ENVIRONMENTAL IMPACT MANAGEMENT SERVICES

BASIC ASSESSMENT REPORT

KOA VALLEY PROSPECTING RIGHT PROJECT

DMR REFERENCE NUMBER:

NC30/5/1/1/2/11985 PR

EIMS REFERENCE NUMBER:

1179A

20 YEARS 1993 - 2013

Environmental Impact Management Services (Pty) Ltd

Unit 1, Esplanade Suites, 12 Clifford Street,

Quigney, East London

P.O. Box 19731, Tecoma, 5214

Tel: +27(0)43 722 7572

Fax: +27(0)86 571 9047

Leaders in Environmental Management

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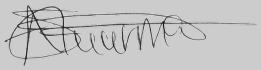
Compiled:	Andisiwe Stuurman		26/07/2017
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REVISION AND AMENDMENTS

Date	No.	Description Of Revision Or Amendment
2017/06/21	0	Draft Basic Assessment Report
2017/07/24	1	Basic Assessment Report

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

PREPARED BY:

ENVIRONMENTAL IMPACT MANAGEMENT SERVICES

NAME OF APPLICANT: Black Mountain Mining (Pty) Ltd

TEL NO: +27 54 983 9287

FAX NO: +27 11 784 2724

POSTAL ADDRESS: Private Bag X01, Aggeneys, 8893

PHYSICAL ADDRESS: 1 Penge Road, Aggeneys, 8893, South Africa

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IMPORTANT NOTICE

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

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

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

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

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information requested 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 order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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

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

c) Describe the need and desirability of the proposed alternatives;

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

    i. The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

    ii. The degree to which these impacts-

aa) Can be reversed;

bb) May cause irreplaceable loss of resources; and

cc) Can be managed, avoided or mitigated;

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

i. Identify and motivate a preferred site, activity and technology alternative;

ii. Identify suitable measures to manage, avoid or mitigate identified impacts; and

iii. Identify residual risks that need to be managed and monitored.

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ABBREVIATIONS

BAR : Basic Assessment Report

BID : Background Information Document

DMR : Department of Mineral Resources

DWS : Department of Water and Sanitation

EA : Environmental Authorisation

EAP : Environmental Assessment Practitioner

EIA : Environmental Impact Assessment

EIMS : Environmental Impact Management Services

EMPR : Environmental Management Programme

GIS : Geographic Information System

I&AP : Interest and Affected Party

MPRDA : Mineral and Petroleum Resources Development Act

NEMA : National Environmental Management Act

NEMWA : National Environmental Management Waste Act

NWA : National Water Act

PPP : Public Participation Process

PRA : Prospecting Right Application

PWP : Prospecting Works Programme

PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. INTRODUCTION

Black Mountain Mining (Pty) Ltd (the Applicant) has submitted an application for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002) (MPRDA) and an Application for Environmental Authorization in terms of Chapter 6 of GNR 982 promulgated under the National Environmental Management Act (Act 107 of 1998) (NEMA) to prospect for ferrous & base metals (Copper Ore, Iron Ore, Zinc Ore, Lead Ore, Manganese Ore, Nickel and Molybdenum) and all associated metals and minerals , precious metals (Gold Ore, Silver Ore) and all associated metals and minerals as well as nuclear fuels (Uranium) and all associated metals and minerals.

The proposed project will aim to ascertain if economically viable mineral deposits exist within the application area. In order to undertake prospecting activities, Black Mountain Mining will require a Prospecting Right in terms of the Mineral and Petroleum Resources Development Act (MPRDA, Act No.28 of 2002). The Applicant is also required to obtain an Environmental Authorisation (EA) in terms of the National Environmental Management Act (NEMA, Act No. 107 of 1998) which involves the submission of a Basic Assessment Report (BAR). Environmental Impact Management Services (Pty) Ltd (EIMS) have been appointed by Black Mountain Mining to compile the BAR (this report) in support of the Prospecting Right application submitted by EIMS on behalf of Black Mountain Mining, which in turn will be submitted to the DMR for adjudication.

This BAR has been designed to meet the requirements for a BAR and Environmental Management Programme (EMPR) as stipulated in the 2014 EIA Regulations promulgated under the NEMA. The adjudicating authority for this Application will be the Department of Mineral Resources (DMR), and this report has been compiled in accordance with the applicable DMR guidelines and reporting template.

The proposed Koa Valley Prospecting Right Area is situated over a number of farm portions and is located approximately 12 to 50 kilometres west of the town of Aggeneys and 60 to 108 kilometres north east of the town of Springbok, Namaqualand District, Northern Cape Province.

A Prospecting Work Programme (PWP) has been developed by the applicant to include both non-invasive and invasive prospecting activities. The target geological formation of the PWP is the Bushmanland Group.

The Prospecting Right Application and Application for EA was submitted to the DMR during May 2017. The DMR accepted the Application for Environmental Authorisation as well as the SAMRAD application on 31 May 2017. The BAR (this report) was made available to Interested and Affected Parties (I&AP's) for comment from 23 June 2017 to 25 July 2017. All comments received during this period will be included in the BAR submitted to the DMR for adjudication.

1.1. REPORT STRUCTURE

This report has been compiled in accordance with the NEMA EIA Regulations, 2014. A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 1 below.

TABLE 1: REPORT STRUCTURE

Environmental Regulation	Description	Section in Report
NEMA Regulation 982 (2014)		
Appendix 1(3)(a):	Details of – (i) The EAP who prepared the report; and (ii) The expertise of the EAP, including a curriculum vitae;	Section 1.2 Section 1.3
Appendix 1(3)(b):	The location of the activity, including: (i) The 21 digit Surveyor General code of each cadastral land parcel; (ii) Where available, the physical address and farm name; and (iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 1.4
Appendix 1(3)(c):	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Section 1.4

Environmental Regulation	Description	Section in Report
Appendix 1(3)(d):	A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered and being applied for; and (ii) A description of the activities to be undertaken including associated structures and infrastructure;	Section 2 Section 2.4 Section 2
Appendix 1(3)(e):	A description of the policy and legislative context within which the development is proposed including – (i) An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) How the proposed activity complies with and responds to the legislation and policy context plans, guidelines, tools frameworks, and instruments;	Section 3
Appendix 1(3)(f):	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;	Section 4
Appendix 1(3)(g):	A motivation for the preferred site, activity and technology alternative;	Section 5
Appendix 1(3)(h):	A full description of the process followed to reach the proposed alternative within the site, including: (i) Details of all the alternatives considered; (ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 6 Section 6.1 Section 6.2 Section 6.4

Environmental Regulation	Description	Section in Report
	(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage, and cultural aspects; (v) The impacts and risks identified for each alternative including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts – (aa) Can be reversed; (bb) May cause irreplaceable loss of resources; and (cc) Can be avoided, managed or mitigated; (vi) The methodology used in determining and ranking the nature, significance, consequences, extent duration and probability of potential environmental impacts and risks associated with the alternatives; (vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological social, economic, heritage and cultural aspects; (viii) The possible mitigation measures that could be applied and level of residual risk; (ix) The outcome of the site selection matrix; (x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Section 6.4 Section 6.5 Section 6.6 Section 6.7 Section 6.5 Section 6.9 Section 6.10

Environmental Regulation	Description	Section in Report
	(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity;	
Appendix 1(3)(i):	A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location 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;	Section 7
Appendix 1(3)(j):	An assessment of each identified potentially significant impact and risk, including – (i) Cumulative impacts; (ii) The nature, significance and consequence of the impact and risk; (iii) The extent and duration of the impact and risk; (iv) The probability of the impact and risk occurring; (v) The degree to which the impact and risk can be reversed; (vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) The degree to which the impact and risk can be mitigated;	Section 8

Environmental Regulation	Description	Section in Report
Appendix 1(3)(k):	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 9
Appendix 1(3)(l):	An environmental impact statement which contains – (i) A summary of the key findings of the environmental impact assessment; (ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicting any areas that should be avoided, including buffers; and (iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Section 10
Appendix 1(3)(m):	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPR;	Section 11
Appendix 1(3)(n):	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 12
Appendix 1(3)(o):	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 13
Appendix 1(3)(p):	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 14

Environmental Regulation	Description	Section in Report
Appendix 1(3)(q):	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, and the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Section 15
Appendix 1(3)(r):	An undertaking under oath or affirmation by the EAP in relation to: (i) The correctness of the information provided in the reports; (ii) The inclusion of comments and inputs from stakeholders and I&Ps; (iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested an d affected parties;	Section 16 Section 27
Appendix 1(3)(s):	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Section 17
Appendix 1(3)(t):	Any specific information that may be required by the competent authority; and	Section 18
Appendix 1(3)(u):	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	Section 19
Appendix 4(1)(1)(a):	Details of – (i) The EAP who prepared the EMPR; and (ii) The expertise of that EAP to prepare an EMPR, including a curriculum vitae;	Section 20.1

Environmental Regulation	Description	Section in Report
Appendix 4(1)(1)(b):	A detailed description of the aspects of the activity that are covered by the EMPR as identified by the project description;	Section 20.2
Appendix 4(1)(1)(c):	A map 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;	Section 20.3
Appendix 4(1)(1)(d):	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified though the environmental impact assessment process for all phases of the development including – (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities;	Section 21
Appendix 4(1)(1)(e):	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 21.5
Appendix 4(1)(1)(f):	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to –	Section 21.5

Environmental Regulation	Description	Section in Report
	(i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practices; (iii) Comply with any applicable provisions of the ac regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	
Appendix 4(1)(1)(g):	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 23
Appendix 4(1)(1)(h):	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 23
Appendix 4(1)(1)(i):	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 23
Appendix 4(1)(1)(j):	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 23
Appendix 4(1)(1)(k):	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 23
Appendix 4(1)(1)(l):	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 24

Environmental Regulation	Description	Section in Report
Appendix 4(1)(1)(m):	An environmental awareness plan describing the manner in which – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 25
Appendix 4(1)(1)(n):	Any specific information that may be required by the competent authority.	Section 26

1.2. DETAILS OF THE EAP

EIMS was appointed by the Applicant as the Environmental Assessment Practitioner (EAP) to compile this report. The contact details of the EIMS consultant who compiled the report are as follows:

Name of the Practitioner: GP Kriel

Tel No.: 043 722 7572

Fax No.: 086 571 9047

E-mail address: gp@eims.co.za

1.3. EXPERTISE OF THE EAP

1.3.1. QUALIFICATIONS OF THE EAP

In terms of Regulation 13 of the EIA Regulations, 2014, an independent Environmental Assessment Practitioner (EAP), must be appointed by the applicant to manage the application. EIMS has been appointed by the Applicant as the EAP and is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations and Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

1) Objective and independent;
2) Has expertise in conducting EIA's;
3) Comply with the NEMA, the Regulations and all other applicable legislation;
4) Takes into account all relevant factors relating to the application; and
5) Provides full disclosure to the applicant and the relevant environmental authority.

The declaration of independence of the EAP and the Curriculum Vitae (indicating the experience with environmental impact assessment and relevant application processes) of the consultants that were involved in the BAR process and the compilation of this report are attached as Appendix A.

1.3.2. SUMMARY OF EAP'S PAST EXPERIENCE

EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS has in excess of 20 years' experience in conducting EIAs, including many EIA's for mines and mining related projects.

Gideon Kriel holds an M.Env.Sci (Water Sciences) Cum Laude from the North-West University (Potchefstroom Campus) and is currently employed as a Senior Environmental Consultant. He has over 8 years of experience in environmental management and is the East London Office Manager.

Gideon is a Registered Professional Natural Scientist (400202/09) with the South African Council for Natural and Scientific Professions (SACNASP) and Member of the Water Institute of Southern Africa. He has delivered presentations locally and internationally concerning the use of bio-indicators for the determination of water quality, and has experience in a wide variety of Environmental Management Projects.

Ms Stuurman holds a M.Sc. degree in Geography and Environmental Resources from Southern Illinois University, Carbondale. Before joining EIMS in August 2015 as an Environmental Scientist, she worked in Research and Development at Johnson & Johnson. To date, Andisiwe has worked on several aspects of

environmental management including basic assessments, water quality monitoring and environmental compliance audits. Andisiwe is a registered Candidate Natural Scientist (114735) with the South African Council for Natural Scientific Professions (SACNASP) and is a member of the International Association for Impact Assessment South Africa.

1.4. LOCATION OF THE OVERALL ACTIVITY

The table below indicates the farm portions that fall within the Prospecting Right Application Area.

TABLE 2: LOCALITY DETAILS

Farm Name (s)	**Please refer to Table 3 below.**
Application Area (Ha)	The area is 57951.951 hectares (fifty seven thousand nine hundred and fifty two hectares)
Magisterial District	Namakwaland
Distance and direction from nearest town	The area is located approximately 12 to 50 kilometres west of the town of Aggeneys and 60 to 108 kilometres north east of the town of Springbok, Namaqualand District, Northern Cape Province.
21 digit Surveyor General Code for each Portion	Please refer to Table 3 below.

TABLE 3: FARM NAMES AND SG CODES

Item No	Farm Name	Registration Division	Extent (Ha)	Title Deed No.	SG 21 Digit Code
1	KATKOP 55 Remainder	Namaqualand	1524.952	T17596/1965	C05300000000005500000
2	ZUURWATER 62 Portion 1	Namaqualand	361.194	T2157/1945	C05300000000006200001
3	ZUURWATER 62 Portion 5	Namaqualand	2468.261	T16113/1953	C05300000000006200005
4	ZUURWATER 62 Portion 6	Namaqualand	1932.399	T13405/1953	C05300000000006200006
5	ZUURWATER 62 Remainder	Namaqualand	4991.470	NAQ5-19/1909	C05300000000006200000
6	OU TAAIBOSMOND 66 Portion 9	Namaqualand	99.164	T22920/1964	C05300000000006600009
7	OU TAAIBOSMOND 66 Portion 14	Namaqualand	1670.167	T16114/1953	C05300000000006600014
8	AMAM 46 Portion 4	Namaqualand	9854.870	T5529/2006	C05300000000004600004
9	AMAM 46 Portion 5	Namaqualand	3185.239	T5530/2006	C05300000000004600005
10	HARAMOEP 53 Portion 1	Namaqualand	5508.179	T21360/1955	C05300000000005300001

Item No	Farm Name	Registration Division	Extent (Ha)	Title Deed No.	SG 21 Digit Code
11	HARAMOEP 53 Remainder	Namaqualand	9259.768	NAQ9-14/1914	C05300000000005300000
12	OONAB 52 Remainder	Namaqualand	7886.587	NAQ5-18/1909	C05300000000005200000
13	FARM (OONAB NOORD) 609	Namaqualand	9209.701	T27879/1990	C05300000000060900000

The prospecting right application boundary is described by the following coordinates.

TABLE 4: APPLICATION AREA BOUNDARY COORDINATES

Point ID	X Coordinate	Y Coordinate
A1	18.655090	-29.178113
A2	18.691719	-29.169611
A3	18.696193	-29.224944
A4	18.707946	-29.226526
A5	18.720085	-29.234759
A6	18.709353	-29.272867
A7	18.713082	-29.273787
A8	18.692002	-29.351379
A9	18.632289	-29.354056
A10	18.637195	-29.290280
A11	18.616965	-29.294287
A12	18.599475	-29.250152
A13	18.641777	-29.233526
A14	18.642958	-29.217988
A15	18.678412	-29.222677

Point ID	X Coordinate	Y Coordinate
B1	18.527970	-29.110877
B2	18.530615	-29.093653
B3	18.596330	-29.121256
B4	18.598066	-29.084446
B5	18.674176	-29.065065
B6	18.766804	-29.079196
B7	18.819086	-29.131092
B8	18.753916	-29.148312
B9	18.595517	-29.138491
B10	18.512013	-29.266155
B11	18.427820	-29.214260
B12	18.352634	-29.163110
B13	18.396392	-29.028704
B14	18.467640	-29.067648
B15	18.494504	-29.097177

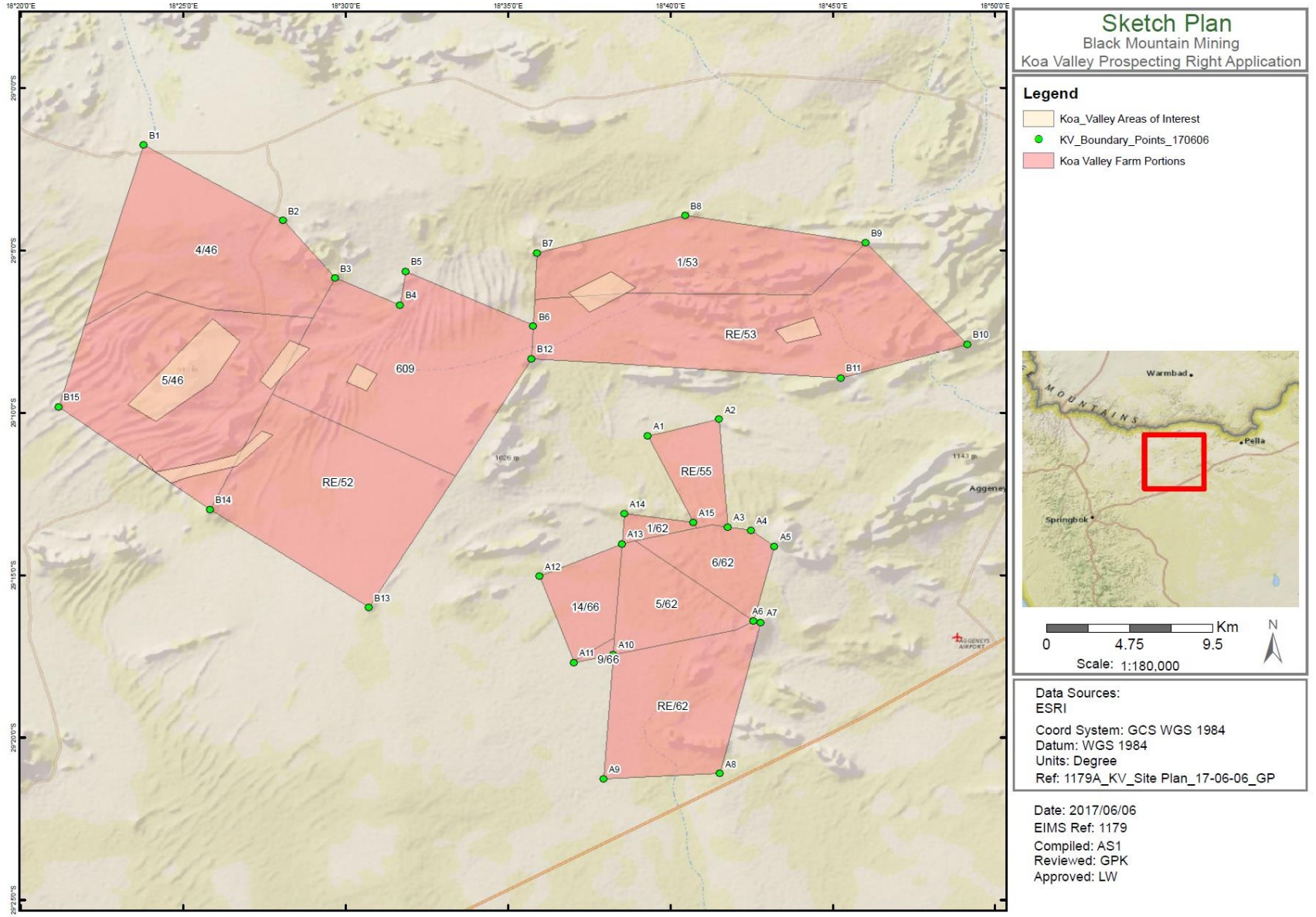

FIGURE 1: SITE PLAN

2. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

Both non-invasive and invasive prospecting activities will be undertaken as part of the proposed Prospecting Work Programme (PWP). The application will follow a phased approach, where the prospecting work program is divided into several sequential phases.

Figure 1 above depicts the proposed prospecting area and the proposed areas of interest within the application area. Vegetation will be cleared at the borehole locations, the area is expected to be approximately 200 m^2 per borehole. There will be 30 boreholes situated in portion 5 of the farm Amam 46, remainder of Oonab 52, Farm Oonab 609, portion 1 and remainder of the farm Haramoep 53 as can be seen in Figure 7. Minor access tracks will be created to access the proposed borehole sites where there are no existing roads, the total length of the access routes is anticipated to the 5000 m and the approximate width is 3m.

At the end of each phase there will be a brief period of compiling and evaluating results. The results will not only determine whether prospecting proceeds, but also the manner in which it will go forward. The applicant will only action the next phase of prospecting, once satisfied with the results obtained in the previous phases. In addition, smaller, non-core parts of the prospecting work program will be undertaken, if warranted. A description of the planned invasive and non-invasive activities is detailed below.

2.1. DESCRIPTION OF PLANNED NON-INVASIVE ACTIVITIES

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

Phase 1: Desktop study

- Compilation of historical prospecting data;
- Analysis of existing data and maps to further understand prospecting area structure & geology; and
- Initial targeting and ranking of prospective areas

Phase 2: Geological field mapping

The field mapping will be focused on potentially prospective areas (Bushmanland Group rocks) to improve understanding of the structure & geology in order to define targets for ground based geophysics as well as to be able to interpret geophysical results.

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

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

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

2.2. DESCRIPTION OF PLANNED INVASIVE ACTIVITIES

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

a) Drilling

The targeting of all drilling activities will be dependent on the results obtained during the preceding phases of prospecting, namely the geological mapping and geophysical surveying.

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

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

Rehabilitation of drill sites will be done according to an approved Environmental Management Plan.

