undertake the recording of the stratigraphy and sedimentary geometry of the exposures, must attempt sampling of the ambient small fossil content and must undertake the compilation of the detailed report.</p>	<p>Excavations must be monitored by on-site personnel under the supervision of the Environmental Control Officer (ECO).</p>
<p><b>Limit loss of heritage artefacts or archaeological resources during site clearance, road construction and earth works</b></p>	<p>Loss of heritage artefacts or archaeological resources; and Loss of paleontological resources</p>	<p>Avoid excess roads or drill pads. Under no circumstances must new tracks be graded or modified in any way other than through the normal vehicle traffic.  No heritage artefacts or archaeological resources will be damaged or destroyed by site clearance, road construction or earth works.</p>	<p>On-site environmental risk assessment by suitably competent person conducted (Appendix D2b, 2019) to reduce impacts before construction.  The following procedures will be followed if any heritage artifact is encountered:  <ul style="list-style-type: none"> <li>• Cease all construction in the immediate vicinity and demarcate the area with barricading tape (50m radius of the site).</li> <li>• Inform the heritage practitioner immediately.</li> <li>• If any evidence of archaeological sites or remains, fossils or other categories of heritage resources are found, SAHRA APM Unit must be alerted.</li> <li>• If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit, must be alerted immediately.</li> <li>• In the event of obvious human remains the South African Police Services (SAPS) will be notified.</li> <li>• Refilling of the site may</li> </ul> </p>	<p>Road verges will be restored to natural state as soon as possible after road construction. This would include storm water diversions and landscaping, replacement of topsoil, brush packing, seeding and/or planting.  Obscured, subterranean sites must be managed, if they are encountered.  The prospecting infrastructure must specifically be subjected to an updated heritage management plan and/or historic study that focus specifically on the identification and management of the inkruip Bushmen/San Massacre sites.</p>	<p>All operators of excavation equipment will be made aware of the possibility of the occurrence of sub-surface heritage features and the procedures will they be encountered.</p>

			<p>not be attempted.</p> <ul style="list-style-type: none"> <li>• Public access will be limited.</li> <li>• The area will be placed under guard.</li> <li>• No media statements will be released until sufficient analyse of the finds are complete.</li> </ul> <p>Liaise on nature of potential finds and appropriate responses.</p>		
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### 3.1.7 Land use Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<b>Restore land use value to sustainable land use or natural pre-determined state</b>	Change in land use potential	No area will be left unsafe, or as waste land after the project. All areas (small or great) must be rehabilitated to reduce cumulative effect of land use reduction as a result of the project.	<p>Land use will be acceptable to the community and sustainable on the long term.</p> <p>Current land-use is conservation in terms of the BMM Biodiversity management plan and biodiversity offset agreement.</p>	Where areas cannot be restored to sustainable land use or natural pre-determined state and alternative land use can be selected through specialist and community consultation process.	Monitor final land use quality before project closure and or handover.

### 3.1.8 Noise Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<b>Reduce noise impacts</b>	Disturbance: Noise		Adjacent landowners to the proposed activity will be notified of commencement of construction and drilling that would result in significant noise generation.	PPE must be worn by all employees and site visitors while drilling takes place.	Safety officer to monitor PPE compliance.