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

b) Assaying

Rock chip / soil samples will be sent to a laboratory of the applicant's choice to be crushed, split, pulverized and assayed. Samples from core will be split using a core cutter before being sent to the laboratory for analysis.

c) Metallurgical Test Work

Metallurgical test work would start during phase 7 of the prospecting work programme. These tests will be done by and in consultation with a preferred and accredited Laboratory of the applicant's choice.

Phase 4: Boreholes

The initial planned invasive prospecting activities will consist of diamond drill boreholes drilled to appropriate depths to target any anomalies identified during Phases 2 & 3 of the non-invasive portion of the prospecting work plan. The work will consist of:

- Access and drill site preparation
- Diamond core drilling
- Sampling and assaying
- Quality assurance and quality control programs
- Down hole geophysics
- Rehabilitation of drill sites
- Recording & Integration of data

Phase 7: Boreholes

This phase of boreholes would determine the continuity of mineralization & potential deposit size. The work will consist of:

- Access and drill site preparation

- Widely spaced diamond drilling and analyses to confirm grade / tonnage potential
- Sampling and assaying
- Quality assurance and quality control programs
- Metallurgical test work
- Rehabilitation of drill sites
- Recording & Integration of data

Phase 8: Boreholes

This phase of boreholes would provide enough information to be able to calculate an inferred resource. The work would consist of:

- Access and drill site preparation
- Close spaced infill diamond drilling and analyses to determine actual grade / tonnage
- Sampling and assaying
- Quality assurance and quality control programs
- Metallurgical test work
- Geotechnical drilling program
- Rehabilitation of drill sites
- Recording & Integration of data

2.3. DESCRIPTION OF PRE/FEASIBILITY STUDIES

Activities in this section includes but are not limited to: initial, geological modelling, resource determination, possible future funding models, etc.

Phase 5: Compilation, interpretation and modelling of data

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

Phase 9: Desktop Pre-Feasibility Study

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

- Closely spaced diamond drilling (Phase 8)
- 3D-modelling of the mineralized ore body
- Resource estimation
- A risk assessment to calculate if a full feasibility study is warranted
- Risk assessment studies

TABLE 5: TIMEFRAMES EACH OF THE PROPOSED ACTIVITIES

Phase	Year 1	Year 2	Year 3	Year 4	Year5
Phase 1 (0-6months) Desktop Study: Literature Survey / Review / acquisition of data	X				
Phase 2 (6-12 months) Geological field mapping	X				
Phase 3 (12-24 months) Regional Ground geophysical Surveys		X			
Phase 4 (24-32 months) Target Prospecting Boreholes			X		
Phase 5 (34-36 months) Data Compilation			X		
Phase 6 (36-42 months) Detailed Ground geophysical Surveys				X	
Phase 7 (42-48 months) Widely Spaced Prospecting Boreholes				X	
Phase 8 (48-60 months) Closely Spaced Prospecting Boreholes					X

2.4. LISTED AND SPECIFIED ACTIVITIES

TABLE 6: LISTED AND SPECIFIED ACTIVITIES

Name of Activity	Aerial Extent of the Activity ha or m²	ListedActivity	Applicable Listing Notice	Waste Management Authorisation
Activities directly related to prospecting of a mineral resource, 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 associated infrastructure, structures and earthworks.	57952 Ha	X	Listing Notice 1 Activity 20	N/A

Name of Activity	Aerial Extent of the Activity ha or m²	Listed Activity	Applicable Listing Notice	Waste Management Authorisation
Desktop Study: Literature Survey / Review / acquisition of data	57952 Ha	N/A	N/A	N/A
Geological field mapping	57952 Ha	N/A	N/A	N/A
Regional Ground and Aerial Geophysical Surveys	57952 Ha	N/A	N/A	N/A
Target Prospecting Boreholes: **30 sites, with a footprint of 200 m² each**	6000 m² (0,6 ha)	X	Listing Notice 1 Activity 20 Listing Notice 3 Activity 12 g ii	N/A
Data Compilation	N/A	N/A	N/A	N/A
Detailed Ground geophysical Surveys	57952 Ha	N/A	N/A	
Widely Spaced Prospecting Boreholes: **30 sites, with a footprint of 200 m² each**	6000 m² (0,6 ha)	X	Listing Notice 1 Activity 20 Listing Notice 3 Activity 12 g ii	N/A
Closely Spaced Prospecting Boreholes	6000 m² (0,6 ha)	X	Listing Notice 1 Activity 20 Listing Notice 3 Activity 12 g ii	N/A
Environmental Screening by ECO	57952 Ha	N/A	N/A	N/A
Ablutions - Chemical Toilets	5 m²	N/A	N/A	N/A
Temporary Fuel storage	5 m² less than 80 cubic metres	N/A	N/A	N/A
Sample storage **(Existing BMM prospecting office. No new infrastructure to be constructed)**	N/A	N/A	N/A	N/A
Access Route **(Mostly existing roads to be utilised. Access tracks**	15000 m² (1,5 ha)	N/A	N/A	N/A

Name of Activity	Aerial Extent of the Activity ha or m²	ListedActivity	Applicable Listing Notice	Waste Management Authorisation
will be made where there are no existing routes.) **Approximate total length : 5000 m** **Approximate width: 3m)**				
Temporary general waste storage **(General/domestic waste - Wheelie bin)**	1m² less than 100 cubic metres	N/A	N/A	N/A
Temporary hazardous waste storage **(Hazardous waste – Sealed Wheelie bin)**	1m² less than 30 cubic metres	N/A	N/A	N/A
Compilation of geological plans	N/A	N/A	N/A	N/A
Undertake rehabilitation as per the rehabilitation plan **6000 m² +15 000 m² (Drill sites + Access tracks)**	21 000 m² (2,1 ha)	N/A	N/A	N/A
Monitoring of rehabilitation efforts	21 000 m² (2,1 ha)	N/A	N/A	N/A

3. POLICY AND LEGISLATIVE CONTEXT

TABLE 7: POLICY AND LEGISLATIVE CONTEXT

Applicable Legislation and Guidelines	Reference Where Applied (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	How does this Development Comply with and Respond to the Legislation and Policy Context
National Environmental Management Act (No. 107 of 1998)(NEMA):	This entire report is prepared as part of the Application for	In terms of the National Environmental Management Act an Application for Environmental Authorisation subject to a Basic

Applicable Legislation and Guidelines	Reference Where Applied (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	How does this Development Comply with and Respond to the Legislation and Policy Context
Listing Notice 1 Activity 20: Activities directly related to prospecting of a mineral resource, 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 associated infrastructure, structures and earthworks. Listing Notice 3 Activity 12 g ii: The clearance of an area of 300 square metres or more of indigenous vegetation in g. Northern Cape ii. Within critical biodiversity areas identified in bioregional plans.	Environmental Authorisation under the NEMA.	Assessment Process has been applied for.
Minerals and Petroleum resources Development Act (No.28 of 2002) (MPRDA): In support of the Prospecting Right Application submitted by Black Mountain Mining, the applicant is required to conduct a NEMA BAR process in terms of Section 5A and Chapter 16 of the MPRDA.	This entire report is prepared as part of the Prospecting Right Application under the MPRDA.	In terms of the Mineral and Petroleum Resources Development Act a Prospecting Right Application has been applied for.
National Water Act (No. 36 of 1998) (NWA): Water may not be used without prior authorisation by the DWS. Section 21 of	No prospecting will be done in proximity to watercourses and no water uses will be applicable to this project, therefore there is no requirement to apply for Water	In terms of the National Water Act no Water Use Licence has been applied for.

Applicable Legislation and Guidelines	Reference Where Applied (i.e. where in this document has it been explained how the development complies with and responds to the legislation and policy context)	How does this Development Comply with and Respond to the Legislation and Policy Context
the NWA water uses for which authorisation is required.	Use authorisation in terms of the NWA.	
The National Environmental Management: Biodiversity Act (Act No. 10 of 2004 – NEMBA) **Section 57 and 87**	Regulations published under NEMBA provides a list of protected species (flora and fauna), according to the Act (GN R. 151 dated 23 February 2007, as amended in GN R. 1187 dated 14 December 2007) which require a permit in order to be disturbed or destroyed	No applications have been submitted in terms of the National Environmental Management: Biodiversity Act.
Namakwa District Biodiversity Sector Plan 2008	The purpose of this document is to ensure that biodiversity information can be accessed and utilized by local municipalities within the Namakwa District Municipality (NDM) to inform land use planning and development as well as decision making processes within the NDM.	Biodiversity information of the Nama Khoi Local Municipality is sourced from this document.

4. NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

Located 113km north-east of Springbok, Black Mountain mine boasts of an annual production of c.30kt of zinc in concentrate, c.50kt of lead in concentrate, c.3kt of copper in concentrate and c.50 tonnes of silver. Black Mountain's underground operations mine a polymetallic orebody, producing concentrates from a sequential flotation plant. With Broken Hill Deeps and Swartberg ore bodies, Black Mountain has considerable potential for mine expansion. However, the expansion will only be made once project feasibility has been proved. Black Mountain mine is a trackless, mechanised underground mine of intermediate depth. The primary mining method is Cut & Fill.

Mining is an important economic sector, accounting for 21.3% of total employment (2007) in the Northern Cape. Black Mountain mine has more than 1500 employees, of whom almost 80% are local (from the Namaqualand and Bushmanland regions of the Northern Cape).

Black Mountain is also the largest private employer in this region of the Northern Cape and has been a stable employer for the last three decades, with potential to continue providing significant employment for another twenty years. The well-established infrastructure available at the dedicated mining town of Aggeneys is a significant advantage. It is predicted that the life of Black Mountain mine will last until 2020 and beyond. Thus, the mine will remain profitable and an important economic driver in the region for many years to come.

Gamsberg Mine

Vedanta Resources Plc (Vedanta), has broken ground at the Gamsberg project, one of the world's largest undeveloped zinc deposits. This commences Vedanta's plans to turn the Southern African region into one of the most important suppliers of zinc in the world and to bring far-reaching socio-economic and environmental benefits to the region. As part of its vision for an integrated zinc business in Southern Africa, Vedanta previously announced the approval of a US$782 million investment over 3 years to develop an open pit zinc mine in Gamsberg, South Africa and to convert the Skorpion Zinc Refinery in Namibia. The majority of the investment, approximately US$630 million, will go towards developing the open pit zinc mine, concentrator plant and associated infrastructure at Gamsberg. The balance will be used to convert the refinery at Skorpion Zinc in Rosh Pinah, Namibia, enabling it to refine zinc sulphide concentrates from the Gamsberg Mine into special, high grade zinc metal.

Gamsberg is a Tier 1 deposit and promises long life and low cost. It is likely to be in the first quartile of the cost curve. The first phase of the Gamsberg open pit mine, which is located near the town of Aggeneys in South Africa's Northern Cape Province, is expected to have a life of mine of approximately 13 years. Development has commenced, with pre-stripping and surface work to access the ore body underway and ore production on track to begin in early 2018.

There is significant potential for further exploration at the North-East deposits, as well as upside at Gamsberg South and West.

5. MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

The application area has been selected as the preferred site based its proximity to existing mining activities and the geological formations in the area. The currently available historical geological information does not allow for the potential identification of economically viable resources, therefore invasive prospecting activities have been included in the PWP.

Some of the techniques employed in the non-invasive prospecting activities will include a literature survey, field reconnaissance/mapping, and geophysics survey of the geology, outcrops. Some of the invasive prospective activities include prospecting boreholes, boreholes to confirm continuity of mineralization & potential deposit size and resource definition drilling.

Consultation with affected land owners and adjacent land owners will be conducted in order to keep them informed about the proposed prospecting activities as well as to capture any comments and concerns they may have regarding the prospecting activity.

6. FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

6.1. DETAILS OF DEVELOPMENT FOOTPRINT ALTERNATIVES

The development footprint is expected to be a fraction of the application area size, which is estimated to be 57952 hectares. The geology is the primary driver in determining the location of prospecting and mining. The area to be prospected is within ore trucking distance of Black Mountain Mining's existing concentrator plant at Aggeneys. Black Mountain Mining at Aggeneys is currently the only operating mine in the District. The inferred tectono-stratigraphic setting of the prospect area is considered favourable for hosting zinc-copper-lead-silver mineralization similar to that currently being exploited at the Black Mountain Mine. As such no assessment of alternative development scenarios was conducted.

6.1.1. PROPERTY

The application area has been selected based predominantly on historical data available for the region, which indicates the potential for economically viable resources to occur. The Prospect area is located approximately 12 to 50 kilometres west of the town of Aggeneys and the Aggeneys - Gamsberg base metal mines. The terrain varies from flat lying plains with poor outcrop of granitic gneiss and slivers of meta-sediments forming more resistant rises in the plain. The area is overlain by quaternary deposits. The Meta-sedimentary rocks of mid-Proterozoic age underlie the quaternary cover and correlates to the Bushmanland Sequence. These metamorphosed sedimentary rocks consist of white to blue quartzite, biotite - sillimanite schist and poorly developed iron formations. These rocks correlate to the metasedimentary sequence hosting the zinc – copper – lead – silver deposits at Aggeneys and Gamsberg which is illustrated in the geological map.

6.1.2. TYPE OF ACTIVITY

Due to the unavailability of extensive historical borehole datasets, invasive prospecting activities such as drilling as well as non-invasive activities will be conducted during prospecting. No bulk sampling work is to be carried out during this prospecting program.

6.1.3. DESIGN OR LAYOUT

Initially, the proposed prospecting area included Portion 1 and Remainder of the Farm Nooisabes 51. However, after the applicant had discussions with the DMR, it was decided to proceed with the Koa Valley prospecting right application excluding these properties and process. A separate prospecting right application has been submitted for these properties. Specific areas within the application area have been identified for drilling in order to minimize land destruction during prospecting. The extent of the initial and revised application area considered is illustrated in below.

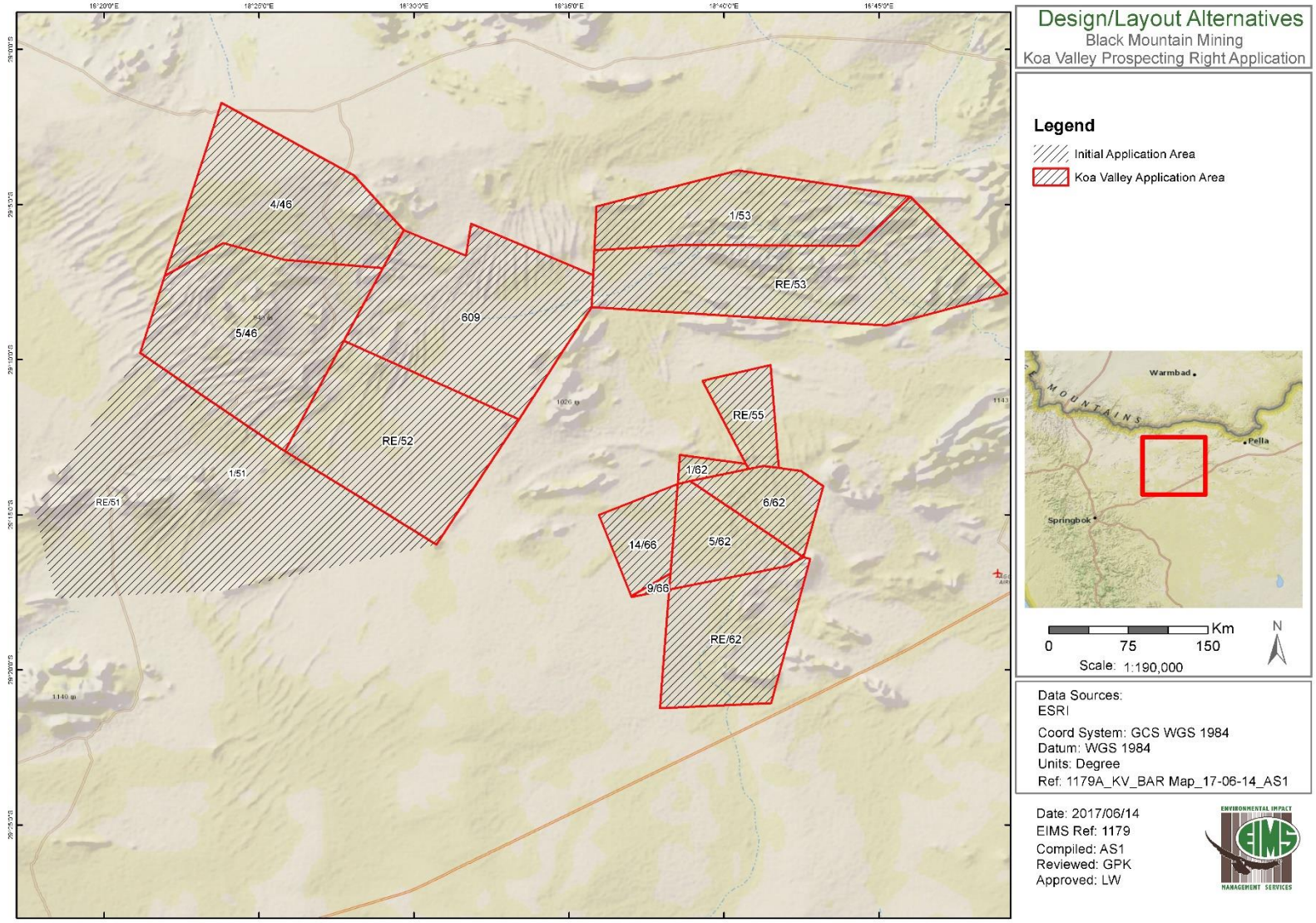

FIGURE 2: LAYOUT ALTERNATIVES CONSIDERED

6.1.4. TECHNOLOGY ALTERNATIVES

The technologies listed in the PWP have been selected as they are proven effective in the determination of resource viability within the proposed prospecting area. Some of the techniques employed in the non-invasive prospecting will include a literature survey, field reconnaissance/mapping, and geophysics survey of the geology, outcrops. Invasive technology alternatives have also been considered. It is hereby noted that the different phases and timeframes of the prospecting herein envisaged are, by their nature, dependent on the results obtained during the preceding phases of such prospecting. The proposals set out in this Prospecting Work Programme are therefore made on the basis that results obtained during the preceding phases may necessitate reasonable changes and adaptations to such proposals, which will be reported as prescribed.

6.1.5. OPERATIONAL ASPECTS

Operational aspects that have been considered for the effective implementation of the PWP include financial arrangements, appropriate equipment available, and technical skills available. Financing of the proposed work plan will be sourced from the Black Mountain Mine Prospecting budget, the current budget for financial year 2017 / 2018 is R80,000,000. The investment strategy is to maintain this level of funding over the next five year period as Black Mountain Mine plan to undertake a large regional prospecting programme in the Northern Cape to discover new deposits and increase their resource base with the long term aim of increasing the current life of mine or developing any new discoveries as stand-alone operations. Details of the equipment available are included in Table 8 below. Black Mountain Mining has ensured that technical personnel are available to execute the prospecting work program.

TABLE 8: APPROPRIATE EQUIPMENT AVAILABLE

Resources
1 x Toyota Land Cruiser, other 4x4 vehicles as required
Exploration office at Black Mountain Mine (Aggeneys) & in Johannesburg
Core cutter and sample processing and storage facilities
Full accommodation and support services at Black Mountain Mine
3 x GPS units, 2 x Geological compasses, 2 x Satellite phones, Handheld radios, 1 x Camera, 1 x Niton hand held XRF analyser
6 x Laptops with ArcMap 10.2, Geosoft, Micromine V12 and Datamine Studio 3. A0-scanner, plotter and printer. Data storage server in Johannesburg
Hand tools for excavating trenches, pits and for sampling
Soil sampling equipment including sieves of various mesh sizes
Geophysical equipment for carrying out ground electro-magnetic, magnetic and gravity surveys. Magnetic and gravity equipment is available on contract as required
Air drills for RAB drilling and Reverse circulation drilling are available on contract as budgeted for
Diamond drill rigs, water and fuel bowsers and other support equipment needed for core drilling are available on contract as budgeted for.
1 x generator per camp
Caravans to host personnel in the field and serve as a mobile office.

6.1.6. OPTION OF NOT IMPLEMENTING

If the prospecting right is not granted, the potential to identify viable mineral resources could be lost. Historical prospecting and mining activities have taken place in the vicinity of the proposed prospecting right area and as such the proposed prospecting activities represent a continuation of surrounding land uses. Additionally, it allows for marginal land impacted on by historical prospecting and mining activities to be re-introduced into the economy.

6.2. DETAILS OF THE PUBLIC PARTICIPATION PROCESS TO BE FOLLOWED

6.2.1. PUBLIC PARTICIPATION METHODOLOGY

The Public Participation Process (PPP) is a requirement of several pieces of South African Legislation and aims to ensure that all relevant I&AP's are consulted, involved and their opinions are taken into account and a record included in the reports submitted to Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study.

The legal landowners and other pre-identified key I&AP's were be sent an initial notification letter on 09 June 2017, disseminated via email and registered mail. I&AP's were provided a period of 14 days (from 09 June 2017 to 23 June 2017) to register for the proposed project. Subsequent notifications were sent as I&APs were identified. All pre-identified and registered I&AP's were further notified of the availability of the BAR for review and comment. All comments received during this period will be included in this BAR submitted to the Commenting Authority. A full description of the Public Participation Process will be included in the Comments and Responses Report which is attached as an Appendix to this report (Appendix B). Results of the consultation are to be summarised in the Consultation Report Attached as Appendix B4.

6.2.2. IDENTIFICATION OF I&AP'S

The applicant provided EIMS with a database of landowners for the application farms and the adjacent farms. An initial I&AP list was compiled using WinDeed searches to determine the contact details of the registered landowners of the project affected land parcels. The I&AP database was compiled containing the following categories of stakeholders:

- Host Communities;
- Landowners;
- Traditional Authority;
- Land Claimants;
- Lawful Land Occupier;
- Department of Land Affairs;
- Any other person(including adjacent and non-adjacent properties) whose socio-economic conditions may be directly affected by the the proposed prospecting operation;
- The Local Municipality;

- The relevant Government Departments, agencies and institutions responsible for various aspects of the environment and for infrastructure which may be affected by the proposed project.
- Agricultural Sector;
- Organised Business;
- Other organisations, clubs, communities, and unions; and
- Various NGO's.

6.2.2.1. LIST OF AUTHORITIES IDENTIFIED AND NOTIFIED

The following authorities have been identified and notified of the proposed Koa Valley Prospecting Right Application:

- Nama Khoi Local Municipality
- Khai Ma Local Municipality;
- Namakwa District Municipality;
- Northern Cape Department of Mineral Resources;
- Northern Cape Department of Environment and Nature Conservation (DENC): Springbok;
- Department of Water and Sanitation;
- Northern Cape Department of Agricultural & Land Reform;
- Northern Cape Department of Rural Development and Land Reform;
- Northern Cape Department of Roads Transport and Public Works;
- South African Heritage Resources Agency.

6.2.2.2. LIST OF KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED

The following key stakeholders have been identified and notified of the proposed Koa Valley Prospecting Right Application:

- Aggeneys Community Forum
- Agri Namakwa;
- Boesmanland Farmers Union;
- Pofadder Landbou Vereniging;
- Riemvasmaak Community Conservancy;
- Augrabies Falls National Park;
- Wildlife and Environment Society of South Africa (WESSA) (Northern Cape Regional Office);
- Endangered Wildlife Trust;
- Botanical Society;
- Namakwaland Action Group/Nago;

- Conservation South Africa (CSA);
- Environmental Monitoring Group;
- Khai Ma Tourism;
- Khai Ma Business Forum;
- South African Heritage Resources Agency;
- SANBI;
- Succulent Karoo Ecosystem Programme (SKEP)
- Eskom;
- South African Tourism;
- SANRAL.

6.2.2.3. LIST OF SURROUNDING SURFACE RIGHTS HOLDERS/LAND OWNERS IDENTIFIED AND NOTIFIED

The following surrounding surface rights holders/landowners of the area under application have been identified and notified of the proposed Koa Valley Prospecting Right application:

- Khai Ma Loal Municipality;
- Nama Khoi Local Municipality;
- Mr Elton (de) Vries;
- Zibula Xploration (Pty) Ltd;
- Emerald Panther Investment 7 (Pty) Ltd;
- Mr Louw;
- Mr FB Agenbag;
- Mr AJ de Waal
- Mr D D Jacobs;
- Mr JJ Mostert;
- Mr D Maasdorp;
- Black Mountain Mining;
- Pofadder Meent;
- Mr Eppie Agenbag,;
- Mr N van den Heever;
- Mr J Compion;
- Mr S Goosen;

- Mr AB Maass;
- Mr F Schutte;
- Mr Deon van Vuuren.

The I&AP database is included in Section 29.2

6.2.3. NOTIFICATION OF I&AP'S

All I&AP's were notified of the proposed Prospecting Right Application via the following methods:

1) Registered letters, emails and faxes;
2) Background Information Document;
3) Questionnaires;
4) Placement of fourteen (7 English and 7 Afrikaans) A2 Correx Site Notices in various locations on the site;
5) Placement of a newspaper advert in the Gemsbok Newspaper on 09 June 2017.

The I&AP database is included in Section 29.2. Please also refer to Appendix B for proof of notification sent to I&APs and for proof of correspondence with I&APs.

Description of the Information Provided to the Community, Landowners and I&AP's

Notification documents sent to all pre-identified I&AP's included the following information:

- The site plan;
- List of activities to be authorised;
- Scale and extent of activities to be authorised;
- Typical impacts of activities to be authorised;
- The duration of the activity;
- Sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land);
- The purpose of the proposed project;
- The prospecting methods to be used;
- Details of the affected properties (including parent farm and portion);
- Details of the MPRDA and NEMA Regulations that must be adhered to;
- The minerals being prospected for;
- The information contained in the BAR and EMPR;
- Date by which comment, concerns and objections must be forwarded through to EIMS; and
- Contact details of the Environmental Assessment Practitioner (EAP).

In addition, a questionnaire was included in the registered letters, emails and facsimiles sent and requested the following information from I&AP's:

- To provide information on how they consider that the proposed activities will impact on them or their socio-economic conditions;
- To provide written responses stating their suggestions to mitigate the anticipated impacts of each activity;
- To provide information on current land uses and their location within the area under consideration;
- To provide information on the location of environmental features on site, to make written proposals as to how and to what standard the impacts on site can be remedied.
- To mitigate the potential impacts on their socio-economic conditions to make proposals as to how the potential impacts on their infrastructure can be managed, avoided or remedied;
- Details of the landowner and information on lawful occupiers;
- Details of any communities existing within the area;
- Details of any Tribal Authorities within the area;
- Details of any other I&AP's that need to be notified;
- Details on any land developments proposed;
- Details of any perceived impacts to the environment that should be considered in the BAR; and
- Any specific comments, concerns or objections to the proposed prospecting operation.

I&AP's were provided a period of 14 days, from 9 June 2017 to 23 June 2017, to register as I&AP's for the proposed project. All registered I&AP's were notified of the availability of the BAR for review and comment. The BAR was made available for 30 days from 23 June 2017 to 25 July 2017, for review and comment. Comments obtained during the BAR process and the responses of the EAP will be included in the Final BAR as per the summary table below.

6.3. SUMMARY OF ISSUES RAISED BY I&AP'S

Any comments received during the PPP will be included in this report and summarised in Table 9 below for submission to the DMR.

TABLE 9: SUMMARY OF ISSUES RAISED BY I&AP'S

Interested and Affected Parties	Consulted	Date	Issue	Response	Report Reference
Key Stakeholders					
Landowner					
Mr Deon Maasdorp	EIMS	12 June 2017	Mr Maasdorp submitted his I&AP registration form and confirmed that he is the owner of the remaining extent of the farm Zuurwater 62 earmarked for prospecting. Mr Maasdorm stated that the farm is currently used for grazing and possible land developments within the application are include a possible solar farm. Mr Maasdorp also stated that he is willing to allow prospecting to progress within his property and that he would	EIMS thanked Mr Maasdorp for his comments. Mr Maasdorp was advised that his comments were noted and will be included in the Comments and Responses Report and submitted to the Competent Authorities for consideration.	N/A

			seek compensation for such an activity on his property.		
Mr FB Agenbag	EIMS	18 June 2017	Mr Agenbag submitted his I&AP registration form and confirmed that he is a landowner for one of the properties earmarked for prospecting (pre-identified for Haramoep 53 Portion 1). Mr Agenbag stated that his interest in the proposed project is a mutually beneficial win-win situation for both parties. Mr Agenbag described the receiving environment as grass and duneveld, as well as mountains with rare vegetation i.e. rare Elephant's trunk, "plakkies", milk-bush species and bulbous plants. The grassveld is used for grazing for cattle, sheep, goats and game. There is a large power line that traverses the	EIMS thanked Mr Agenbag for his comments and informed him that EIMS would include his comments in the report to the Department (DMR).	N/A

			western side of the farm. Mr Agenbag mentioned that a Solar farm is proposed for the part close to the Eskom power line that could possibly cross the Koa Valley. It was also mentioned that mining activities will influence the landowner's socio-economic status if grazing/ tourism/ accommodation on the farm will be affected. As subsistence farmers, failure to compensate adequately for the loss of land will negatively affect our socio-economic status. Security is affected by uncontrolled movement of people that come and go and that the farm owner often has no control over. Mr Agenbag requested that they must be informed at all times regarding people that access their farm as they already		

			struggle with livestock and game theft. Mr Agenbag concluded by stating that there is a need for discussions. All communication to please be in Afrikaans.		
Dr Stephan Cramer	EIMS	2017/06/17	Dr Cramer who is a Science advisor at the Southern African Faith Communities Environment Institute (SAFCEI) sent an email to EIMS on 17 June 2017 requesting to be included in the I&AP database.	EIMS thanked Dr Cramer and confirmed that he would be included in the I&AP database. .	N/A
Mr Carstens	EIMS	15 June 2017	Mr De Waal contacted EIMS on behalf of Mr Carstens and requested background information on the project.	EIMS responded to Mr Carstens by forwarding the Background Information Document (BID) to him. EIMS also added Mr Carstens to the I&AP database	N/A
Mr Edmund Agenbag	EIMS	29 June 2017	Mr Edmund Agenbag submitted his I&AP questionnaire on the 29th of	EIMS thanked Mr Agenbag for submitting his questionnaire. EIMS	N/A

			June 2017. Mr Agenbag is an Eskom official and he is also an occupier of the farm Oonab-Noord 609. Mr Agenbag described the receiving environment as farming, grazing and vegetation fields. Mr Agenbag highlighted his concerns stating that vehicles will destroy vegetation and grazing fields. He also highlighted that the project will cause a security hazard and a risk of animal theft.	reassured Mr Agenbag that even though the prospecting will have an impact on vegetation, the impact however is anticipated to be of low significance. Mr Agenbag was also advised that with regards to the security concerns, it is anticipated that the impact will also be of low significance since the people on site will be limited to the Applicant, contractor and geologists for the topographical and geophysical surveys.	
Ms Natasha Higgit	EIMS	24 July 2017	Ms Higgit noted the Basic Assessment Report submitted and the appointment of ArchaeoMaps and Banzai Environmental (Pty) Ltd were appointed to conduct the Heritage Component of the BAR. Ms Higgit noted the	EIMS thanked Ms Higgitt for the correspondence and advised that all comments and recommendatiions had been noted. EIMS advised Ms Higgit that these would be included in the final BAR which would be	N/A

			recommendations incuded in the BAR. Ms Higgit further stated that SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit has no objection to the proposed development and accepts the heritage specialist reports and the recommendations contained therein. The recommendations contained within the reports and the following conditions must be included in the Environmental Management Programme (EMPr): • The Final BAR and appendices must be submitted to SAHRA for record purposes; • If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone	uploaded to SAHRIS as requested.	

			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/John Gribble 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to		

			inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; and • If the development receives an Environmental Authorisation (EA), SAHRA must be informed and all documents pertaining to the EA must be uploaded to the SAHRIS Case file.		

6.4. THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES

6.4.1. SOCIO-ECONOMIC CONTEXT

The proposed Koa Valley Prospecting Project will be situated on Portion 4 and Portion 5 of the farm Amam 46, Remaining extent of the farm Katkop 55, Portion 1, Portion 5, Portion 6 and remaining extent of the farm Zuurwater 62, Portion 9 and Portion 14 of the farm Ou Taaibosmond 66, Portion 1 and remaining extent of the farm Haramoep 53, Remaining extent of the farm Oonab 52, Farm Oonab Noord 609. These properties are situated approximately 31-62 km southwest of Aggeneys mining town in the Khai-Ma Local Muncipality and Nama Khoi Local Municipality withinin the Namakwaland Magisterial District in the Northern Cape Province. Aggeneys town is situated approximately 60km south-west of the town of Pofadder.

The prospecting area falls within ward 1 of Nama Khoi Local Municipality and ward 4 of Khai Ma Local Municipality within Namakwa District Municipality (NDM).

The main economic activities within the NDM are agriculture and mining. Stock farming in the District includes sheep, cattle and goat farming and is the key contributor to the agricultural sector. Ostrich farming is also practised within the District. Flower bulbs and wool production are also important contributors to the agricultural sector. The Orange River plays a key role in the regions' agricultural activities and alluvial diamond mining activities.

Nama Khoi is considered the hub of the NDM in terms of economic activities with a 41.7% contribution to the NDM Gross Domestic Product (GDP). Mining is a very crucial industry in the Namakwa District Municipality, contributing 52.3% towards the district GDP and 21.3% towards employment.

The education levels in the NDM are low. Approximately half of the population over 20 years old within the District have some secondary education and a very small percentage obtained Grade 12 qualification.

6.4.2. TYPE OF ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY

6.4.2.1. GEOLOGY AND TOPOGRAPHY & SOILS

The development footprint in the Koa Valley is underlain by the Mid Proterozoic (Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province (Bushmanland Group) and Cenozoic superficial deposits. The Namaqua-Natal Province is primarily highly metamorphosed sediments and volcanic rocks (e.g. gneisses, schists, quartzites, amphibolites) plus major granitic and gabbroic (norite) intrusions, which are dated between 2050 and 1000 Ma (million years ago; Cornell et al., 2006).

Various types of superficial deposits of Late Caenozoic (Miocene to Pliocene to Recent) age occur throughout the Karoo Basin (Partridge et al. 2006). In palaeontological terms the Quaternary superficial deposits have been relatively neglected. They contain pedocretes (e.g.calcretes), colluvial slope deposits, down wasted surface gravels, river alluvium, wind-blown sands as well as spring and pan sediments. Hill slopes are usually covered with a layer of colluvium or slope deposits (for example sandstone and dolerite scree).

Khai Ma Local Municipality is characterized by undulating landscapes. Nama Khoi Local Municipality is characterized by coastal plains and granite hills in the west and low lying Bushmanland plains to the east of Springbok. The NDM is characterised by considerable variation in the types of soils. The area is characterised as semi-arid to arid and this indicates that the soil moisture deficit is high. The soil characteristics over most of

the area are a function of insitu weathering. NDM is characterized by generally poor quality soils due to scarce or no water retaining capabilities. Due to the sandy nature of the soils within the region, many areas in the District are prone to wind erosion when the natural vegetation cover is disturbed. The erosion levels within an area depend on slopes' steepness, rainfall patterns and land-use activities in the area. Soils on steep gradients are subject to geological erosion. Extreme topography and soil characteristics within the NDM indicate that soil erosion is an important factor that limits development options (Chidley et al. 2011).

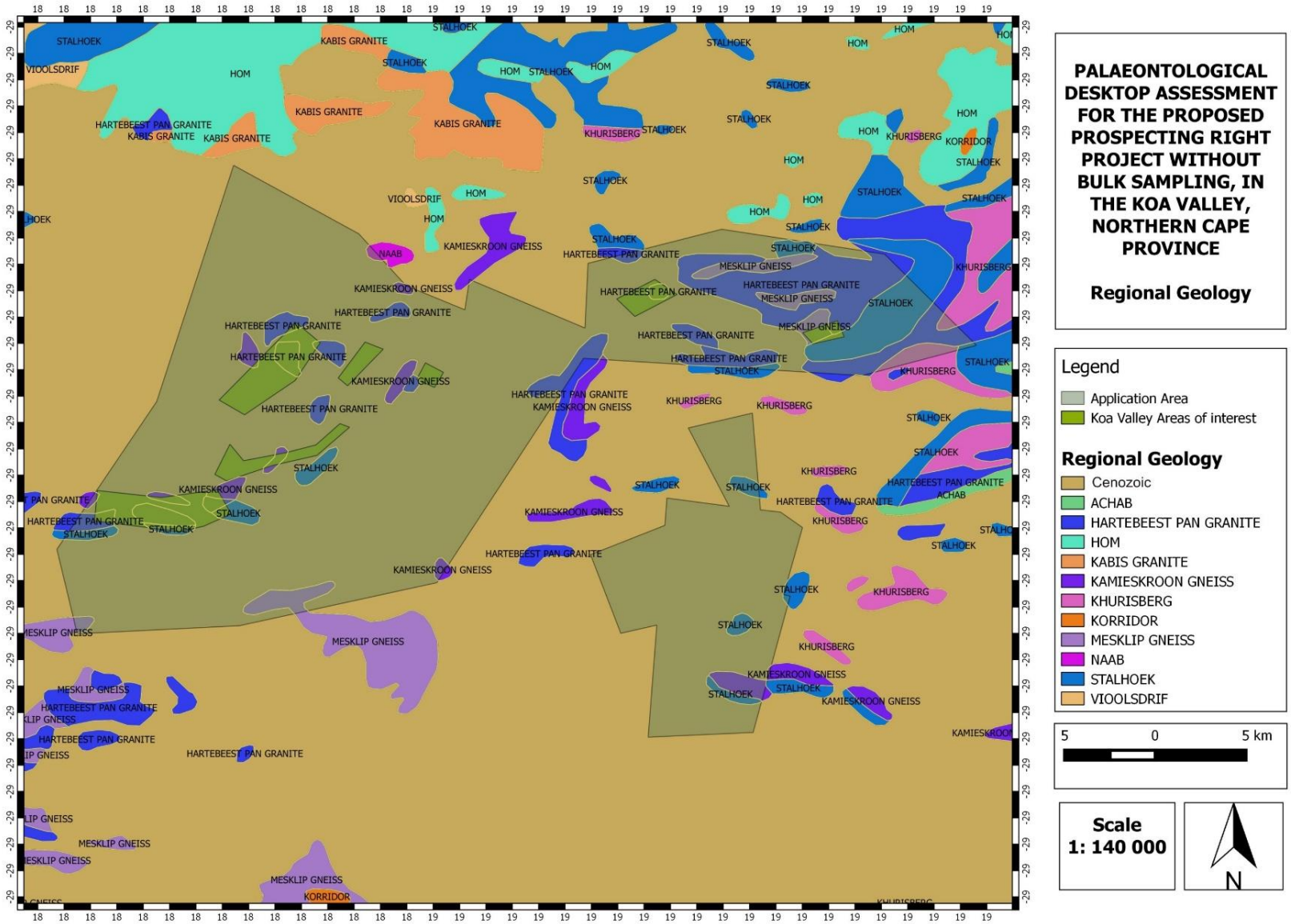

FIGURE 3: GEOLOGY OF THE APPLICATION AREA

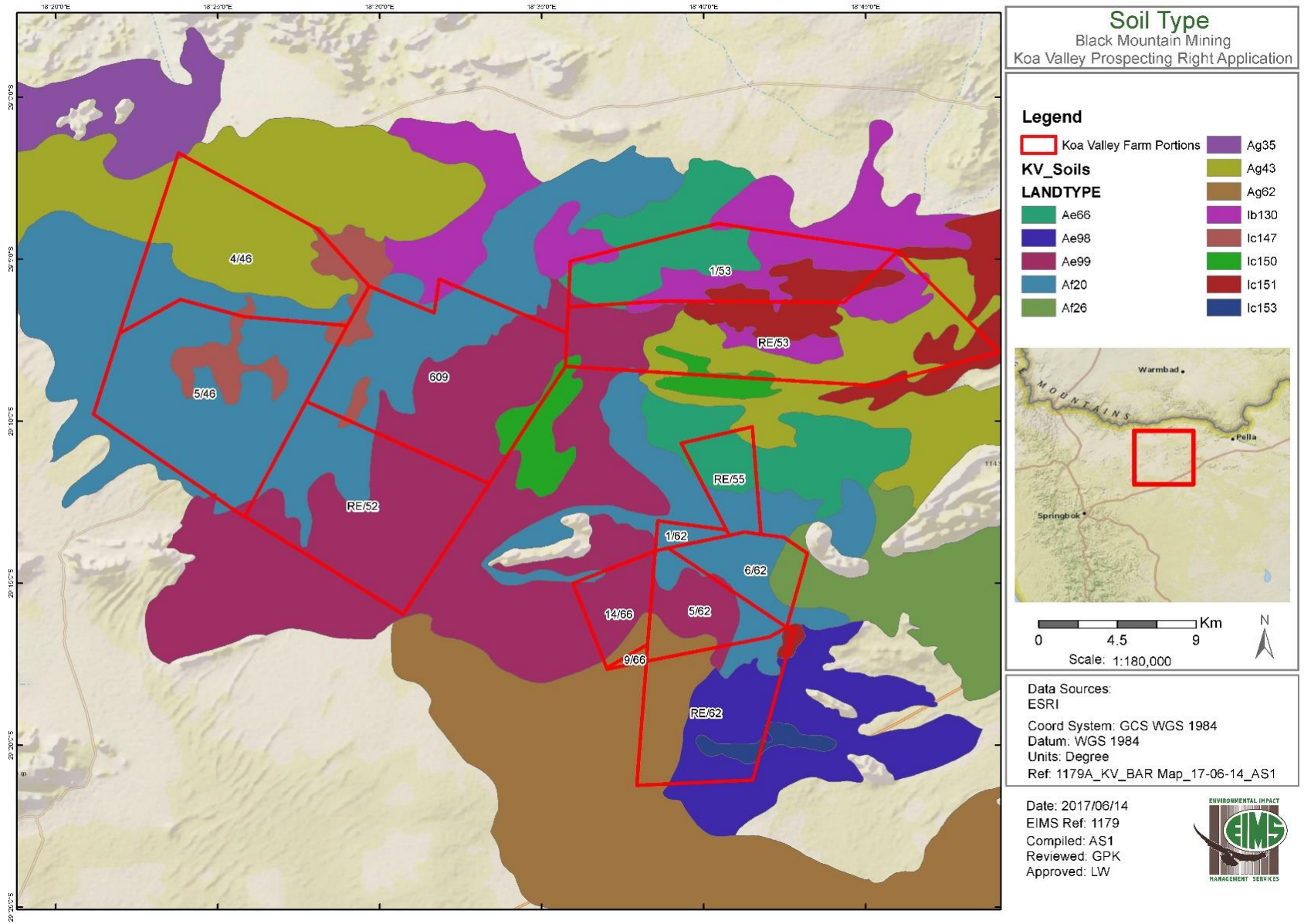

FIGURE 4: SOIL TYPES OF THE APPLICATION AREA

FIGURE 5: GENERAL VIEW OF THE KOA VALLEY DUNE SYSTEM, HARAMOEP 53 (ARCHAEOMAPS, 2017)