### 3.1.9 Rehabilitation Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<p><b>Manage rehabilitation sustainability through proper planning</b></p>	<p>Costs: increase in rehabilitation costs; Costs: Increased management costs; Costs: shift in rehabilitation costs; Changes to landscape: transformation; and Change in land use potential.</p>	<p>Ensure a rehabilitation plan is in place that incorporate physical and biophysical (biotic and abiotic remediation) designs specific to the site conditions.</p> <p>Independent, external specialists will be appointed to compile a dedicated monitoring programme in line with the Gamsberg Zinc Mine Rehabilitation Monitoring Protocols for post rehabilitation monitoring of each of the exploration sites.</p>	<p>Reduce rehabilitation costs by implementing rehabilitation according to the rehabilitation plan and review plan and monitoring results annually to adjust for continual improvement.</p>	<p>Identification of both geographical areas and timescales are needed for site rehabilitation planning activity. Ultimate survival rates for such plant translocation (either from the BMM Nursery or directly from new sites) are likely to be much lower than transplantation to the nursery itself.</p> <p>Transplantation trials of selected species (representing Gamsberg taxa) to determine how to maximise survival (timing of transplantation / climate / growth cycle / provision of water and shade / soil amelioration / competition effects etc.).</p> <p>Decommissioning will take place concurrently, as each drill site is closed. Concurrent rehabilitation will take place according to the search, rescue and translocation plan as well as the closure quantum requirements.</p>	<p>Fire, flood, wind and trampling impacts on rehabilitation works will be mapped and prioritised for follow-up as frequently as these impacts on rehabilitation occur.</p> <p>Monitor the rehabilitation plan and rehabilitation success annually and ensure availability of reports.</p> <p>It is proposed that aerial photos (drone footage) at 5, 10 and 15 meters above the drill site be taken as fixed photo monitoring before, during and after rehabilitation.</p> <p>Transplantation trials will be set up using sound scientific methodologies and be written up for publication. Three years of post-rehabilitation monitoring is required before final sign off can be considered.</p>

### 3.1.10 Soil Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<p><b>Prevent and manage soil contamination</b></p>	<p>Loss of soil function. Generation of contaminated soils.</p>	<p>Drill rigs should be lined with impervious sheeting to prevent ingress of hydrocarbons from the drill rig during a breakdown.</p> <p>Drill sludge will be contained in recycle drums and not be allowed to interact with natural soils.</p> <p>All hazardous materials will be stored according to the hazardous material management procedures to prevent contamination of the site.</p> <p>Clearing of soils will be limited as far as possible. The stockpiles will be located up-slope of the drill pad and shaped to divert storm water around the drill pad.</p>	<p>All hazardous storage containers will comply with the relevant SABS standards during in transport and transfer.</p> <p>Hydrocarbon management procedures and environmental incident procedures will be implemented on site.</p> <p>Drill sludge will be disposed of at the nearest demarcated waste rock dump.</p> <p>Topsoil will be cleared and stock-piled on PVC liners for rehabilitation where soil impacts are unavoidable (drill holes).</p>	<p>Marginally contaminated soil will be treated on site. Significantly contaminated soil will be despatched to registered hazardous waste site or bio-remedial plant. A diesel bowser will be used for rig refuelling. Spillage will be prevented as far as possible and cleaned up in the event that it occurs.</p> <p>Commercial oil spill kits will be kept at each site to be used in the event of any spillages.</p>	<p>The appointed TMM engineer will inspect the rigs regularly to ensure drill rig standards, condition and maintenance is sufficient to prevent unnecessary breakdowns and polluting operations.</p> <p>Parking areas, refuelling areas and storage areas will be monitored for soil contamination.</p> <p>The management of hydrocarbons and spill kits will be done on a weekly basis by the site ECO.</p> <p>Drill equipment and diesel bowsters must be monitored and checked regularly by operators for pollution potential. Any oil dripping must be reported to the supervisor immediately. The supervisor is responsible to stop the machine and replace the dripping machine.</p> <p>Evidence of final correct disposal must be kept on site.</p> <p>The contractor must have a drill rig maintenance plan addressing each rig type with prestart checklists and no operation standards if prestart indicate faults.</p>

### 3.1.11 Geohydrology Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<b>Manage and limit impact on groundwater levels and quality</b>	Changes in ground water quality.	Avoid ingress of surface-and/or affected-water to ground water by having a raised, closed borehole cap immediately after drilling. No excess drill sludge, sump water or hydrocarbons will be placed down a borehole.	Hydrocarbon impacts on ground water will be reduced by selecting environmentally designed chemicals.	Contractors will be equipped with borehole amelioration socks, spill kits and chemicals. All boreholes will be treated down hole and around the casing for hydrocarbon impacts upon removal of the rig from the borehole.	Ground water visual assessments will be conducted after initial contractor treatment and bi-annually thereafter until the borehole is clean. Chemical water analysis will be done to quantify visual assessments where required. BMM will continue with groundwater monitoring under the existing Impact Management Agreement and Groundwater Monitoring Programme and will adhere to the obligations under the Impact Management Agreement of 15/09/2013, specifically i.t.o groundwater monitoring and borehole water levels monitoring.