FIGURE 6: GENERAL VIEW OF THE AMAMAKOP INSELBERGS, AMAM 46 (ARCHAEOMAPS, 2017)

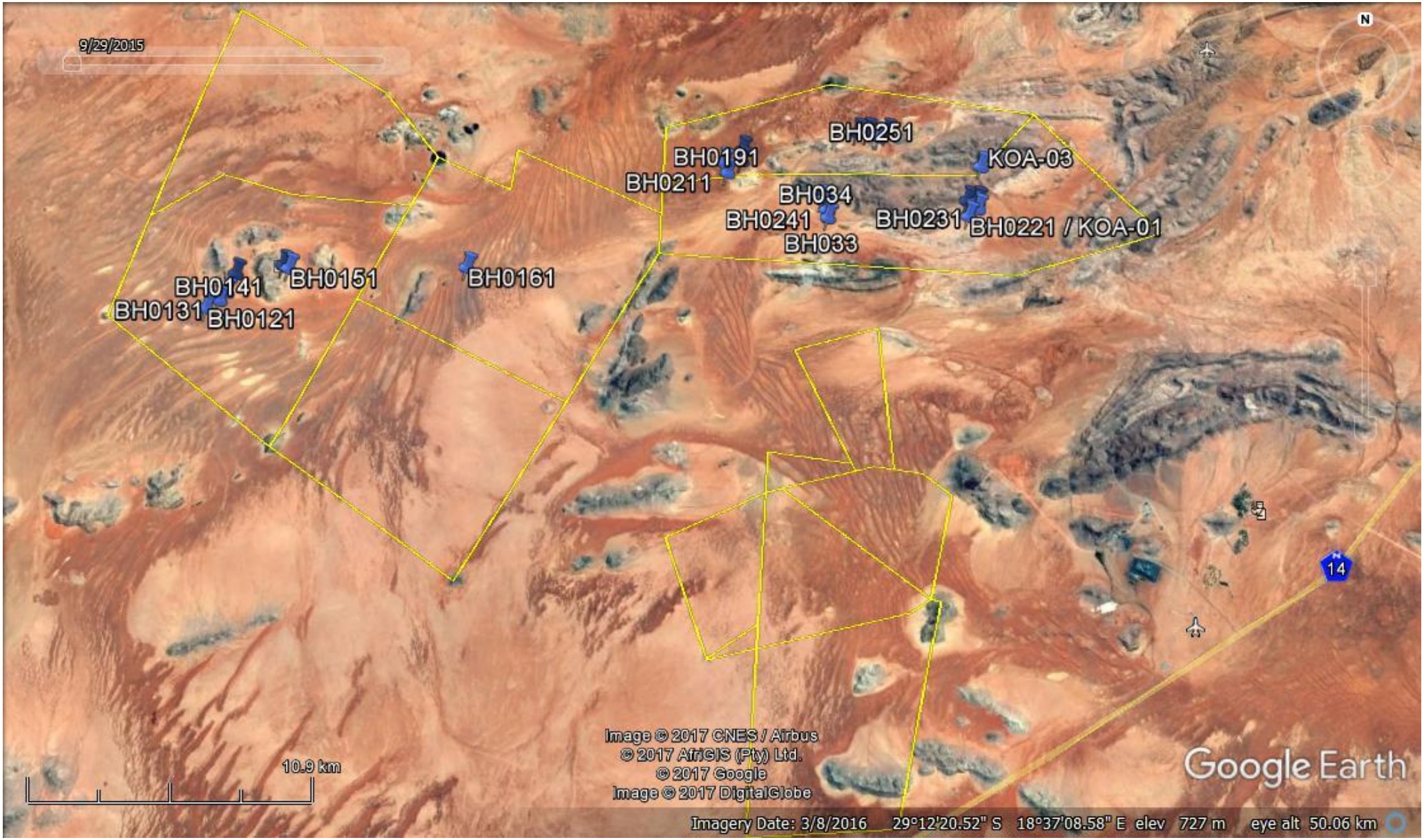

FIGURE 7: THE KOA VALLEY PROSPECTING AREA, INDICATING LOCALITY OF PROPOSED DRILL POSITIONS (BMM, 2017)

6.4.2.2. HYDROLOGY

The prospecting area is located in the Lower Orange Water Management Area within the D82A, DB2C and D82D quaternary catchments. The Lower Orange WMA is the furthest downstream in the Orange River Basin and as such is affected by upstream activities. Flows are largely supported by means of releases from Gariep and Vanderkloof dams in the Upper Orange WMA. Ninety percent of the runoff generated in the two Orange River WMAs is generated in the Upper Orange WMA. Approximately 60% of the runoff generated in the Lower Orange comes from the Fish River in Namibia which enters the Orange River close to the river mouth (DWAF, 2004).

Sheep and goat farming is practised over most of the area. Large parts of the WMA contain conservation areas. Cultivation is restricted to isolated patches where higher rainfall occurs, and extensive irrigation is practised in the fertile alluvial soils along the Orange River valley. Irrigation water is supplied by releases from the Vanderkloof Dam.

Large mining operations occur in various parts of the WMA. There are no large urban developments or power stations. Groundwater plays a major role in meeting the water requirements of the towns and rural settlements along the tributaries of the Orange.

Irrigation is the dominant water use sector in the Lower Orange WMA, representing 94% of the total requirement for water of 1 130 million m^3/a. Water requirements for urban, rural and mining use respectively represents 3%, 2% and 1% of the total water requirements in the WMA. Virtually all of the irrigation developments are situated along the main stem of the Orange River, with most of the irrigation being for high-value orchard crops (DWAF, 2004). Water is transferred from the Orange River for urban and mining use. Water requirements in this regard are small and are associated with towns such as Springbok, Steinkopf and Port Nolloth, as well as the mines in the area (Childey et al, 2011).

The Lower Orange WMA is in surplus which is available for allocation to users or to large projects and also ecological reserve at Orange River mouth Ramsar site (DWAF, 2004).

6.4.2.3. FLORA

The vegetation of the general area and the proposed site is typical of the Upper Karoo and consists mainly of Karoo scrub and grass and the occasional Karoo Acacia and forms part of the vegetation in the least threatened Nama-Karoo biome (Mucina & Rutherford 2006). There are several biomes within the NDM, these are the:

- Desert Biome;
- Fynbos biome;
- Nama Karoo biome;
- Succulent Karoo biome; and
- Azonal Vegetation types.

The Nama Khoi Local Municipality contains 37 vegetation types of which 23 are endemic; this indicates the high degree of diversity in the region. The Aggeneys Gravel Vygieveld contains 17 endemic species and the Namakwaland Klipkoppe Shrubland 15 species. The endemic vegetation species includes amongst others, the critically endangered Eselore (*Cheiridopsis peculiaris*), Komaggas camelthorn forest (*Acacia erioloba*) and

Komaggas Aloe (*Aloe striata* subsp. *komaggasensis*) listed as vulnerable (NDM Biodiversity Sector Plan Draft, 2008). Khai Ma Local Municipality is characterized by desert grasslands and inselbergs; ancient rocky outcrops. The region contains numerous rare habitat types including the fine grain quartz patches featuring special dwarf succulents.

The Khai Ma Local Municipality contains 11 vegetation types of which 3 are entirely endemic and one endangered, the Lower Gariep Alluvial Vegetation. There are 854 recorded plant species with 41 endemic species (i.e. *Conophytum ratum* and *Trachyandra species*), 20 potentially endemic species, 5 threatened species and 3 Near Threatened species. Some of the local plant species include *Conopithum burgheri* (Burger's onion), *Lithops dorotheae* (Pella se bababoudtjie) and *Pachypodium namakwanum* (halfmens). The bushmanland inselbergs have 429 plant species with 67 only found in the inselbergs and 87 red listed species (NDM Biodiversity Sector Plan Draft, 2008).

As illustrated in Figure 8 and Figure 9 below, the prevalent biomes in the application area are Nama Karoo, Succulent Karoo and Desert Biomes. The vegetation types anticipated in the application area are those associated with the Bushmanland Arid Grassland, Bushmanland Inselberg Shrubland, Bushmanland Sandy Grassland, Bushmanland Vloere, Eastern Gariep Plains Desert and Eastern Gariep Rocky Desert. The descriptions of the vegetation types below are sources from Mucina & Rutherford 2012.

6.4.2.3.1. BUSHMANLAND ARID GRASSLAND

Distribution Northern Cape Province: Spanning about one degree of latitude from around Aggeneys in the west to Prieska in the east. The southern border of the unit is formed by edges of the Bushmanland Basin while in the northwest this vegetation unit borders on desert vegetation (northwest of Aggeneys and Pofadder). The northern border (in the vicinity of Upington) and the eastern border (between Upington and Prieska) are formed with often intermingling units of Lower Gariep Broken Veld, Kalahari Karroid Shrubland and Gordonia Duneveld. Most of the western border is formed by the edge of the Namaqualand hills. Altitude varies mostly from 600–1 200 m.

Vegetation & Landscape Features Extensive to irregular plains on a slightly sloping plateau sparsely vegetated by grassland dominated by white grasses (*Stipagrostis* species) giving this vegetation type the character of semidesert 'steppe'. In places low shrubs of *Salsola* change the vegetation structure. In years of abundant rainfall rich displays of annual herbs can be expected.

Important Taxa ([W]Western and [E]Eastern regions of the unit only) Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *Enneapogon desvauxii* (d), *Eragrostis nindensis* (d), *Schmidtia kalahariensis* (d), *Stipagrostis ciliata* (d), *S. obtusa* (d), *Cenchrus ciliaris*, *Enneapogon scaber*, *Eragrostis annulata*[E], *E. porosa*[E], *E. procumbens*, *Panicum lanipes*[E], *Setaria verticillata*[E], *Sporobolus nervosus*, *Stipagrostis brevifolia*[W], *S. uniplumis*, *Tragus berteronianus*, *T. racemosus*[E]. Small Trees: *Acacia mellifera* subsp. *detinens*[E], *Boscia foetida* subsp. *foetida*. Tall Shrubs: *Lycium cinereum* (d), *Rhigozum trichotomum* (d), *Cadaba aphylla*, *Parkinsonia africana*. Low Shrubs: *Aptosimum spinescens* (d), *Hermannia spinosa* (d), *Pentzia spinescens* (d), *Aizoon asbestinum*[E], *A. schellenbergii*[E], *Aptosimum elongatum*, *A. lineare*[E], *A. marlothii*[E], *Barleria rigida*, *Berkheya annectens*, *Blepharis mitrata*, *Eriocephalus ambiguus*, *E. spinescens*, *Limeum aethiopicum*, *Lophiocarpus polystachyus*, *Monechma incanum*, *M. spartioides*, *Pentzia pinnatisecta*, *Phaeoptilum spinosum*[E], *Polygala seminuda*, *Pteronia leucoclada*, *P. mucronata*, *P. sordida*, *Rosenia humilis*, *Senecio niveus*, *Sericocoma avolans*, *Solanum capense*, *Talinum arnotii*[E], *Tetragonia arbuscula*, *Zygophyllum microphyllum*. Succulent Shrubs: *Kleinia longiflora*, *Lycium*

bosciifolium, *Salsola tuberculata*, *S. glabrescens*. Herbs: *Acanthopsis hoffmannseggiana*, *Aizoon canariense*, *Amaranthus praetermissus*, *Barleria lichtensteiniana*[E], *Chamaesyce inaequilatera*, *Dicoma capensis*, *Indigastrum argyraeum*, *Lotononis platycarpa*, *Sesamum capense*, *Tribulus pterophorus*, *T. terrestris*, *Vahlia capensis*. Succulent Herbs: *Gisekia pharnacioides*[E], *Psilocaulon coriarium*, *Trianthema parvifolia*. Geophytic Herb: *Moraea venenata*.

Biogeographically Important Taxon (Bushmanland endemic) Succulent Herb: *Tridentea dwequensis*.

Endemic Taxa Succulent Shrubs: *Dinteranthus pole-evansii*, *Larryleachia dinteri*, *L. marlothii*, *Ruschia kenhardtensis*. Herbs: *Lotononis oligocephala*, *Nemesia maxii.*

Conservation Least threatened. Target 21%. Only small patches statutorily conserved in Augrabies Falls National Park and Goegab Nature Reserve. Very little of the area has been transformed. Erosion is very low (60%) and low (33%).

6.4.2.3.2. BUSHMANLAND INSELBERG SHRUBLAND

Distribution Northern Cape Province: A group of prominent solitary mountains (inselbergs) and smaller koppies towering over surrounding flat plains in northern Bushmanland in the Aggeneys and Pofadder regions. The most important inselbergs include Achab se Berg, Aggeneys se Berg, Ghaamsberg, Goob se Berg, Naib se Berg and Namiesberge. Altitude ranges from 600–1 180 m (most of the area 700–1 120 m).

Vegetation & Landscape Features Shrubland with both succulent (Aizoaceae, Asphodelaceae, Crassulaceae, Didiereaceae, Euphorbiaceae, Zygophyllaceae) as well as nonsucculent (mainly Asteraceae) elements and with sparse grassy undergrowth (*Aristida, Eragrostis, Stipagrostis*) on steep slopes of the inselbergs.

Important Taxa Succulent Shrubs: *Adromischus diabolicus* (d), *Euphorbia gregaria* (d), *Ihlenfeldtia vanzylii* (d), *Ruschia divaricata* (d), *Schwantesia pillansii* (d), *Tylecodon sulphureus* (d), *Euphorbia gariepina*, *Kleinia longiflora*, *Othonna euphorbioides*, *Psilocaulon subnodosum, Tetragonia reduplicata*, *Tylecodon rubrovenosus*. Tall Shrub: *Boscia foetida*. Low Shrubs: *Eriocephalus pauperrimus* (d), *Pteronia unguiculata*. Woody Succulent Climber: *Sarcostemma viminale* (d). Herb: *Acanthopsis hoffmannseggiana*. Succulent Herbs: *Anacampseros baeseckei* (d), *A. karasmontana* (d), *Avonia ruschii* (d), *Conophytum fulleri* (d), *Avonia quinaria* subsp. *alstonii*, *Conophytum marginatum* var. *haramoepense*. Graminoids: *Aristida adscensionis* (d), *Eragrostis annulata*, *Stipagrostis obtusa*.

Biogeographically Important Taxa ([NQ]Namaqualand endemic, [G]Gariep endemic) Succulent Shrubs: (d), *Ceraria fruticulosa*[G], *Cheiridopsis pillansii*[G]. Geophytic Herb: *Whiteheadia bifolia*[NQ]. Succulent Shrub: *Hoodia alstonii*[G].

Endemic Taxon Succulent Herb: *Huernia barbata* subsp. *ingeae.*

Conservation Threatened (although not immediately) by potential mining interests around Aggeneys. Target 34%. None conserved in statutory conservation areas—a fact needing quick remedy. Erosion is very low.

6.4.2.3.3. BUSHMANLAND SANDY GRASSLAND

Distribution Northern Cape Province: Surrounds of Aggeneys (northern Bushmanland) and a few isolated patches south of Copperton on the eastern edge of the Bushmanland Basin suggesting the course of the paleoriverine system of the Orange River and its tributaries. The largest continuous patch of this vegetation type

fills the shallow valley of the intermittent Koa River southeast and west of Aggeneys. Altitude varies mostly from 500–1 200 m.

Vegetation & Landscape Features Dense, sandy grassland plains with dominating white grasses (*Stipagrostis, Schmidtia*) and abundant drought-resistant shrubs. After rainy winters rich displays of ephemeral spring flora (*Grielum humifusum, Gazania lichtensteinii*) can occur.

Important Taxa Graminoids: *Schmidtia kalahariensis* (d), *Stipagrostis brevifolia* (d), *S. ciliata* (d), *S. obtusa* (d), *Aristida adscensionis*, *A. congesta*, *Centropodia glauca*, *Enneapogon desvauxii*, *Stipagrostis anomala*. Herbs: *Gazania lichtensteinii* (d), *Grielum humifusum* (d), *Tribulus zeyheri* (d), *Dicoma capensis*, *Hirpicium echinus*, *Manulea nervosa*, *Requienia sphaerosperma*, *Sesamum capense*. Succulent Herb: *Crassula muscosa*. Tall Shrubs: *Rhigozum trichotomum*, *Sisyndite spartea*. Low Shrubs: *Zygophyllum microphyllum* (d), *Barleria rigida*, *Berkheya spinosissima* subsp. *namaensis*, *Eriocephalus microphyllus* var. *pubescens*, *E. pauperrimus*, *Galenia fruticosa*, *Hermannia spinosa*, *Monechma incanum*, *Peliostomum leucorrhizum*, *Pentzia spinescens*, *Plinthus karooicus*, *Pteronia mucronata*, *P. sordida*, *Rosenia humilis*, *Tetragonia arbuscula*. Succulent Shrubs: *Aridaria noctiflora* subsp. *straminea*, *Lycium bosciifolium*, *Ruschia robusta*, *Salsola tuberculata*, *Senecio cotyledonis*, *Zygophyllum flexuosum*, *Z. foetidum*. Woody Succulent Climber: *Sarcostemma viminale*.

Conservation Least threatened. Target 21%. None conserved in statutory conservation areas. Very little of the area has been transformed. The alien shrub *Prosopis* sp. can be seen as a threat. Erosion is very low (82%) or moderate (17%).

6.4.2.3.4. BUSHMANLAND VLOERE

Distribution Northern Cape Province: Vloere (salt pans) of the central Bushmanland Basin as well as the broad riverbeds of the intermittent Sak River (functioning as temporary connection between some of the pans) as well as its numerous ancient (today dysfunctional) tributaries. The patches of this vegetation unit are embedded especially within NKb 6 Bushmanland Basin Shrubland and NKb 3 Bushmanland Arid Grassland and to a lesser extent also within NKb 4, NKu 1, NKu 2 as well as marginal Succulent Karoo units summarised within the bioregion of Trans-Escarpment Succulent Karoo. Altitude 850–1 450 m.

Vegetation & Landscape Features Flat and very even surfaces of pans and broad bottoms of intermittent rivers. The centre of a pan (or the river drainage channel itself) is usually devoid of vegetation; loosely patterned scrub dominated by *Rhigozum trichotomum* and various species of *Salsola* and *Lycium*, with a mixture of nonsucculent dwarf shrubs of Nama-Karoo relationship. In places loose thickets of *Parkinsonia africana*, *Lebeckia linearifolia* and *Acacia karroo* can be found.

Important Taxa Tall Shrubs: *Parkinsonia africana*, *Xerocladia viridiramis*. Low Shrubs: *Rhigozum trichotomum* (d), *Aizoon schellenbergii*, *Asparagus glaucus*, *Eriocephalus decussatus*, *E. spinescens*, *Pegolettia retrofracta*. Succulent Shrubs: *Salsola aphylla* (d), *S. glabrescens* (d), *S. rabieana* (d), *Lycium pumilum*, *Salsola gemmifera*. Herbs: *Amaranthus dinteri* subsp. *dinteri*, *Lotononis minima*. Geophytic Herb: *Crinum variabile*. Graminoids: *Stipagrostis ciliata* (d), *S. obtusa* (d), *Sporobolus nervosus*, *Stipagrostis namaquensis*.

Conservation Least threatened. Target 24%. None conserved in statutory conservation areas. About 2% transformed for cultivation or building of dams (Vanwyksvlei Dam). Alien *Prosopis* occurs as scattered in some vloere and dry riverbeds. Several of the pans are mined for salt production.

6.4.2.3.5. EASTERN GARIEP PLAINS DESERT

Distribution Comprises the sheet wash plains east of the Richtersveld, which lead down to the Orange River at Henkries, Goodhouse, Kabis, Klein Pella/Kambreek and the vicinity of Onseepkans. Also mapped on plains west of Pella to south of Vuurdoodberg Mountain (and Goodhouse) in the west, forming a broad east-west passage between the mountains to the north that fringe or are close to the Orange River and the more broken east-west line of hills and mountains to the south (for example Annakoppies, Grootberg, Witberg, Haramoebberge, Bantamberg and Amankop). Also found at lower reaches of the Kaboep River in the east. This unit also occurs north of the Orange River in Namibia. Altitude roughly 250–900 m.

Vegetation & Landscape Features Often sloping plains, sharply contrasting with the surrounding rocky hills and mountains. Typical wash vegetation in the breaks between the mountains to the Orange River. Grassland dominated by 'white grasses', some spinescent (*Stipagrostis* species), on much of the flats with additional shrubs and herbs in the drainage lines or on more gravelly or loamy soil next to the mountains.

Important Taxa Small Tree: *Parkinsonia africana.* Stem- & Leaf-succulent Shrubs: *Brownanthus pseudoschlichtianus*, *Psilocaulon subnodosum.* Stem-succulent Shrub: *Euphorbia gregaria.* Leaf-succulent Shrub: *Zygophyllum microcarpum.* Other Shrubs: *Sisyndite spartea* (d), *Calicorema capitata*, *Gaillonia crocyllis*, *Hermbstaedtia glauca*, *Monechma spartioides*, *Petalidium setosum.* Graminoids: *Stipagrostis brevifolia* (d), *S. ciliata* (d), *Schmidtia kalahariensis*, *Stipagrostis obtusa.* Perennial Herbs: *Codon royenii*, *Rogeria longiflora.* Succulent Herb: *Mesembryanthemum guerichianum.*

Conservation Target 34%. None conserved in statutory conservation areas. Few intact examples of this vegetation remain. Heavy grazing and arid climate combined with the ease of accessibility of the vegetation to stock mean that pastoral activities in the past have significantly altered the structure and composition of vegetation of this unit. In some areas *Prosopis* shows potential to become a serious problem, especially around natural springs or aquifers. Some very restricted areas are cultivated, mainly with date palms and grape vines.