### 3.1.12 Hydrology Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<b>Reduce impact on surface hydrology and consequential secondary impacts</b>	Changes in surface hydrological patterns and processes.	Avoid road and site establishment in steep gradients as far as possible. Where this is unavoidable, storm water isolation berms will be constructed to isolate affected areas from natural areas. Diversion of potential rainwater around affected sites will be planned for all drill sites where rainwater is expected to affect adjacent areas.	Reduce long term impacts by installing storm water controls during road construction and implement road maintenance during drilling.  To reduce potential for water pollution during the drilling activities, a raised recycling sump will receive drill fluids and allow for evaporation.	Reduce long term impacts by road rehabilitation immediately after drilling. Restoration of the hydrological regime will be done to ensure minimal silt and loose soils wash downwards towards the Aggeney's Gravel Vygie veld which is most susceptible to such disturbance.	Monitoring of secondary impacts adjacent to roads and drill sites. Monitor storm water infrastructure after each rain event to ensure mitigation measures remain.

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
		The excavation of a sump will not be required. A drill sludge containment and water recycling unit will be used.			
<b>Manage and limit the impact of mineral waste generation and accumulation on surface water</b>	Changes in surface water quality runoff.	Avoid contamination of soils by waste, hydrocarbons or drill sludge that could lead to dirty water areas that could wash / drain into clean water areas.	Remediate all impacted sites immediately during drilling. Sludge and hydrocarbon spills will not be left until rehabilitation phase.	Soil remediation by the use of spillsorb and or other amelioration to restore functionality (like microorganism inoculation) must be considered where soils do not recover from sludge / hydrocarbon impacts.	Rehabilitation monitoring will incorporate pollution and soil impact (subsoil, compaction, erosion) assessments that could affect rehabilitation success.

### 3.1.13 Waste Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
<b>To minimise and manage waste generated in the proposed development area.</b>	Ecological system impacts: Ecological and aesthetic deterioration	Sanitary waste must be contained in mobile toilets and removed from site by a competent contractor.	A waste management system will be implemented, and sufficient waste bins provided on site.  Waste containers will be closed to eliminate the possible access of rainwater or animals.	General waste accumulating on site will be sorted, stored and deposited of at a registered waste facility.  Recyclables will be taken to a licensed recycling facility.	Implementation of the waste management procedure will be monitored by the ECO.



### 3.1.14 Health and Safety Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
Limit injuries to individuals on site	Human injuries	Site access will be controlled and no unauthorized persons will be allowed onto the site.  All boreholes will be pegged to ensure their visibility to humans.		No open holes will be left without rehabilitation at the site as persons can fall in and get injured.	

### 3.1.15 Economic Mitigation Measures

Environmental Management Objective	Impact	Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
Maintenance and monitoring management		Sufficient resources and funds must be available to maintain the required monitoring and maintenance, data analysis and management of elements monitored throughout the project.		Rehabilitation maintenance plans will be in place for each site rehabilitated.	Alien vegetation monitoring and maintenance plans adhered for the site during operation and for the rehabilitated areas after operation has ceased.

## 4. Volumes and rate of water use required for the operation.

During the operational phase water will be supplied from Pella water drift Orange River Pump Station to Gamsberg Zinc Mine. Supply from Pella water drift orange river pump station to Gamsberg then delivered via JoJo tanks, aqua dams and pipes or watercarts for up to 150 000 liters storage. Where water use will exceed the general authorization volume for the area, BMM WUL will be checked for application of compliance or new authorization sought whichever is applicable. The site has a water use license and is authorized to use water beyond the generally authorized amounts. No groundwater will be extracted for prospecting.

### 4.1. Has a water use license been applied for?

Black Mountain Mining (Pty) Ltd: Gamsberg Zinc Mine has an existing water use license. License number 14/D82C/ABCGIJ/2654 issued on 2016/04/14.

In terms of legal application, in summary water can legally be used without a WUL for domestic use for the prospecting project and water can be stored up to 50 000 cubic meters for domestic and prospecting use.

No water use license is required where water use is limited to the above volumes, drilling takes place outside 100 meters of a water course and regulation 704 buffer areas of 500 meters is applied to pans. Drilling can be conducted legally without a WUL or regulation 704 exemption application as long as BMM avoids drilling within 100 meters of a water course or 500 meters from a pan. Where drilling will exceed these buffers, application for authorization can be made to the Department of Water and Sanitation (DWS).

A water use license in terms of section 21c&I have been applied for and was approved on 11/12/2019.

## 5. Financial Provision

### 5.1. Determination of the amount of Financial Provision

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

Black Mountain Mining (Pty) Ltd: Gamsberg Zinc Mine currently commits to the following closure objectives:

1. To secure the effective and sustainable transfer of the municipal services of the town, Aggeneys, and the Pella-drift Water Board to the Khai-Ma municipality;
2. To ensure that the biodiversity and environment on the site is protected;
3. To make sure that the following commitments will be achieved as a minimum:
  - ④ The site will be made safe for both humans and animals;
  - ④ The site will be rehabilitated to be physically, chemically and biologically stable;
  - ④ The residual impacts will be managed to acceptable levels and will not deteriorate over time; and
  - ④ Closure will be achieved with minimal socio-economic upheaval.
4. To provide sufficient funds at the end of life of mine, to properly implement the closure plan, and also to make provision for possible premature closure, and post closure monitoring requirements.

The main alignment to the baseline environment is aiming for the protection of the biodiversity through all the phases of the project. This will be achieved by implementing the rehabilitation plan.

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

The landowner is also the proponent. The nearest neighboring farm is approximately 1.29 km from the drill sites. The Basic Assessment Report and Environmental Management Plan are now made available to each registered stakeholder for review and comment. All comments will be recorded in the issues and response section and will be included into the final report.

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

The proposed rehabilitation approach is to conduct rehabilitation concurrently while drilling takes place according to the different prospecting areas and phases.

The drilling plan inserted above is also the concurrent rehabilitation plan as set out in the rehabilitation schedule above.

Timeline for exploration is a projection and completely dependent on zinc prices and budget availability for exploration activities. Please refer to the financial provision report appended to this submission for more detail.

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

The rehabilitation plan has been developed on the basis that the rehabilitated areas are safe, stable, non-polluting and are able to support an ecosystem similar to the surrounding natural environment. Due to the nature of the activities, the impacts will be limited and of short duration. The management plan is provided in such a manner as to ensure concurrent rehabilitation. To ensure the alignment of the rehabilitation plan with the closure objective, a high-level risk assessment of the prospecting activities has been conducted to establish the potential risks associated with it.

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

**Table 31: Summary of Project Context for calculation**

<b>Project Context</b>						
<b>Land holding</b>						
Project Name	DMR Ref	Year Approved	LoM	Property Name	Erf No.	Ownership
Gamsberg South & East	NCS 30/5/1/2/2/ (518) MR	2021	2026	Gamsberg	Gams 60, Portion 01	Black Mountain Mining Pty (Ltd)
<b>Drilling Status</b>						
Project Name	Access Roads	Total Approved #	Sites Drilled	Sites Planned for Drilling	Drill Sites rehabilitated	Rehabilitation Signed off
Gamsberg South & East	numerous	28	27	1	27	0
<b>Rehabilitation Status: Roads, Laydown areas and Drill Sites</b>						
Project Name	Total landholding (ha)	Approved footprint (ha)	Disturbed (ha)	Planned Disturbance (ha)	Rehabilitated (ha)	Balance (Disturbed -Rehab)
Gamsberg South & East	3 858.00	14.70	11.17	3.53	-	-

**Table 32: Summary of Project Financial Quantum**

<b>Financial Quantum Summary</b>						
<b>Financial quantum per closure and rehabilitation works</b>						
Project	Safety and Security	Pollution Control	Rehabilitation	Maintenance	Monitoring	Total
Gamsberg South & East	372 961.80	871 615.94	100 397.62	12 932.13	188 446.32	<b>1 546 353.82</b>

**5.1.6 Confirm that the financial provision will be provided as determined.**

Black Mountain Mining (Pty) Ltd, a member of Vedanta plc, is considered financially competent and undertakes concurrent rehabilitation in the company resolution as provided in the Prospecting Work Programme.