6.4.2.3.6. EASTERN GARIEP ROCKY DESERT

Distribution All the rocky desert areas along the Orange River, including Groot Pellaberge, Dabenorisberge, Abbasasberge and many smaller mountains between Pella and Vioolsdrif. Also some mountains mapped further south well away from the Orange River such as the Haramoebberge and Witberg. Altitude about 250–1 205 m at the highest peak of the Groot Pella.

Vegetation & Landscape Features Hills and mountains (up to 650 m of relative altitude from their base), mostly with bare rock outcrops and covered with very sparse shrubby vegetation in crevices. Separated by broad sheet-wash plains (Eastern Gariep Plains Desert). Habitats are mainly controlled by topography, aspect, local climate and lithology. On the Groot Pellaberg, for example, there is a sparse shrubland on the southern foothills (with, for example, *Aloe dichotoma*, *Rhigozum trichotomum* and *Petalidium setosum*) and a higher cover of plants in the southern ravines and rocky drainage lines (e.g. *Abutilon pycnodon*, *Asparagus suaveolens*, *Ficus cordata*, *Rhus populifolia* and *R. viminalis*). On the higher southern slopes *Justicia orchioides* is often dominant, with localised grassland directly below steep cliffs (*Enneapogon scaber*, *Triraphis ramosissima* and *Danthoniopsis ramosa*). The south-facing quartzite cliffs and steep slopes support chasmophytes (cremnophytes) such as *Ficus ilicina*, *Aloe dabenorisana* and *Bowiea gariepensis*. On the summits and higher northern slopes there is a much higher preponderance of succulent plants including *Euphorbia avasmontana*, *Aloe dichotoma*, *A. microstigma*

subsp. *microstigma*, *Pelargonium aridum* and *Kleinia longiflora*. Succulent plants are also important on the northern foothills and also include *Aloe dichotoma*, *Euphorbia avasmontana*, *Sarcostemma viminale* and the diminutive *Lapidaria margarethae* (Van Jaarsveld 1985).

Important Taxa ([W]Mainly western part, [E]Mainly eastern part) Succulent Tree: *Aloe dichotoma* (d). Small Trees: *Acacia mellifera*, *Boscia albitrunca*, *B. foetida*, *Ehretia rigida*, *Euclea pseudebenus*, *Maerua gilgii*, *Pappea capensis*. Stem-& Leaf-succulent Shrubs: *Brownanthus pseudoschlichtianus*, *Ceraria fruticulosa*, *Psilocaulon subnodosum*, *Ruschia barnardii.* Stem-succulent Shrubs: *Ceraria namaquensis*, *Commiphora capensis*[W], *C. cervifolia*[W], *C. gracilifrondosa*[E], *C. namaensis*, *Euphorbia avasmontana*, *E. friedrichiae*, *E. gariepina*, *E. gregaria*, *E. guerichiana*, *E. virosa.* Leaf-succulent Shrubs: *Aloe dabenorisana*, *A. gariepensis*, *Mesembryanthemum inachabense, Prenia tetragona*, *Trianthema parvifolia*, *Tylecodon rubrovenosus*, *Zygophyllum decumbens*, *Z. microcarpum*, *Z. rigidum.* Other Shrubs: *Adenolobus gariepensis*, *Antherothamnus pearsonii*, *Aptosimum tragacanthoides*, *Barleria lancifolia*[E], *B. rigida*, *Cadaba aphylla*, *Calicorema capitata*, *Diospyros acocksii*, *Dyerophytum africanum*, *Eriocephalus scariosus*, *Hermannia stricta*, *Justicia orchioides*, *Monechma mollissimum*, *Petalidium setosum*, *Rhigozum obovatum*, *Rhus populifolia*, *Sisyndite spartea.* Graminoids: *Enneapogon scaber*, *Schmidtia kalahariensis*, *Stipagrostis anomala*, *S. ciliata, S. obtusa*. Perennial Herbs: *Abutilon pycnodon*, *Chascanum garipense*, *Codon royenii*, *Rogeria longiflora*, *Tribulus cristatus.* Geophytic Herb: *Bowiea gariepensis*. Succulent Herb: *Mesembryanthemum guerichianum.* Annual Herbs: *Cleome angustifolia* subsp. *diandra*, *C. foliosa* var. *lutea.*

Endemic Taxa Small Tree: *Ozoroa namaquensis.* Leaf-succulent Dwarf Shrub: *Tylecodon sulphureus.*

Conservation Target 34%. None conserved in South Africa in statutory conservation areas. This unit also occurs north of the Orange River in Namibia where it is potentially conserved through the ownership of the Farm Tsams by the Namibian Ministry of Environment and Tourism.

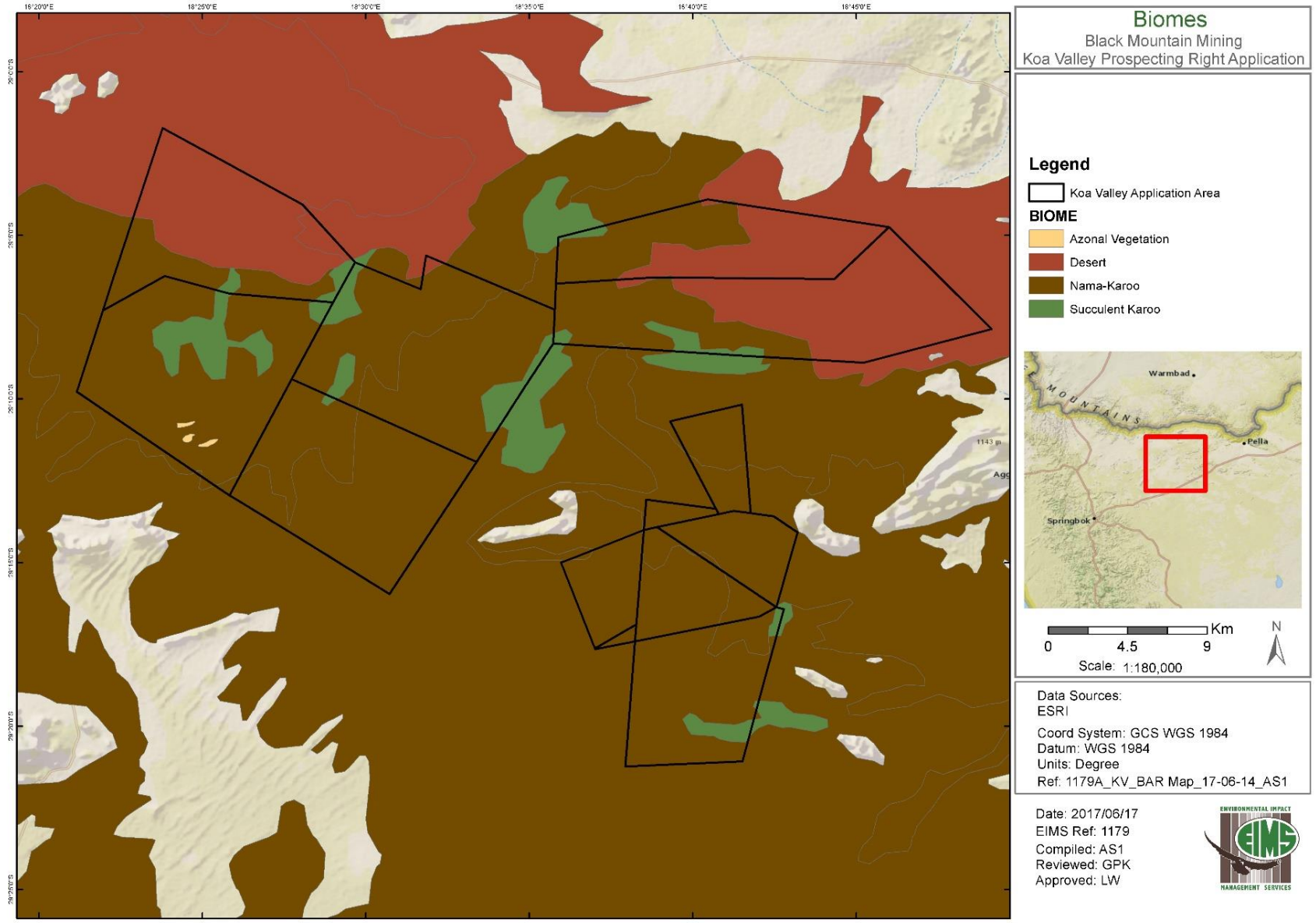

FIGURE 8: BIOMES ASSOCIATED WITH THE APPLICATION AREA

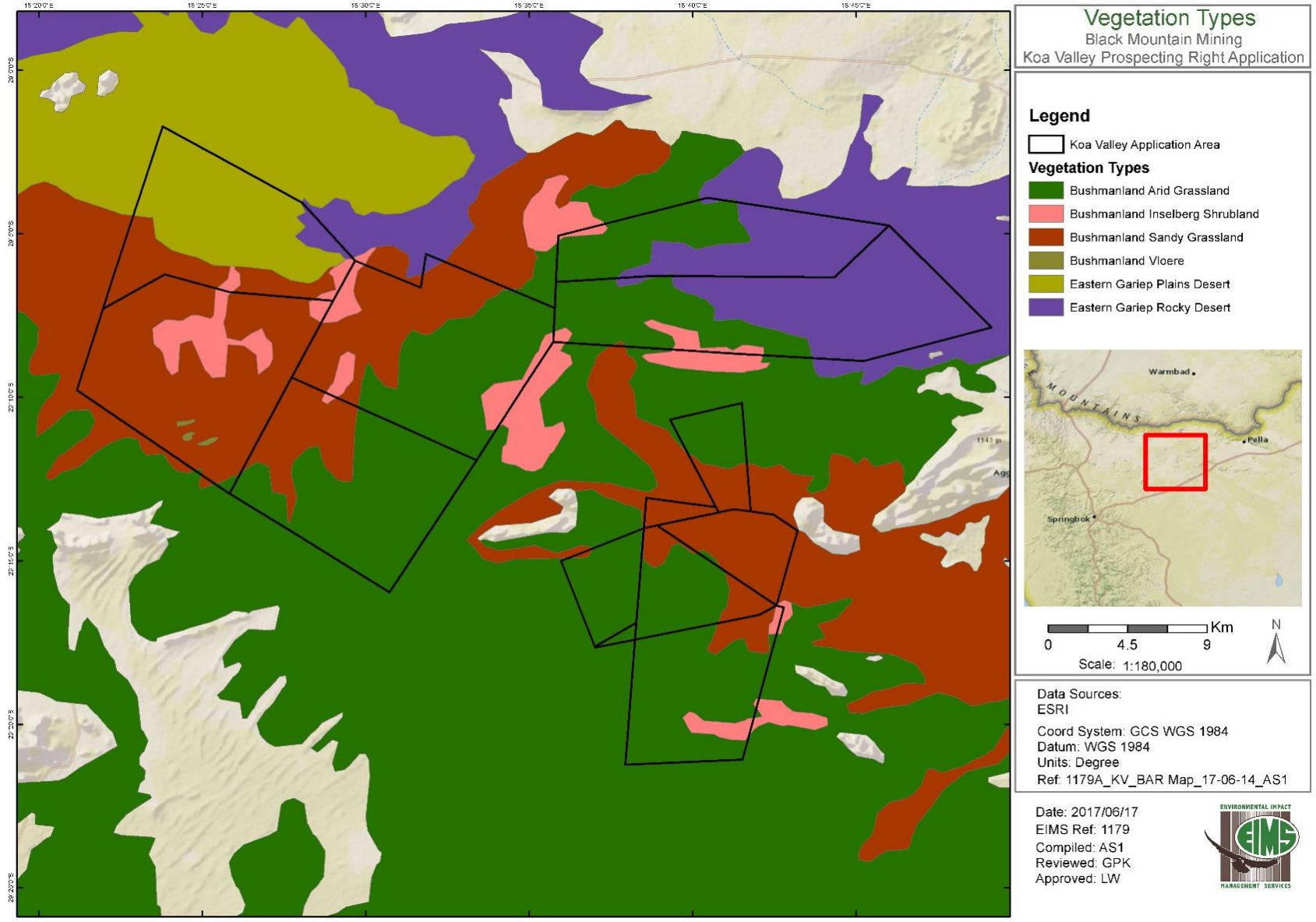

FIGURE 9: VEGETATION TYPES

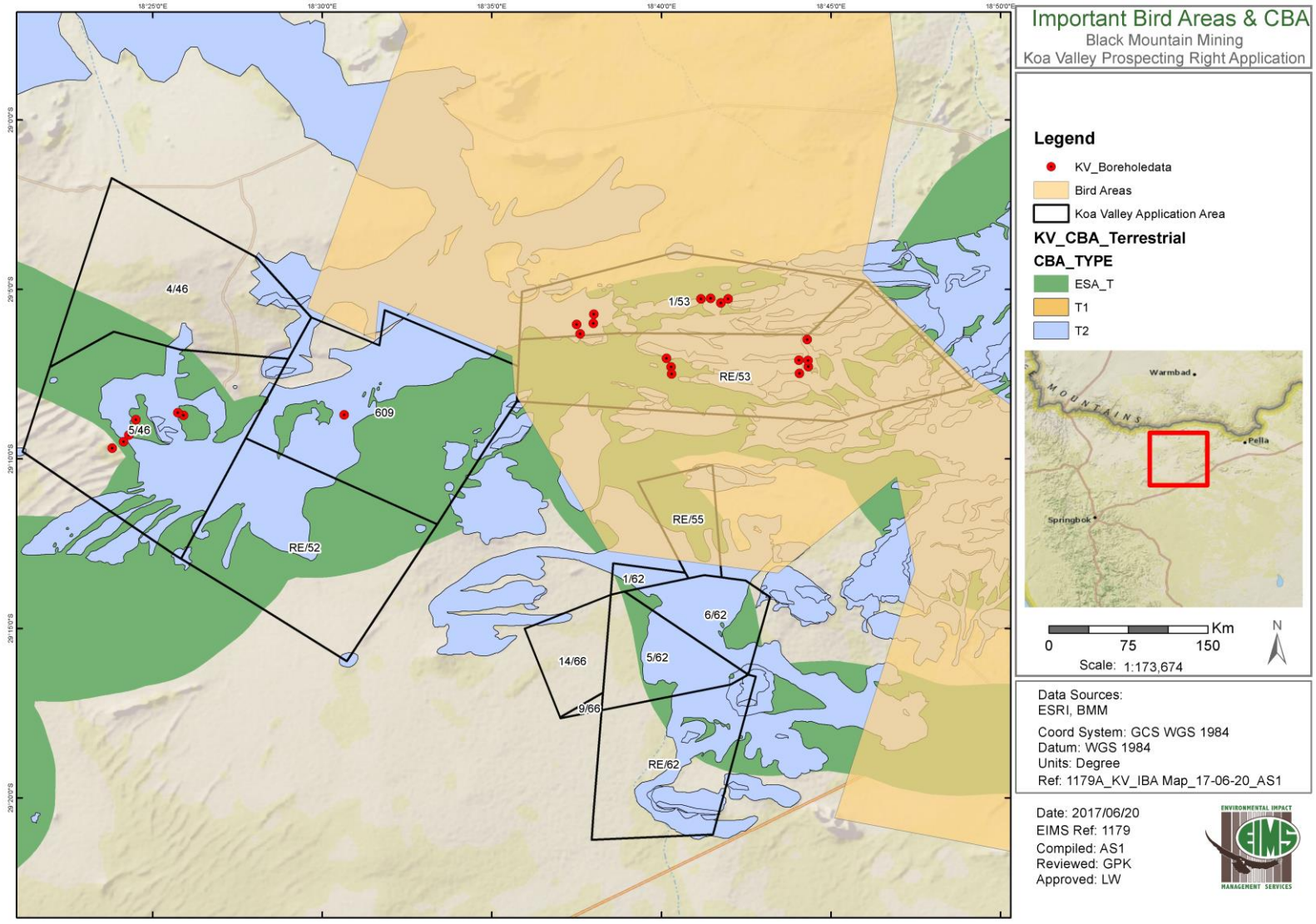

FIGURE 10: CRITICAL BIODIVERSITY AREA AND IMPORTANT BIRD AREAS

6.4.2.4. FAUNA

The NDM has a rich biodiversity, it contains all, or the majority of, five of the nine Succulent Karoo Ecosystem Programme's geographic priority areas. The majority of these five areas are outside of formally protected areas, therefore in order to conserve these areas, favourable land-use practices must be implemented (Todd et. al; 2009).

The Succulent Karoo is a biodiversity hotspot. There are 115 reptile species, 36 of which are endemic. The majority of the reptile species are lizards. There are 70 recorded lizard species, 30 of these are endemic. Four of the recorded 38 snake species are endemic. There are eight tortoise species in the Succulent Karoo hotspot and three of these species are endemic. Of the 17 recorded frog species, five are endemic, this includes the Desert Rain Frog (*Breviceps macrops*). Eighteen out of the 70 scorpion species are endemic. There are also several insect groups with high endemism; Monkey Beetles (*Rutelinae: Hoplini*), wasps and various specialised bees. The Namakwa Pollen Wasp (*Ceramius rex*) is confined to small refuge populations. There are 269 recorded bird species and 24 are near-endemic. There are 78 mammal species including four small endemic mammals (SKEP, 2003).

The Succulent Karoo and Nama Karoo provide habitats for the Riverine Rabbit (*Bunolagus monticularis*). The Riverine Rabbit is endemic to the semi-arid Great Karoo and parts of the Klein Karoo, and is Critically Endangered. The Riverine Rabbit is a habitat specialist that occupies the discontinuous and dense vegetation associated with the seasonal rivers of the Karoo. These areas along the rivers are however favoured for livestock grazing and crop growing (EWT, 2010).

The fauna that inhabits the Khai Ma Local Municipality include, amongst others, the endemic Red Lark which occurs in the Koa River Valley. It is also expected that a wide variety of unique invertebrates are found in the area especially the south-facing slopes of the inselbergs and kloofs that have a much more moderated micro-climate. The aquatic pans in the region provide habitat for wading birds when inundated.

Domestic animals within the NDM include sheep, goats, cattle, horses and donkeys. Stock farming is one of the major economic sectors within the NDM and it includes sheep, goat and cattle farming. Horses and donkeys are used for agricultural activities and as a mode of transport by the local people. Karoo Hoogland and Hantam Local Municipalities are the main agricultural centres where stock farming is the main economic activity (Chidley et al, 2011).

The application area is also located next to an Important Bird Area (IBA), i.e. the Haramoep and Black Mountain Mine Nature Reserve. This IBA is one of only a few sites protecting the globally threatened Red Lark ***Calendulauda burra***, which inhabits the red sand dunes and sandy plains with a mixed grassy dwarf shrub cover; and the near-threatened Sclater's Lark ***Spizocorys sclateri***, on the barren stony plains. It also holds 16 of the 23 Namib-Karoo biome-restricted assemblage species as well as a host of other arid-zone birds. At the time of this IBA's assessment, its 27 pentads had been poorly atlased for SABAP2. The total number of species recorded for the IBA is 198. Ludwig's Bustard ***Neotis ludwigii*** and Kori Bustard ***Ardeotis kori*** are regularly seen. Martial Eagle ***Polemaetus bellicosus***, Secretarybird ***Sagittarius serpentarius***, Verreauxs' Eagle ***Aquila verreauxii***, Booted Eagle ***Hieraaetus pennatus***, Cape Eagle-Owl ***Bubo capensis*** and Spotted Eagle-Owl ***B. africanus*** are present. On occasion Hooded Vulture ***Necrosyrtes monachus*** can be spotted close to the Orange River. The IBA is seasonally important for nomadic larks, such as Stark's Lark ***Spizocorys starki***, and sparrow-larks, which are abundant after good rains.

6.4.2.5. CULTURAL AND HERITAGE (ARCHAEOMAPS)

The Koa Valley prospecting is proposed by means of a phased approach, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive techniques, including assaying and drilling. Only the impact of invasive techniques is to be considered with reference to requirements of the NHRA 1999. The impact of assaying, rock chip and soil sample collection, is negligible with reference to the recorded archaeological and cultural heritage of the greater terrain. The Phase 1 AIA focussed on field assessment of the thirty-four (34) proposed drill positions. Drill positions are proposed situated on the peneplains and within the Koa Valley dune system, with both of these areas having proven to be of no to low archaeological significance. Low density MSA and LSA artefacts are present in surface gravel lenses, as has been identified at drill positions BH0221 (Site KOA-01) and BH031 (Site KOA-02) on the south-eastern peneplain of Haramoep. Similar type anthropogenic lenses have been identified elsewhere, on the peneplains of Haramoep but with these not affected by the proposed drill positions.

Drill positions BH0221, BH0231, BH031 and BH032 are situated on a peneplain to the south-east of the Haramoep inselberg. The peneplain is characterised by low density scatters of MSA and LSA lithic artefacts in surface gravel lenses. Gravel lenses containing artefacts are intersected by vast areas of anthropogenic sterile red Hutton sands. Lithic deposits across the greater BH0221, BH0231, BH031 and BH032 peneplain are archaeologically insignificant. Site KOA-03 is situated in close proximity to the BH0221, BH0231, BH031 and BH032 cluster of drill positions and comprises the Colonial Period Haramoep farmstead.

TheBH037, BH0251, BH035 and BH036 cluster of drill positions are situated towards the north of the Haramoep inselberg, on an anthropogenic sterile red Hutton sand peneplain. High rising quartz and quartzite outcrops surrounding the peneplain serve as indicators of a potential archaeological landscape, but development in this area poses no threat to any identified archaeological resources.