Black Mountain Mining (Pty) Ltd will provided bank guarantee if prospecting project is approved.

**6. Mechanisms for monitoring compliance**

*Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including:*

- a) *Monitoring of Impact Management Actions;*
- b) *Monitoring and reporting frequency;*
- c) *Responsible persons;*
- d) *Time period for implementing impact management actions; and*
- e) *Mechanism for monitoring compliance.*

It is the primary responsibility of Black Mountain Mining (Pty) Ltd to ensure that the execution of the monitoring and management programme is done in accordance with this environmental management programme (EMP).

In instances where contractors will be appointed, it remains the responsibility of the BMM Manager to communicate the requirements of this EMP to the said contractors. An environmental officer or other appointed representative will at least conduct EMP audits monthly during prospecting to ensure compliance with the EMP.

All existing ISO14001 procedures and standards will be applied to this site as for the rest of the BMM operation. Where new requirements are detailed in this report that is not in the existing standards, the standards will be reviewed and updated. Roles

and responsibilities need to be defined clearly in such a procedure. The Manager must ensure that all reporting to specific government department is done as per this EMP.

The table below provides details of how environmental impacts must be managed and monitored and also provides the monitoring frequency as well as the reporting frequency.

**Table 33: Mechanisms for Monitoring Compliance**

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY
Site clearance and traffic	Changes in air quality - dust	Dust monitoring programme to assess impacts on floral biodiversity	Biodiversity Manager	Monitoring: Annually Reporting: Annually
Site clearance and construction	Habitat destruction	Restore road verges to natural state after construction. Including storm water diversions, landscaping, topsoil replacement, brush packing, seeding and/or planting.	Environmental Manager	Monitoring: After each rain event Reporting: Annually
		Take photographs prior, during and after drilling as records of each drill site	Prospecting Manager	Monitoring: Every drill site Reporting: Annually
		A detailed drawing of the site platform (including scaffolding, rubber, drill rig etc.) must be in place before the contractor go on site. This item should be audited on site.	ECO Prospecting Manager	Monitoring: Weekly Reporting: Weekly Monitoring: Annual Audit
Site clearance and construction	Interaction with the environment: Ecological system impacts; Changes in soil functionality; and Changes in surface water quality runoff.	A feral dog and cat control programme must be implemented where monitoring indicate any presence of domestic animals on site.	Biodiversity Manager	Monitoring: Daily Reporting: If required
		Demarcation of the drill site and road footprint with visible removable barriers, prior to search and rescue of a site.	Mine Environmental Manager; Drill Site Manager & ECO	Monitoring: Prior to drilling
Site clearance and traffic	Loss of sensitive habitats.	The rehabilitation of the south access route needs to be completed before prospecting commences.	Biodiversity Manager	Monitoring: Prior to drilling Monitoring: Annually Reporting: Annually
		Rehabilitation monitoring according to the BMM monitoring protocols in place.	Biodiversity Manager	Monitoring: Annually Reporting: Annually
Traffic	Persecution of fauna - road kills	Record all road kills. Include species, date, area.	Project team	Monitoring: Daily Reporting: Immediate incident reporting
Site clearance Construction	Fauna: Loss of habitats; and Persecution of fauna - road kills.	An animal monitoring program is incorporated in Black Mountain Mine's management.	Biodiversity Manager	Monitoring: Annually Reporting: Annually
Site clearance Operational	Impact on flora: Species composition; Loss of vegetation cover; Loss of species; Loss of populations; and Changes in vegetation composition	The planned impact footprint area must be demarcated, screened and plant populations profiled, mapped and seed collected to secure genetic diversity before search and rescue of the listed species take place	Biodiversity Manager	Monitoring: Prior to search and rescue