The BH0201, BH038, BH0191 and BH0211 cluster of drill positions are situated to the east of the Haramoep inselberg, in a red Hutton sand dune system, or the Koa dune system, the very dune system that afforded the Koa Valley its name. The Koa dune system proved to be anthropogenically sterile. Towards the south-west of the Haramoep inselberg drill positions BH034, BH0241 and BH033 are again situated on a peneplain with intersecting anthropogenic surface gravel lenses and sterile red sand; the peneplain thus very similar in character to the BH0221, BH0231, BH031 and BH032 peneplain. None of the drill positions are situated on gravel lenses, and intersecting anthropogenic gravel lenses are archaeologically insignificant.

6.4.2.5.1. DRILL POSITION BH0221 / SITE KOA-01 – MSA AND LSA LITHIC SCATTER – S29.12480°; E18.73461°

The drill position BH0221 / Site KOA-01 area is characterised by a low density lithic artefact scatter in the surface gravel lens. Artefacts are typologically classed as Volman (1984) MSA3 and a macrolithic LSA, with artefacts produced mainly from local quartz. Artefact ratios (artefacts: m²) across the low density lithic occurrence are notably low, with ratios of 1-5: 1 recorded.

- Site Significance and Recommendations: The Site KOA-01 anthropogenic gravel lens comprises a Stone Age archaeological site / occurrence, and is ascribed a SAHRA Low Significance and a Generally Protected IV-C Field Rating. Lithic deposits at the occurrence are archaeologically insignificant. It is recommended that development proceed without the developer having to comply with additional heritage compliance recommendations.

6.4.2.5.2. DRILL POSITION BH031 / SITE KOA-02 – MSA AND LSA LITHIC SCATTER – S29.11841°; E18.73877°

Drill position BH031 / Site KOA-02 is situated on a gravel lens containing amorphous Volman (1984) MSA 3 and macrolithic LSA artefacts, with raw material use and artefact ratios similar to that recorded at the BH0221 / Site KOA-01 low density lithic occurrence.

- Site Significance and Recommendations: The Site KOA-02 low density Stone Age lithic occurrence is ascribed a SAHRA Low Significance and a Generally Protected IV-C Field Rating. Lithic deposits at the occurrence are archaeologically insignificant. It is recommended that development proceed without the developer having to comply with additional heritage compliance recommendations.

6.4.2.5.3. DRILL POSITION BH0232 – S29.11834°; E18.73432°

Infrequent, mainly quartz MSA and LSA artefacts are present across the surface of the site, with artefact ratios (artefacts: m²) too low to be recorded.

- Site Significance and Recommendations: Development to proceed as applied for.

6.4.2.5.4. SITE KOA-03 – COLONIAL PERIOD FARMSTEAD – S29.10819°; E18.73847°

Site KOA-03 comprises the well conserved Colonial Period Farm Haramoep 53 farmstead, including the main residence and related outbuildings, situated immediately adjacent to the access road. The site is at present fenced with an access gate, complying with SAHRA minimum site conservation standards. The Colonial Period Haramoep 53 farmstead, a vernacular structure, may well be in the region of 100 years old.

- Site Significance and Recommendations: Site KOA-03 comprise a heritage site (structure older than 60 years of age) and is formally protected by the NHRA 1999. The site receives automatic SAHRA protection as a site of High Significance with a Provincial Grade II Field Rating. Formal conservation measures complying with SAHRA minimumsite conservation standards are in place. The developer need not comply with additional conservation requirements prior to, or during the development.

No other heritage resources were identitied on the the remaining drill positions assessed. A summary of the findings is detailed below.

TABLE 10: HERITAGE COMPLIANCE SUMMARY – KOA VALLEY PROSPECTING RIGHT APPLICATION (WITHOUT BULK SAMPLING),

Drill Location	Site Number	Site Description	Co-ordinates	Recommendations
Haramoep 53				
BH0221	Site KOA-01	MSA & LSA lithic scatter	S29.12480°; E18.73461°	N/A (Lithic scatter archaeologically insignificant)
BH0231	-		S29.12154°; E18.73901°	N/A
BH031	Site KOA-02	MSA & LSA lithic scatter	S29.11841°; E18.73877°	N/A (Lithic scatter archaeologically insignificant)
BH032	-		S29.11834°; E18.73432°	N/A

Drill Location	Site Number	Site Description	Co-ordinates	Recommendations
-	Site KOA-03	Colonial Period farmstead	S29.10819°; E18.73847°	Formal heritage conservation measures in place
BH037	-		S29.08819°; E18.69961°	N/A
BH0251	-		S29.09008°; E18.69597°	N/A
BH035	-		S29.08795°; E18.69088°	N/A
BH036	-		S29.08812°; E18.68613°	N/A
BH0201	-		S29.10016°; E18.63323°	N/A
BH038	-		S29.09565°; E18.63349°	N/A
BH0191	-		S29.10076°; E18.62511°	N/A
BH0211	-		S29.10531°; E18.62675°	N/A
BH034	-		S29.11733°; E18.66927°	N/A
BH0241	-		S29.12167°; E18.67151°	N/A
BH033	-		S29.12501°; E18.67171°	N/A
Oonab-Noord 609				
BH0161	-		S29.14523°; E18.51078°	N/A
Oonab 52 (No drilling)	–			
N/A	N/A	N/A	N/A	N/A
Amam 46				
BH0151	-		S29.14541°; E18.43177°	N/A
BH0181	-		S29.14411°; E18.42902°	N/A
BH0171	-		S29.14760°; E18.40838°	N/A
BH0141	-		S29.15541°; E18.40501°	N/A
BH0131	-		S29.15845°; E18.40228°	N/A
BH0121	-		S29.16164°; E18.39675°	N/A

Notice of the proposed Prospecting Right Application has been be uploaded onto the South African Heritage Resources Agency's (SAHRA) website, South African Heritage Information System (SAHRIS).

6.4.2.6. PALEONTOLOGY (BANZAI ENVIRONMENTAL)

The Proterozoic granite-gneiss basement rocks of the Namaqua-Natal Metamorphic Province do not contain any fossils because they are igneous in origin or too highly metamorphosed (Almond & Pether 2008), and their palaeontological sensitivity is correspondingly low (Almond & Pether 2008, Almond 2008).

Late Caenozoic superficial deposits may occasionally contain important fossil biotas, e.g. bones, teeth and horn cores of mammals as well as reptiles remains. Non-marine molluscs (bivalves and gastropods), ostrich egg shells, trace fossils (for example calcretised termitaria, coprolites), and plant remains such as peats or palynomorphs in organic-rich alluvial horizons. In pan sediments siliceous diatoms have been recovered. These fossil assemblages are mostly sparse, low in diversity, and occur over a wide geographic area; hence the palaeontological sensitivity of the deposits within the study region is rated as low negative. Consequently, pending the discovery of significant new fossil material here, no further specialist studies are considered to be necessary.

Thus, the proposed Koa Valley prospecting right project, may be authorised as the whole extent of the development footprint is not considered as sensitive in terms of palaeontological resources.

6.4.2.7. SENSITIVE RECEPTORS

The proposed properties are situated to the north of the N14 tar road from Aggeneys to Springbok. Several sensitive receptors have been identified within the proposed Prospecting Right Application area, these include:

- Roads;
- Powerlines;
- Farmstead (Haramoep 53);
- Fencing.

Each of these sensitive receptors is considered in the formulation of the technical management options/mitigation measures employed to minimise, reduce, and mitigate against potential impacts.

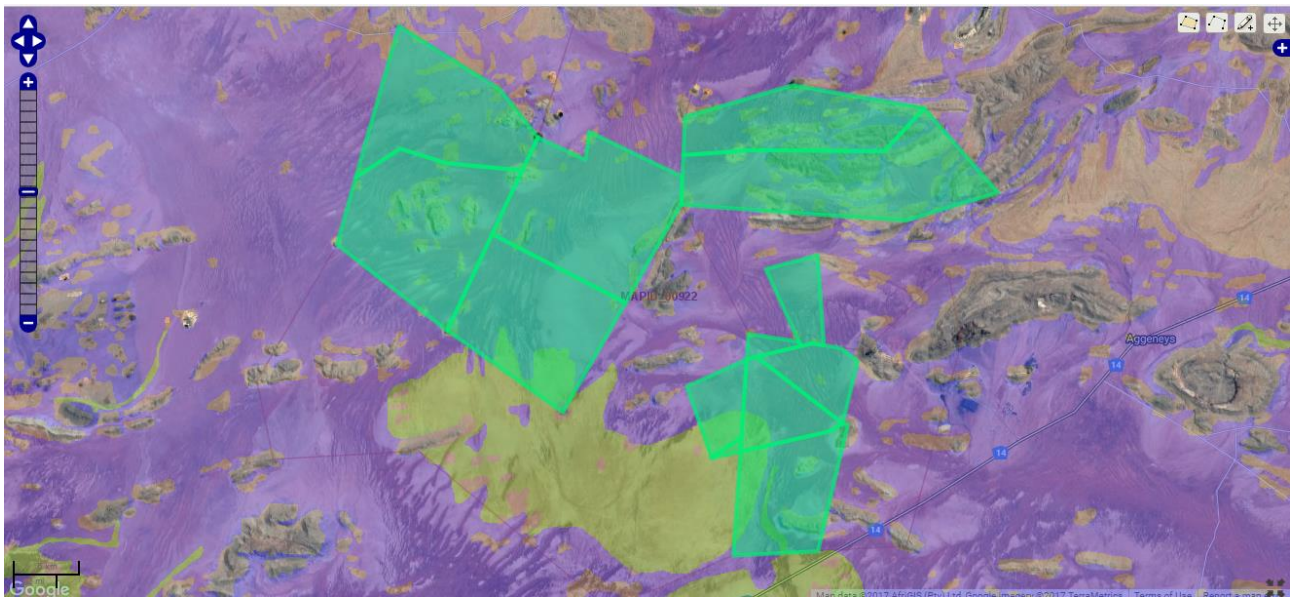

FIGURE 11: THE PALAEONTOLOGICAL SENSITIVITY OF THE STUDY AREA (GREEN POLYGON) (SAHRIS)

6.4.2.8. ENVIRONMENTAL ASPECTS WHICH MAY REQUIRE PROTECTION AND/OR REMEDIATION

Several NFEPA Rivers and wetlands have been identified within the application area during the desktop assessment. In the absence of a national protocol, a generic 100m buffer should be established around river and wetland FEPAs. This 100m buffer is considered adequate from a water quality perspective in providing functional filtering capacity to the river or wetland. This generic buffer has the potential to be reduced following a site-based level assessment and consideration of risk of proposed development and the proposed mitigation measure (NFEPA, 2011). Regulation 4 of GN704 of the NWA prohibits any underground or opencast mining, prospecting or any other operation or activity under or within the 1:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest.

The application area also falls within a terrestrial Critical Biodiversity Area (CBA) and terrestrial migraotory corridor. An application for environmental authorization for the clearance of vegetation within the CBA has been submitted. The extent of the clearance will only be limited to the areas required for drill sites and appropriate rehabilitation measures will be implemented upon completion of invasive activities. There are no protected areas within 5 km of the application area, however the application area does fall within Kamiesberg Bushmanland Augrabies which is a National Protected Areas Expansion Focus Area.

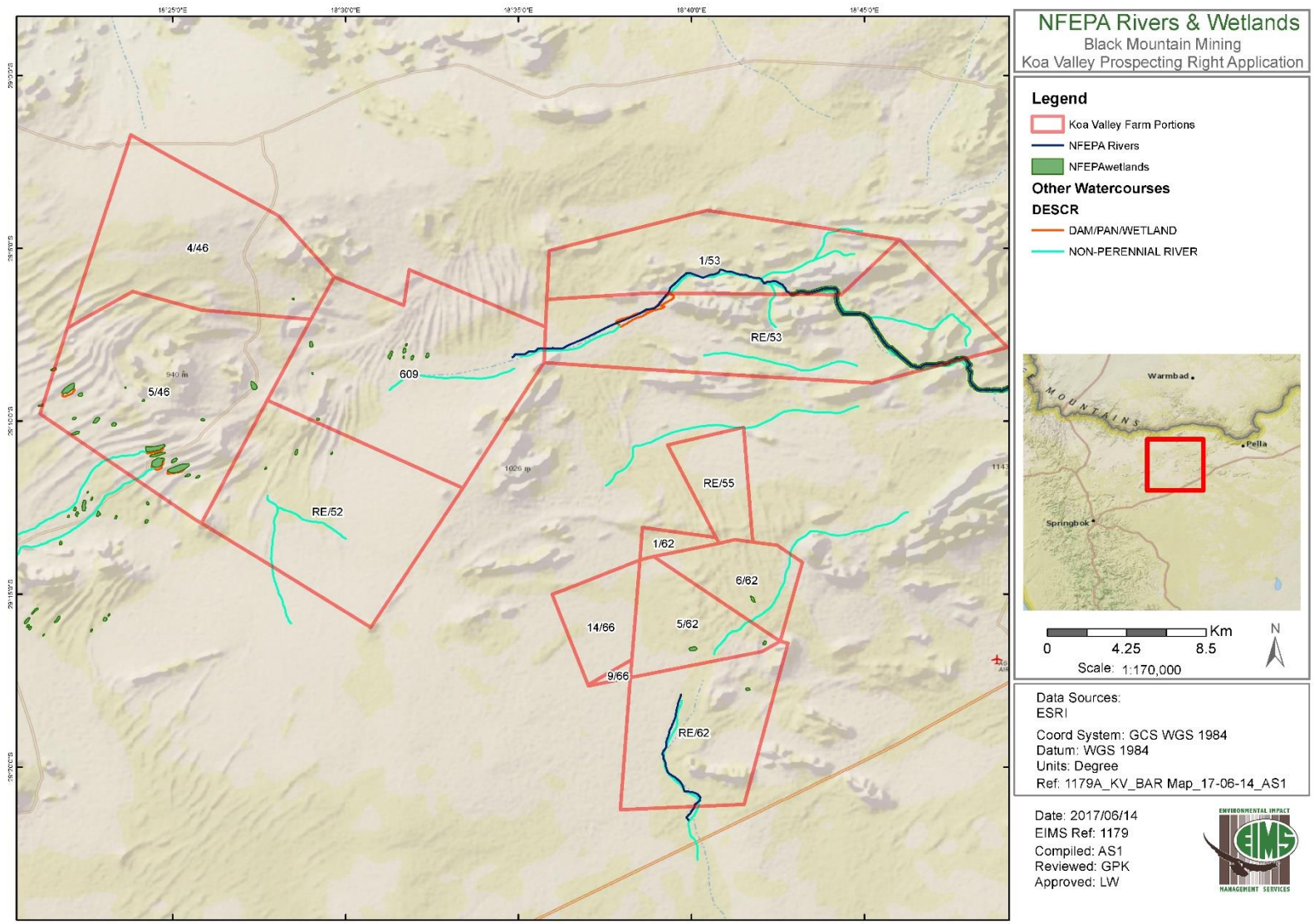

FIGURE 12: NFEPA RIVERS AND WETLANDS OF THE APPLICATION AREA

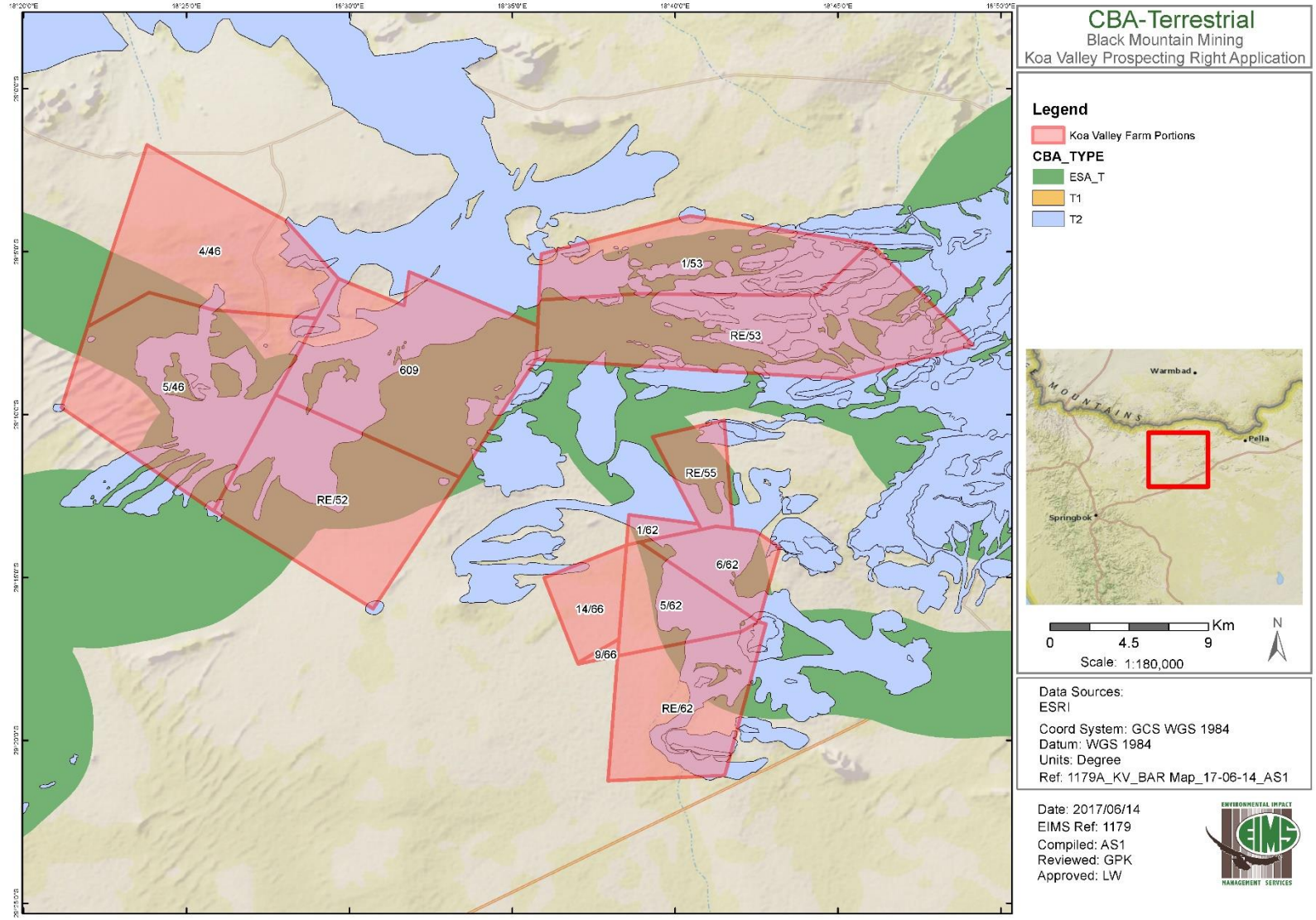

FIGURE 13: CRITICAL BIODIVERISTY AREAS

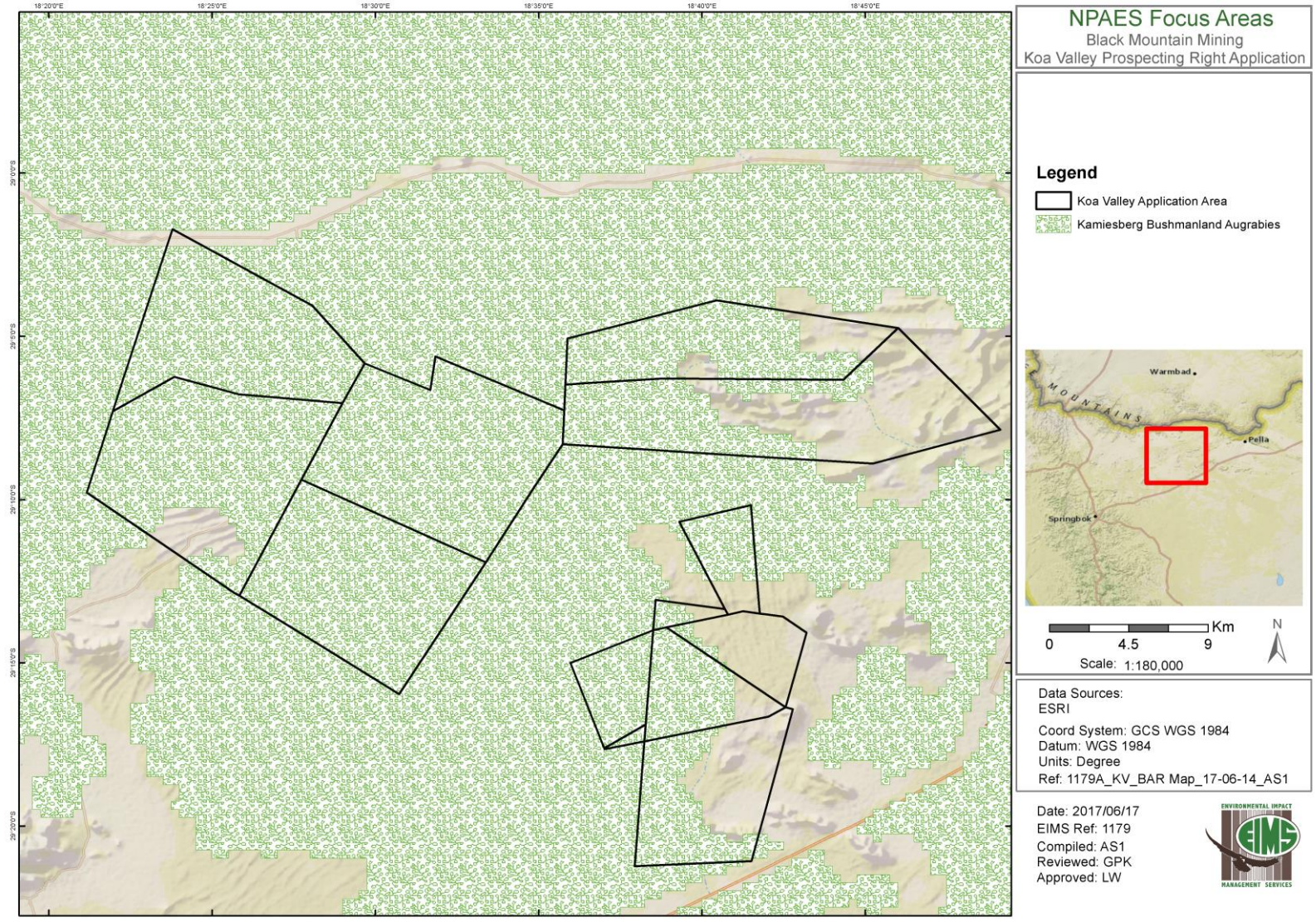

FIGURE 14: NATIONAL PROTECTED AREAS EXPANSION FOCUS AREA

6.4.3. DESCRIPTION OF CURRENT LAND USES

The properties were previously largely undisturbed and were and are presently mainly used for grazing of sheep and cattle. Only a few tracks or roads cross these properties. The existing land uses within the proposed Prospecting Right Application area include:

1. Vacant land; and
2. Grazing land.

The map below (Figure 15) indicates the proposed prospecting area boundary and the current land uses within it.