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY
		Search, rescue and translocation must take place before site access is granted to the contractor.	Biodiversity Manager	Monitoring: Prior to site clearance Reporting: Annually
		Vegetation cover and composition as part of the baseline and rehabilitation monitoring program.	Biodiversity Manager	Monitoring: Annually Reporting: Annually
		The plant list needs to be checked by a botanist or plant ecologist to confirm identification and spelling.	Biodiversity Manager	Monitoring: Ongoing
		Plants recorded will be marked and demarcated for weekly monitoring and photographic evidence.	Biodiversity Officer	Monitoring: Weekly
		Training will include: classroom training; in-field training; awareness of No-Go Area; and utilization of the onsite nursery for plant identification.	Biodiversity Officer and Employees	Training: Continuous
Invasive drilling	Flora Change in species composition; Loss of species; and Loss of populations.	Specialist species monitoring and rehabilitation monitoring will take place on reference and drill sites before and after drilling.	Biodiversity Manager	Monitoring: Prior and post drilling Reporting: Annually
Operational	Changes in vegetation composition: Alien species encroachment.	Alien vegetation monitoring and maintenance plans will be in place for the site.	Environmental / Biodiversity Manager	Monitoring: Annually Reporting: Annually
		An alien plant monitoring program is also incorporated in Black Mountain Mine's management.	Biodiversity Manager	Monitoring: Annually Reporting: Annually
Post drilling	Human injuries	Cap and mark all boreholes	Prospecting Manager	Monitoring: Every drill site, as drill site close (temporary or permanently) Reporting: Monthly
Site clearance Construction	Loss of heritage artefacts or archaeological resources; and Loss of paleontological resources	Excavations must be monitored.	ECO	Monitoring: Daily Reporting: Immediate incident reporting
Operational Closure	Change in land use potential	Monitor final land use quality	Prospecting Manager	Monitoring: Prior to project closure Reporting: Prior to project closure
Site clearance Operational Closure	Unlawful activity: Affecting a water resource without permission	Audits to ensure that the rehabilitation is stable; failing stability, remedial action must be taken to rectify any impacts.	Environmental Manager	Monitoring: Annually (for 3years) Reporting: Annually (for 3years)
		Regular monitoring and maintenance of storm water drainage facilities must be conducted at all times.	Environmental Manager	Monitoring: Daily Reporting: Immediate incident reporting
		Implementation of concurrent rehabilitation and rehabilitation monitoring of riverine habitat is required.	Biodiversity Manager	Monitoring: Annually Reporting: Annually

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY
Invasive drilling	Disturbance: Noise	Monitor PPE compliance.	Safety Officer	Monitoring: Daily
Pre-Site clearance Operational Closure	Costs: increase in rehabilitation and management costs Changes to landscape: transformation; and Change in land use potential.	Fire, flood, wind and trampling impacts on rehabilitation works will be mapped and prioritised for follow-up as frequently as these impacts on rehabilitation occur.	Environmental Manager	Monitoring: When necessary Reporting: When necessary
		Monitor the rehabilitation plan and rehabilitation success.	Environmental / Biodiversity Manager	Monitoring: Annually Reporting: Annually
		It is proposed that aerial photos (drone footage) at 5, 10 and 15 meters above the drill site be taken as fixed photo monitoring before, during and after rehabilitation.	Prospecting Manager	Monitoring: Annually Reporting: Annually
		Post-rehabilitation monitoring before final sign off can be considered.	Biodiversity Manager	Monitoring: Annually (for 10years)
		Ecological sustainability monitoring: Information from the monitoring program must detect changes in the ecosystem which ultimately show degree of ecological sustainability. Data is presented from inductive reasoning or pattern recognition.	Biodiversity Manager	Monitoring: Annually Reporting: Annually
		Rehabilitation evaluation.	Environmental Manager	Monitoring: Prior search and rescue Monitoring: Post drilling Monitoring: Post rehabilitation Reporting: Annually
Operational	Loss of soil function. Generation of contaminated soils.	Inspect the rigs regularly to ensure drill rig standards, condition and maintenance is sufficient to prevent unnecessary breakdowns and polluting operations.	Appointed TMM	Monitoring: Regularly
		Parking areas, refuelling areas and storage areas will be monitored for soil contamination.	ECO	Monitoring: Daily Reporting: Weekly
		Management of hydrocarbons and spill kits	ECO	Monitoring: Weekly
		Drill equipment and diesel bowsers must be monitored and checked regularly for pollution potential. Any oil dripping must be reported to the supervisor immediately. The supervisor is responsible to stop the machine and replace the dripping machine.	Operating team	Monitoring: Daily Reporting: Immediate incident reporting
		Evidence of final correct disposal must be kept on site.	ECO	Reporting: When required
Operational	Ecological system impacts: Ecological and aesthetic deterioration	Implementation of the waste management procedure.	ECO	Monitoring: Weekly Reporting: Annually
Post drilling	Changes in ground water quality.	Ground water visual assessments will be conducted according to the existing Impact Management Agreement and Groundwater Monitoring Programme.	Environmental Manager	Monitoring: After initial contractor treatment Monitoring: Bi-annually (Until clean)

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY
				Reporting: Annually
		Chemical water analysis will be done to quantify visual assessments where required.	Environmental Manager	Monitoring: When required Reporting: Annually
Operational	Changes in surface hydrological patterns and processes.	Monitoring of secondary impacts adjacent to roads and drill sites.	Environmental / Biodiversity Manager	Monitoring: Annually Reporting: Annually
		Monitor storm water infrastructure.	Environmental Manager	Monitoring: After each rain event Reporting: Annually
		Monitor river crossings for erosion.	Biodiversity Manager	Monitoring: After each rain event Reporting: Annually
		Existing river crossings will be monitored and maintained for future environmental and biodiversity monitoring as per existing Biodiversity Risk Protocol for Pans and Rivers.	Biodiversity Manager	Monitoring: Annually Reporting: Annually
Post drilling	Changes in surface water quality runoff.	Rehabilitation monitoring will incorporate pollution and soil impact (subsoil, compaction, erosion) assessments that could affect rehabilitation success.	Environmental / Biodiversity Manager	Monitoring: Annually Reporting: Annually
Operational	Ecological system impacts	Sites need to be visited by the mine environmental officer and a report submitted to the mine environmental manager and head geologist that details progress with implementing the Prospecting Environmental Management Guideline, issues arising and how these were addressed.	Mine Environmental Officer	Monitoring: Weekly Reporting: Weekly
		Independent environmental review of prospecting activities and restoration program. Findings need to be submitted to the mine environmental manager and head geologist.	Independent specialist	Monitoring: Bi-annually Reporting: Bi-annually
		Review of the restoration plan that takes into account the planned infrastructure provided persist degradation process have been abated.	Environmental / Biodiversity Manager	Monitoring: Annually Reporting: Annually



## **7. Indicate the frequency of the submission of the performance assessment/ environmental audit report**

Internal and external inspections will be conducted on a regular basis to confirm the compliance to this EMP.

EMP performance results and quantum update from these inspections will be reported to the relevant regulator according to the prescribed manner annually.

## 8. Environmental Awareness Plan

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

All employees and subcontractor staff involved with the project will undergo Safety-Health-Environmental Induction that is updated on a regular basis to adhere to changes in compliance requirements.

A Safety-Health-Environmental (SHE) representative is appointed for the working teams to assist in highlighting operational SHE issues while drilling takes place.

The reporting hierarchy for operational performance is also used to ensure environmental communication and awareness. Competent contractors are appointed with supervisors that can translate SHE risks to foremen and operating staff. This takes place through morning meetings before drilling commence (toolbox meetings) and SHE meetings held specifically for this purpose.

In addition to this, specific contractor training must be considered in respect of drilling at Gamsberg.