6.4.4. DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON SITE

The proposed properties are situated to the south and north of the N14 tar road from Aggeneys to Springbok.The most notable infrastructure features on site includes the following:

- Roads;
- Powerlines;
- Farmstead (Haramoep 53); and
- Fencing.

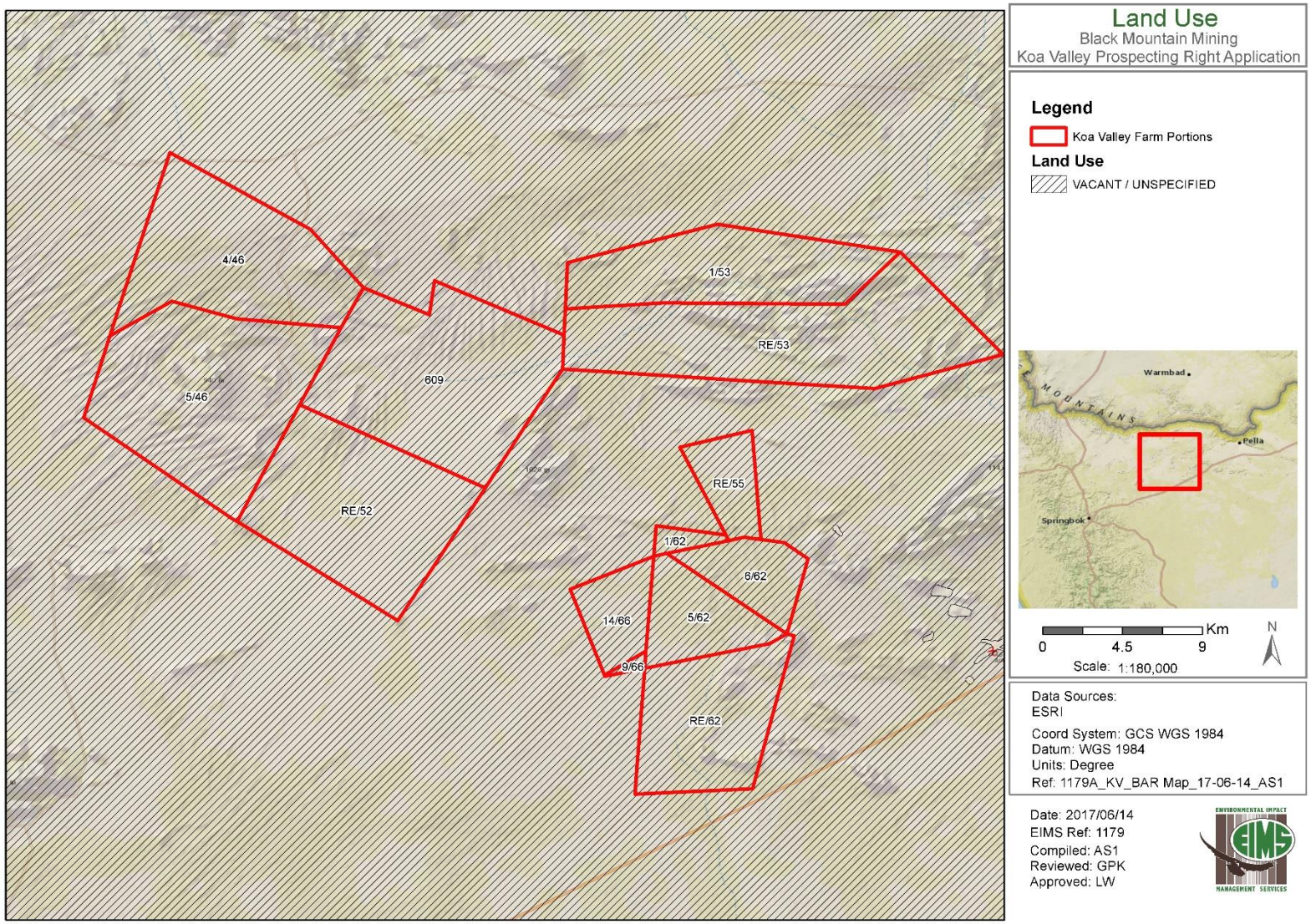

FIGURE 15: LAND USE OF THE APPLICATION AREA

6.5. IMPACTS AND RISKS IDENTIFIED

In order to calculate the significance of an impact, probability, duration, extent and magnitude will be used. The pre- and post mitigation scores will provide an indication of the extent to which an impact can be mitigated.

Due to the unavailability of historical geological data, both invasive and non-invasive prospecting techniques will be utilized. Activities that will require site access include Geological Field Mapping Semi-Regional Geophysical Survey, Detailed Ground and Aerial Geophysical Survey, Prospecting Boreholes, Boreholes to confirm continuity of mineralization & potential deposit size and Resource Definition Drilling.

Potential impacts that may occur as a result of the proposed prospecting activities are:

- Job Creation;
- Clearance/Disturbance of vegetation;
- Compacting of Soils;
- Drilling impact on identified lithic scatters;
- Impact on conserved Colonial Period Farm Haramoep 53 farmstead;
- Deterioration and damage to existing access roads and tracks;
- Safety and security risks to landowners and lawful occupiers;
- Interference with existing land uses;
- Generation and disposal of waste;
- Contamination of surface and ground water;
- Introduction/invasion by alien species;
- Noise;
- Impact on faunal species;
- Pollution of Soils;
- Dust;
- Erosion due to vegetation clearance;
- Impact on surface water features;
- Impact on groundwater;
- Loss of fossil heritage.

6.6. THE IMPACT ASSESSMENT METHODOLOGY

The impact significance rating methodology, as provided by EIMS, is guided by the requirements of the NEMA EIA Regulations (2010). The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring.

This determines the environmental risk. In addition other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).

The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E+D+M+R) \times N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 11:

TABLE 11: CRITERIA FOR DETERMINATION OF IMPACT CONSEQUENCE

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property boundary),
	3	Local (i.e. the area within 5 km of the site),
	4	Regional (i.e. extends between 5 and 50 km from the site
	5	Provincial / National (i.e. extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years),
	3	Medium term (6-15 years),
	4	Long term (the impact will cease after the operational life span of the project),
	5	Permanent (no mitigation measure of natural process will reduce the impact after construction).

Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected),
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected),
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way),
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease), or
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease).
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 12.

TABLE 12: PROBABILITY SCORING

Probability	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or

	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

ER= C x P

TABLE 13: DETERMINATION OF ENVIRONMENTAL RISK

Consequence						
	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Probability				

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 14.

TABLE 14: SIGNIFICANCE CLASSES

Environmental Risk Score	
Value	Description
< 10	Low (i.e. where this impact is unlikely to be a significant environmental risk),
≥ 10; < 20	Medium (i.e. where the impact could have a significant environmental risk),
≥ 20	High (i.e. where the impact will have a significant environmental risk).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/ mitigated.

In accordance with the requirements of Regulation 31 (2)(l) of the EIA Regulations (GNR 543), and further to the assessment criteria presented above it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

In addition it is important that the public opinion and sentiment regarding a prospective development and consequent potential impacts is considered in the decision making process.

In an effort to ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority / significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/ mitigation impacts are implemented.

TABLE 15: CRITERIA FOR THE DETERMINATION OF PRIORITISATION

Public response (PR)	Low (1)	Issue not raised in public response.
	Medium (2)	Issue has received a meaningful and justifiable public response.
	High (3)	Issue has received an intense meaningful and justifiable public response.
Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 15. The impact priority is therefore determined as follows:

Priority = PR + CI + LR

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 2 (refer to Table 16).

TABLE 16: DETERMINATION OF PRIORITISATION FACTOR

Priority	Ranking	Prioritisation Factor
3	Low	1
4	Medium	1.17
5	Medium	1.33
6	Medium	1.5
7	Medium	1.67
8	Medium	1.83
9	High	2

In order to determine the final impact significance the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is to be able to increase the post mitigation environmental risk rating by a full ranking class, if all the priority attributes are high (i.e. if an impact comes out with a medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential, significant public response, and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

TABLE 17: ENVIRONMENTAL SIGNIFICANCE RATING

Environmental Significance Rating	
Value	**Description**
< -10	Low negative (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ -10 < -20	Medium negative (i.e. where the impact could influence the decision to develop in the area).
≥ -20	High negative (i.e. where the impact must have an influence on the decision process to develop in the area).
0	No impact
< 10	Low positive (i.e. where this impact would not have a direct influence on the decision to develop in the area).
≥ 10 < 20	Medium positive (i.e. where the impact could influence the decision to develop in the area).

≥ 20	High positive (i.e. where the impact must have an influence on the decision process to develop in the area).

6.7. THE POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED

The proposed prospecting activities to be undertaken include the use of both invasive and non-invasive prospecting techniques. There will therefore be physical disturbance to the application area although this disturbance will be limited to the identified borehole sites and not the entire application area. Another negative impact of the proposed activity would be the interference with landowners or communities and the existing land uses. The actual invasive work only covers a few properties within the application area itself and therefore the disturbance due to invasive work will be minimal.

The positive impact of the proposed activity is the discovery of an economically viable mineral resource within the Nama Khoi and Khai Ma Local Municipalities, whose economy is very dependent of the mining industry.

It should be noted that this report made available to I&AP's for review and comment and their comments and concerns will be taken into account in this BAR. Furthermore, it should be noted that the impact scores themselves will include the results of the public response and comment. Please refer to Section 6.6 for the Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.

The following provides a description and assessment of the potential impacts identified in the impact assessment process. Please refer to Section 29.4 for the full impact scoring calculations. The topographical and geophysical surveys will see an increase in the use of access tracks by vehicles driving around the site. The access roads may over time and continuous use deteriorate and become damaged. The potential exists for a group of unfamiliar workers to enter the project area during the prospecting activities. This impact could potentially affect the local communities, however the impact will be minimal as people on site will be limited to the Applicant, contractor and geologists for the topographical and geophysical surveys.

Access to the application area for the topographical and geophysical survey, prospecting drilling and resource definition drilling will be required which may interrupt the existing land uses, such as grazing and residential developments. However, this impact will be minimal as it is of short duration. Approximately 0,6 ha of vegetation will be cleared during prospecting, however, care will be taken to be ensure that any protected species identified are relocated outside the footprint of the prospecting activities. Provisions have been made for the rehabilitation of all areas disturbed during prospecting, including access tracks.

The prospecting activities will generate general waste during the construction/ operational phase. This waste must be collected during site visits to be disposed of at appropriate landfill sites.

Impact	Pre-Mitigation Score
Job Creation	+5.25

Impact	Pre-Mitigation Score
Clearance/Disturbance of vegetation	-8.00
Compacting of Soils	-5.25
Drilling impact on identified lithic scatters	-8.00
Impact on conserved Colonial Period Farm Haramoep 53 farmstead	-2.00
Deterioration and damage to existing access roads and tracks	-8.00
Safety and security risks to landowners and lawful occupiers	-6.00
Interference with existing land uses	-7.00
Generation and disposal of waste	-6.00
Contamination of surface and ground water	-8.25
Introduction/invasion by alien species	-6.00
Noise	-4.50
Impact on fauna	-6.75
Pollution of Soils	-4.50
Dust	-4.50
Erosion due to vegetation clearance	-5.25
Impact on surface water features	-6.00
Impact on groundwater	-6.00
Loss of fossil heritage	-3.50

6.8. THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK

The following sections provide a description and assessment of the mitigation measures for each potential impact identified in the impact assessment process. The impact scores below are reflective of the impacts post the implementation of mitigation measures. A second score indicating the final significance of each potential impact is also reflected below. This score indicates the degree of potential loss of irreplaceable resources, the

cumulative nature of the impact, as well as the degree of public concern regarding the impact. It should be noted that this report will be made available to I&AP's for review and comment and their comments and concerns will be addressed in the final report to be submitted to the DMR for adjudication. Furthermore, it should be noted that the impact scores themselves will include the results of the aforementioned public response and comment. The results of the public consultation will be used to update the impact scores upon completion of the public review period, where after the finalised report will be submitted to the DMR for adjudication. Please refer to Appendix B for the full impact scoring calculations.

The following mitigation types have been associated with the potential impacts identified:

- Avoid and control through implementation of EMP mitigation measures (e.g. speed limit enforcement, vehicle maintenance);
- Avoidance and control through preventative measures (e.g. site security, code of conduct);
- Remedy through application of mitigation measures in EMP;
- Avoid and control through implementation of preventative measures (e.g. monitoring, communication with landowners, emergency response procedures);
- Avoid through implementation of preventative measures (e.g. consultation and communication);
- Avoid and remedy impacts and risks to the community through ongoing communication with the community. In this regard, quarterly community meetings shall be held with the affected communities.
- Avoid through implementation of suitable progressive rehabilitation and soil management;
- Avoid and control through implementation of EMP mitigation measures (e.g. Spill prevention, Hydrocarbon Storage);
- Avoid through preventative measures (e.g. bunding, spill kits);
- No invasive prospecting activities to be undertaken within 100m of a watercourse.
- Should any watercourse be affected, then the necessary water use licences should be obtained from the Department of Water and Sanitation.
- No ablution of site laydown areas are to be located within 100m of a watercourse.
- Where shallow aquifers are encoundered, a survey of the drinking water/ livestock watering boreholes should be undertaken (within 5km of the prospecting borehole sites). A detailed groundwater monitoring programme should be developed for these drinking water/ livestock watering boreholes and pre- and post-prospecting water quality samples should be taken.
- Where drinking water/ livestock watering boreholes are to be affected then the advice of a geohydrologist should be sought with regards to the need for plugging and casing of the prospecting boreholes.
- Remedy through cleanup and waste disposal; and
- Avoid and control through implementation of preventative measures (e.g. location of toilets, spill prevention, waste management).

Impact	Post-Mitigation Score	Final Significance
Job Creation	+5.25	+5.25
Clearance of vegetation	-7.00	-7.00
Compacting of Soils	-3.75	-3.75
Drilling impact on identified lithic scatters	+3.75	+4.38
Impact on conserved Colonial Period Farm Haramoep 53 farmstead	+1.75	+1.75
Deterioration and damage to existing access roads and tracks	-5.00	-5.00
Safety and security risks to landowners and lawful occupiers	-4.00	-4.00
Interference with existing land uses	-5.00	-5.83
Generation and disposal of waste	-4.50	-4.50
Contamination of surface and ground water	-3.50	-4.08
Introduction/invasion by alien species	-3.00	-3.00
Noise	-2.50	-2.50
Impact on fauna	-6.00	-7.00
Pollution of Soils	-2.50	-2.50
Dust	-2.50	-2.50
Erosion due to vegetation clearance	-2.50	-2.50
Impact on surface water features	-3.50	-3.50
Impact on groundwater	-3.50	-3.50
Loss of fossil heritage	-3.25	-3.25

6.9. MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

The development footprint is expected to be a fraction of the application area size, which is estimated to be 57 952 hectares. The geology is the primary driver in determining the location of prospecting and mining. The area to be prospected is within ore trucking distance of Black Mountain Mining's existing concentrator plant at Aggeneys. Black Mountain Mining at Aggeneys is currently the only operating mine in the district. The inferred tectono-stratigraphic setting of the prospect area is considered favourable for hosting zinc-copper-lead-silver mineralization similar to that currently being exploited at the Black Mountain Mine. As such no assessment of alternative development scenarios was conducted.

Initially, the proposed prospecting area included Portion 1 and Remainder of the Farm Nooisabes 51. However, after the applicant had discussions with the DMR, it was decided to proceed with the Koa Valley prospecting right application excluding these properties. Specific areas within the application area have been identified for drilling in order to minimize land destruction during prospecting.

6.10. STATEMENT MOTIVATING THE ALTERNATIVE DEVELOPMENT LOCATION WITHIN THE OVERALL SITE

As discussed above, the proposed application area has been selected due to the geology of the site and the anticipated favourable tectono-stratigraphic setting of the prospect area. There are no protected areas within 5 km of the application area, however the application area does fall within Kamiesberg Bushmanland Augrabies which is a National Protected Areas Expansion Focus Area (Figure 14). No prospecting will occur within 100m of any watercourse. The land or properties affected are mostly vacant and/or used for grazing and therefore the potential discovery of viable mineral resources within the application area would be beneficial in terms of diversifying the use of land in the area. It is noted that there are future developments such as a solar farm proposed within the application area, consultation with all interested and affected parties will be conducted. Negative impacts identified above will be mitigated through implementation of the proposed mitigation measures as detailed in the EMP. Where negative impacts cannot be avoided, rehabilitation will be undertaken.

The impacts of the development alternative are of Medium to Low significance and would be reduced to low should the proposed mitigation measures be implemented accordingly.

7. 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

The impact assessment process may be summarised as follows:

1. Identification of proposed prospecting activities including their nature and duration;
2. Screening of activities likely to result in impacts or risks;
3. Utilisation of the above mentioned EIMS methodology to assess and score preliminary impacts and risks identified;

4. Inclusion of I&AP comment regarding impact identification and assessment;
5. Finalisation of impact identification and scoring.

8. IMPACT ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

TABLE 18: IMPACT ASSESSMENT SUMMARY

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
Geological Field Mapping and Environmental Screening	Interference with existing land uses	Site Access	Planning	-7.00	• Site access control, heritage impact assessment; consultation with Landowners	-8.17
	Deterioration and damage to existing access roads and tracks	Transportation	Planning Operation	-8.00	• Site access control; Demarcation of access tracks to be used	-5.00
Regional Ground Geophysical Surveys and Detailed Ground Geophysical Surveys	Interference with existing land uses	Site Access	Planning	-7.00	• Site access control, heritage impact assessment; consultation with Landowners	-5.83
	Deterioration and damage to existing access roads and tracks	Transportation	Planning Operation	-8.00	• Site access control; Demarcation of access tracks to be used	-5.00
Site Clearance	Clearance of vegetation	Prospecting areas	Construction	-8.00	• Demarcation of sensitive areas in consultation with	-7.00

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
			Operation		relevant specialists and ECO; • Minimise removal of vegetation as far as possible; • Implement alien vegetation management; • Ongoing identification of risks and impacts; • Emergency preparedness; and • Monitoring and review.	
	Erosion due to vegetation clearance	Prospecting areas	Construction Operation	-2.50	• Limit construction to approved demarcated areas. • Rehabilitation using indigenous seed mix.	-2.50
	Impact on surface water features	Prospecting areas	Construction	-3.50	• No prospecting drill site to be located within	-3.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					100m of watercourse. • Implementation of pollution prevention mitigation measures.	
	Drilling impact on identified lithic scatters	Prospecting areas	Construction Operation	-1.75	• Notification of Provincial and National Heritage Authorities	+1.00
	Impact on conserved Colonial Period Farm Haramoep 53 farmstead	Construction	Construction Operation	-2.00	• Notification of Provincial and National Heritage Authorities • Temporary heritage signage during the construction (drilling) phase	+1.00
	Pollution of Soils	Prospecting areas	Construction Operation	-4.50	• All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					prevent pollution of the environment or harm to people or animals. • Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution in the event of a spill; and way that does not pose any danger of pollution even during times of high rainfall. • Hazardous substances must be confined to specific and secured areas, and stored at all time withing bunded areas; • Adequate spill prevention and cleanup procedures should be developed and	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					implemented during the prospecting activities. • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.	
	Introduction/ invasion by alien species	Prospecting areas	Construction Operation Rehabilitation	-6.75	• Use of indigenous species for rehabilitation, immediate rehabilitation of areas where construction is completed, rehabilitation monitoring.	-3.00
	Dust	Prospecting areas	Construction Operation	-4.50	• Use of suitable dust suppression measures such as water spraying; • All stockpiles of fine material must be covered;	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					• Limit clearance of vegetation.	
	Interference with existing land uses	Site Access	Planning Construction Operation	-7.00	• Site access control, heritage impact assessment; consultation with Landowners	-5.83
Target Prospecting Boreholes & Widely Spaces Boreholes	Pollution of Soils	Drilling	Construction Operation	-4.50	• All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to prevent pollution of the environment or harm to people or animals. • Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					in the event of a spill; and way that does not pose any danger of pollution even during times of high rainfall. • Hazardous substances must be confined to specific and secured areas, and stored at all time withing bunded areas; • Adequate spill prevention and cleanup procedures should be developed and implemented during the prospecting activities. • Should any major spills of hazardous materials take place, such should be reported in terms	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					of the Section 30 of the NEMA.	
	Compacting of Soils	Drilling	Construction Operation Decommissioning	-5.25	• Compacting of soil must be avoided as far as possible, and the use of heavy machinery must be restricted in areas outside of the proposed exploration sites to reduce the compaction of soils.	-3.75
	Surface Water	Drilling	Construction Operation Decommissioning	-6.00	• No invasive prospecting activities to be undertaken within 100m of a watercourse. • Should any watercourse be affected, then the necessary water use licences should be obtained from the Department of Water and Sanitation.	-3.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					• No ablusion of site laydown areas are to be located within 100m of a watercourse.	
	Groundwater	Drilling	Construction Operation Decommissioning	-6.00	• Where shallow aquifers are encoundered, and a pollution event occurs at a particular borehole, a survey of the drinking water/ livestock watering boreholes should be undertaken (withing 5km of the prospecting borehole sites). A detailed groundwater monitoring programme should be developed for these drinking water/ livestock watering boreholes and pre- and post-	-3.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					prospecting water quality samples should be taken. • Where drinking water/ livestock watering boreholes are to be affected then the advise of a geohydrologist should be sought with regards to the need for plugging and casing of the prospecting boreholes.	
	Noise	Drilling	Construction Operation	-3.75	• Local residents (landowners and directly adjacent landowners) should be notified of any potentially noisy activities or work and these activities should be undertaken at reasonable times of the day. This work should not take place at	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					night or on weekends; • The contractor must attempt to restrict noisy activities as far as is possible to times and locations whereby the potential for noise nuisance is reduced.	
	Loss of fossil heritage	Drilling	Construction Operation	-3.25	• Should any chance finds be uncovered during the construction phase, these must be handled in accordance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA); and • Should fossil remains be discovered in the Cenozoic Superficial	-3.25