- ④ Prior to the commencement of the drilling campaign, a Prospecting Environmental Management Guideline document must be drawn-up that collates and includes all existing information and experience relating the minimization, mitigation and management of the environmental aspects of prospecting in sensitive environments on the mine;
  - ④ The document must be written by a competent ecologist in collaboration with the mine exploration geologist and environmental manager;
  - ④ The document needs to be reviewed by an independent ecologist before being signed-off by the mine GM and included in the EMPR; and
  - ④ The guideline document needs to be specific as to the roles and responsibilities of all parties involved (mine, contractor, DENC, DMR, etc.) in terms of pre-drilling planning, drilling implementation, site management and inspection, and post drilling management and restoration activities and monitoring.
- ④ Prior to the commencement of prospecting, a signed letter from the drilling contractor to the mine GM needs to acknowledge acceptance of the guideline document and a written undertaking to implement the guidelines;
  - ④ The drilling contractor contract milestones and deliverables need to be conditional to implementation of the guideline document as the blueprint for drilling implementation. Clear and effective sanctions need to be explicit in the contract for transgression of (1) the Prospecting Environmental Management Guideline and (2) the impact footprint as defined by this assessment - (Set\_aside\_Disturbed\_footprint\_Sept\_2020\_v1\_20200903.shp); and
  - ④ The contractor management staff and operators must be trained in the guideline document.

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

Black Mountain Mining Pty (Ltd) will aim to apply a risk management system where risks are identified and rated.

Site inspections in terms of EMP compliance take place and will serve as a training opportunity.

Emergency procedures of risks are practiced at least annually, and improvements made to ensure emergency preparedness and response is adequate to address environmental incidents.

Recommendations and Incident reporting of events takes place during site inspections and are addressed to ensure continual improvement of the environmental management on site.

Vedanta plc applies international IFC best practice standards on site and BMM is an ISO14001 certified operation.

## 9. Specific information required by the Competent Authority

.....  
*Among others, confirm that the financial provision will be reviewed annually*  
.....

Specific recommendations from the Department of Environmental Affairs to be included in the environmental authorization:

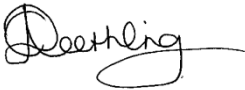
- ④ Specific conditions stemming from the Fauna and Flora Reports must be written into the EA as conditions;
- ④ To mitigate mortality, certain species will not be transplanted to a nursery, but directly affected areas in similar habitats and the South African National Biodiversity Institute (SANBI) will assist with seed collection in the field and maintenance and storage of seed;
- ④ The Plant Rescue and Protection Plan (Appendix H) must be subjected to public comment;
- ④ The EA must include specific conditions relating to the involvement of SANBI during the translocation process;
- ④ Sensitive habitats should be avoided unless a biodiversity offset is secured before impact takes place; and
- ④ Should the DMR decide to issue an EA to the applicant, such EA is to include relevant recommendations from the Flora and Fauna Reports as conditions in the EA.

## 10. UNDERTAKING

The EAP herewith confirms

- (a) The correctness of the information provided in the reports;
- (b) The inclusion of comments and inputs from stakeholders and I&APs;
- (c) The inclusion of inputs and recommendations from the specialist reports where relevant; and
- (d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the environmental assessment practitioner:



Name of company:

EndemicVision Environmental Services

Date:

19 November 2020

## Reference List

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## Appendix A

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### EAP CURRICULUM VITAE

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix B

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### LOCALITY MAP

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix C

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### SITE MAP

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**



## **Appendix D1**

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### **PALEONTOLOGICAL IMPACT ASSESSMENT**

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix D2a

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### HERITAGE IMPACT ASSESSMENT, 2018

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix D2b

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### HERITAGE IMPACT ASSESSMENT, 2019

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix D3

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### FLORA IMPACT ASSESSMENT

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix D4

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### FAUNA IMPACT ASSESSMENT

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix E

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### STAKEHOLDER ENGAGEMENT

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix F

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### CLOSURE QUANTUM

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## Appendix G

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### REASSESSING THE FLORA BASELINE AND OFFSET REQUIREMENT OF THE PROPOSED GAMSBURG SE PROSPECTING

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**



## Appendix H

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### GAMSBERG SEARCH, RESCUE AND TRANSLOCATION PROTOCOL V03

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**

## **Appendix I**

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### **SPECIALIST REPORTS' CONDITIONS**

**For the Gamsberg East and South Prospecting Basic Assessment Report  
2020**