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					deposits during any phase of construction, either on the surface or exposed by fresh excavations, the ECO responsible for these developments should be alerted immediately. Such discoveries ought to be protected (preferably in situ) and the ECO should alert SAHRA so that appropriate mitigation (e.g. recording, sampling or collection) can be taken by a professional palaeontologist	
	Impact on faunal species	All prospecting activities	Construction Operation	-2.50	• All incidents of harm to any natural vegetation (apart from the agreed upon areas) or	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					animals must be reported to the ECO. • Harvesting or poaching of animals and plants is forbidden. • Feeding of all animals is strictly forbidden. • No food of the construction workers should be left open and unattended as the likelihood of animals taking the food is high. This process disturbs ecological processes and is therefore strictly forbidden. • Construction activities must also take into consideration the breeding periods of surrounding bird species, limiting	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					construction during that time period and also reducing any negative impacts which may be caused on surrounding species. • No firewood may be collected.	
Ablutions - Chemical Toilets	Contamination of surface waters	All prospecting acivities	Construction Operation	-6.75	• Provision of adequate chemical toilets on site, chemical ablutions to be emptied regularly. • Chemical ablutions must not be placed in close proximity to watercourses.	-4.08
Temporary Fuel storage	Pollution of Soils	Drilling	Construction Operation	-4.50	• Any spills of hydrocarbons or fluids used during operation, must be cleaned up immediately; • An above ground drilling sump must be used to	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					contain drilling mud in order to reduce surface and groundwater contamination. No earthen mud sumps are to be constructed and utilized; • No prospecting boreholes should be drilled in the immediate vicinity of existing private boreholes; • Soils in drilling areas where disturbances will be encountered must be stripped and stockpiled outside affected areas for use after completion of the drilling program. • Topsoil must be adequately stripped to the correct depth and stored separately from subsoils;	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					• Cut of trench and berm must be constructed around the drill pad to prevent contaminated surface runoff from entering shallow aquifers and surrounding water resources, where required by the topography; • A liner should be placed over the drill pad and drip trays must be used in all areas where hydrocarbons are handled;	
	Contamination of Surface and Ground water	Drilling	Construction Operation	-8.25	• No prospecting boreholes may be located within 100m of a watercourse. • Cut of trench and berm must be constructed around the drill pad to prevent contaminated	-4.08

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					surface runoff from entering shallow aquifers and surrounding water resources, where required by the topography; • A liner should be placed over the drill pad and drip trays must be used in all areas where hydrocarbons are handled;	
Creation of access roads	Disturbance/ Clearance of vegetation	Transportation	Construction Operation	-8.00	• No indiscriminate driving in natural areas. • Use of existing access tracks wherever possible. • Rehabilitation of any disturbed areas due to prospecting.	-7.00
Undertake rehabilitation as per the annual and final	Introduction/invasion by alien species	Rehabilitation	Operation Rehabilitation	-6.75	• Only indeginous plant species must be used during revegetation of	-3.00

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
rehabilitation plan					disturbed areas, a plant specialist must be consulted for this purpose. • Any excess or waste material or chemicals, including drilling muds etc. must be removed from the site and must preferably be recycled (e.g. oil and other hydrocarbon waste products). • Any waste materials or chemicals that cannot be recycled must be disposed of at a suitably licensed waste facility. • Restoration and rehabilitation of disturbed areas must be implemented as soon as prospecting activities are completed;	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					• Sites must be restored to the original condition with vegetation cover (where applicable) equaling the surrounding vegetation cover; • All debris and contaminated soils must be removed and suitably disposed of; • Contours and natural surrounding must be reformed; • Natural drainage patterns must be restored; • All surface infrastructure on site must be removed; • Temporary access routes/roads must be suitably rehabilitated; and • Sites must be monitored by the	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					ECO (including relevant specialist's inputs if, necessary) for adequate rehabilitation until the desired rehabilitation objectives have been achieved	
Monitoring of rehabilitation efforts	Erosion due to vegetation clearance	Closure and Rehabilitation	RehabilitationPost-rehabilitation	-5.25	• The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1) year unless otherwise specified by the competent authority. • The monitoring activities during this period will	-2.50

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCEif mitigated
					include but not be limited to: • Biodiversity monitoring; and • Re-vegetation of disturbed areas where required. • Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed prospecting activities and incorporated into post closure monitoring and management.	

9. SUMMARY OF SPECIALIST REPORTS

Specialist study undertaken	Recommendations of Specialist Report	Sepecialist Recommendations that have been included in the EIA Report (Mark with X where applicable	Reference to the applicable section of the Report where Specialist recommendations have been included.
Heritage Impact Assessment	The Koa Valley prospecting is proposed by means of a phased approach, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive techniques, including assaying and drilling. Only the impact of invasive techniques is to be considered with reference to requirements of the NHRA 1999. The impact of assaying, rock chip and soil sample collection, is negligible with reference to the recorded archaeological and cultural heritage of the greater terrain. The Phase 1 AIA focussed on field assessment of the thirty-four (34) proposed drill positions. Drill positions are proposed situated on the peneplains and within the Koa Valley dune system, with both of these areas having proven to be of no to low archaeological significance. None of the drill positions are situated on gravel lenses, and intersecting anthropogenic gravel lenses are archaeologically insignificant.	X	Section 6.4.2.5

Specialist study undertaken	Recommendations of Specialist Report	Sepecialist Recommendations that have been included in the EIA Report (Mark with X where applicable	Reference to the applicable section of the Report where Specialist recommendations have been included.
Palaeontological Impact Assessment	The broader area near Aggeneys is underlain by the Mid Proterozoic (Mokolian) basement rocks of the Namaqua-Natal Metamorphic Province (Bushmanland Group), and Cenozoic superficial deposits. The Proterozoic granite-gneiss basement rocks of the Namaqua-Natal Metamorphic Province do not contain any fossils because they are igneous in origin or too highly metamorphosed and their palaeontological sensitivity is similarly low. The low palaeontological sensitivity of the Cenozoic superficial deposits can be attributed to the scarcity of fossil heritage in this deposits. In Palaeontological terms the significance is thus rated as LOW (negative). Consequently, pending the discovery of significant new fossil material here, no further specialist studies are considered to be necessary. Thus, the proposed Koa Valley prospecting right project, may be authorised as the whole extent of the development footprint is not considered as sensitive in terms of palaeontological resources.	X	Section 6.4.2.6

Please refer to Appendix F and Appendix G for the complete specialist reports.

10. ENVIRONMENTAL IMPACT STATEMENT

10.1. SUMMARY OF KEY FINDINGS

A summary of the key findings of the environmental impact assessment is outlined below.

Key findings for the Basic Assessment

- NFEPA watercourses have been identified within the application area.
- The application area falls within a terrestrial Critical Biodiversity Area and within the Kamiesberg Bushmanland Augrabies which is a National Protected Areas Expansion Focus Area.
- The proposed prospecting activities fall within an Important Bird Area and terrestrial migratory corridor.
- There are no Critically Endangered Threatened Ecosystems in the application area.
- The vegetation of the general area and the proposed site is typical of the Upper Karoo and consists mainly of Karoo scrub and grass and the occasional Karoo Acacia and forms part of the vegetation in the Nama-Karoo biome (Mucina & Rutherford 2006). The prevalent biomes in the application area are Nama Karoo, Succulent Karoo and Desert Biomes. The vegetation types anticipated in the application area are those associated with the Bushmanland Arid Grassland, Bushmanland Inselberg Shrubland, Bushmanland Sandy Grassland, Eastern Gariep Plains Desert and Eastern Gariep Rocky Desert.
- There are no protected areas within 5km of the proposed prospecting area.
- The application area is larglely undisturbed, vacant grazing land.
- The prospecting area is located in the Lower Orange Water Management Area within the D82A, D82C and D82D quaternary catchments.
- The low palaeontological sensitivity of the Cenozoic superficial deposits can be attributed to the fact that these fossil assemblages are mostly sparse, low in diversity, and occur over a wide geographic area. In Palaeontological terms the significance is thus rated as LOW (negative).

Key findings for the socio-economic environment

- Landowners in the application area have stated that the land wthin the application area is used for livestock grazing and game activities. The proposed prospecting activities may interefere with other existing land uses such as tourist accommodation, as well as future developments within the application area such as a proposed solar farm and a diamond prospecting activity on portion 5 of the farm Amam 46
- There are no existing mining operations and related infrastructure located on the application area.
- Consultation with the community and land owners will be conducted in order to capture any comments or concerns regarding the proposed activities and to to ensure the community and landowners are kept informed and allowed to raise issues. The concerns raised will be included in the final BAR.

10.2. FINAL SITE MAP

Please refer to the composite map included in Section 20.3 below.

10.3. SUMMARY OF POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS

The positive implication of the Prospecting Right is the discovery of an economically viable mineral resource. Although non-invasive techniques will be utilized as part of the proposed prospecting activities. The implementation of the proposed mitigation measure will ensure that the negative implications and risks of the project are minimal. The potential negative impacts are as follows:

- Job Creation;
- Clearance/Disturbance of vegetation;
- Compacting of Soils;
- Drilling impact on identified lithic scatters;
- Impact on conserved Colonial Period Farm Haramoep 53 farmstead;
- Deterioration and damage to existing access roads and tracks;
- Safety and security risks to landowners and lawful occupiers;
- Interference with existing land uses;
- Generation and disposal of waste;
- Contamination of surface and ground water;
- Introduction/invasion by alien species;
- Noise;
- Impact on faunal species;
- Pollution of Soils;
- Dust;
- Erosion due to vegetation clearance;
- Impact on surface water features;
- Impact on groundwater;
- Loss of fossil heritage.

The EMPr has identified appropriate mechanisms for avoidance and mitigation of these negative impacts.

11. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

The management objective is to minimise the socio-economic impact of the proposed Prospecting Right in terms of the socio-economic perceptions and expectations of I&AP's. The outcome to be achieved is to lessen the impact through the following measures:

- Adhere to an open and transparent communication procedure with stakeholders at all times;

- Ensure that accurate information regarding the prospecting activities to be undertaken and the resultant lack of requirements for site access and labour is communicated to I&APs;
- Ensure that information is communicated in a manner which is understandable and accessible to I&APs;
- Enhance project benefits and minimise negative impacts through consultation with stakeholders;
- To limit interference with existing land uses as far as possible during prospecting;
- Limit the impact on the groundwater and surface water features through the implimentation of the EMPr and the impact mitigation measures.
- To avoid damage to road infrastructure; and
- To maintain safety to pedestrians and motorists.

12. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

Please refer to Section 14.2 for the main measures that should be included as conditions in the authorisation.

13. DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The following assumptions, uncertainties, and gaps in knowledge are applicable to this BAR:

- The baseline environment was compiled through desktop studies only and a limited field assessment conducted by the heritage specialist, and is subject to change based on the results of the public participation process. The possibility exists that the desktop data is outdated or incomplete. A limited duration site visit was undertaken during the PPP in order to verify the desktop data utilised. Furthermore, the description of the baseline environment will be further informed by the results of the public participation process.
- A single professional archaeologist conducted fieldwork of the study area. As the proposed activity is a prospecting application, the fieldwork focussed on assessing those sections of the study area identified by the client as being prospecting lines and point footprints.
- In interpreting the NFEPA data, it must always be remembered that the NFEPA database is in incomplete. The NFEPA Implementation Manual, Driver *et al*. (2011) states *"not all wetlands have been mapped and there are substantial gaps". Furthermore, "rivers and wetlands that are not FEPAs… still require a biodiversity assessment because knowledge of special ecological features or species of special concern is incomplete*.

14. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

14.1. REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT

The impacts on the environment can be mitigated through open communication with the community, landowners, implementation of the proposed EMPr provisions including the decommissioning, closure and rehabilitation plans, and limiting site access requirements. It is therefore the opinion of the EAP that the proposed activity should be authorised.

14.2. CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

Stakeholder Engagement will continue throughout the prospecting activities to ensure the community and landowners are kept informed and allowed to raise issues. These issues will then be addressed through a grievance mechanism.

Arrangements for financial provisions for the decommissioning, closure and rehabilitation must be made.

The applicant should adhere to the conditions of the EA, EMPR and the Specialist reports for this project.

15. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The Environmental Authorisation is required for five (5) years.

16. UNDERTAKING

It is confirmed 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 BAR and the EMPR.

17. FINANCIAL PROVISION

17.1. EXPLAIN HOW THE AFORESAID AMOUNT WAS DERIVED

The Regulations Pertaining to the Financial Provision for Prospecting, Prospecting, Mining or Production Operations promulgated under section 44(aE), (aF), (aG), (aH) read with sections 24(5)(b)(ix), 24(5)(d), 24N, 24P and 24R of the National Environmental Management Act, 1998 (Act No.107 of 1998) (20 November 2015) have been considered and this is anticipated to result in an increase in the rehabilitation costs estimated using above mentioned quantum.

A detailed Final Rehabilitation, Decommissioning and Closure Plan (FRDCP) has been compiled in terms of the requirements of Regulations Pertaining to the Financial Provision for Prospecting, Prospecting, Mining or Production Operations. This FRDCP has been included in Appendix E. Please refer to Appendix E for a detailed description of the amount required to meet the objectives of the FRDCP.

17.2. CONFIRM THAT THIS AMOUNT CAN BE PROVIDED FOR FROM OPERATING EXPENDITURE

Financing of the proposed work plan will be sourced from the Black Mountain Mine Exploration (prospecting) budget, the current budget for financial year 2017/ 2018 is R80,000,000. The investment strategy is to maintain this level of funding over the next five year period as Black Mountain Mining plan to undertake a large regional prospecting programme in the Northern Cape to discover new deposits and increase their resource base with the long term aim of increasing the current life of mine or developing any new discoveries as stand-alone operations.

Arrangements to provide the financial provision detailed in Appendix E prior to commencing with any prospecting operations will be made.

18. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No additional information other than the appendices of this report has been included.

18.1. 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 BAR REPORT MUST INCLUDE THE:

18.1.1. IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON

The potential impacts on the socio-economic conditions have the potential to include:

- Safety and security risks to landowners and lawful occupiers

  The potential exists for a group of unfamiliar workers to enter the project area during the prospecting activities. This impact could potentially affect the local communities, however the impact will be minimal as people on site will be limited to the Applicant, contractor and geologists for the topographical and geophysical surveys.

- Interference with existing land uses

  Access to the application area for the topographical and geophysical survey will be required which may interrupt the existing land uses, such as livestock grazing, residential developments and game activities. However, this impact will be minimal as no heavy equipment will be brought on site and it is of short duration.

The consultation process will allow directly affected parties to raise their concerns. Further to this, it must be noted that I&AP's, including directly affected parties such as landowners, have the opportunity to review and comment on this report. The results of the public consultation have been included in the final report submitted to the department for adjudication.

18.1.2. IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NATIONAL HERITAGE RESOURCES ACT

Please refer to Section 6.4.2.5. Notice of the proposed Prospecting Right Application has been uploaded onto the South African Heritage Resources Agency's (SAHRA) website, South African Heritage Information System (SAHRIS).

19. OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT

The proof of investigations conducted is attached as Appendix B.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME

20. INTRODUCTION

20.1. DETAILS OF THE EAP

The details and expertise of the EAP are detailed in Section 1 above as required.

20.2. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

A description of the aspects of the activity covered by the EMPR below is included in Section 2 above.

20.3. COMPOSITE MAP

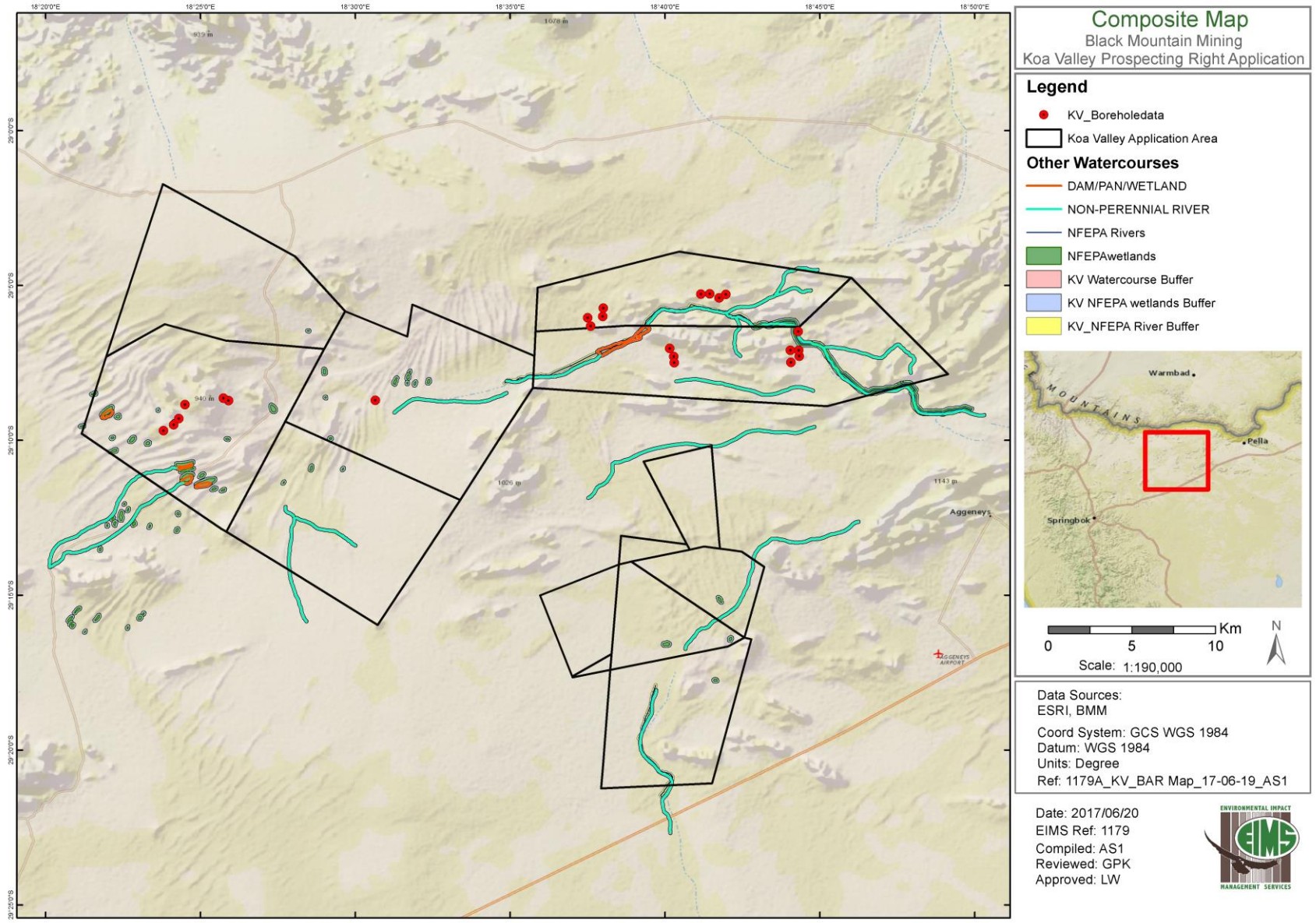

FIGURE 16: COMPOSITE MAP OF THE APPLICATION AREA

21. DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

21.1. DETERMINATION OF CLOSURE OBJECTIVES

The vision, and consequent objective and targets for rehabilitation, decommissioning and closure, aim to reflect the local environmental and socio-economic context of the project, and to represent both the corporate requirements and the stakeholder expectations.

The receiving environment within which the prospecting activities will be undertaken include the following key land-uses:

- Natural Veld primarily utilised for livestock grazing;
- Low density rural residential.

With reference to Section 6.2, concerns raised by the stakeholders consulted during the public participation process for the basic assessment have been taken into consideration and will be included in the final BAR and EMPr which will be submitted to the DMR.

In practice the post closure land-use will depend on the pre-prospecting land-use applicable to the specific location of the invasive prospecting activities. Considering that the exact locations of the planned prospecting have been identified and assessed, it can be said that the closure plan will sufficiently address the objectives for the preferred alternative. This EMP does, however, aim to address the key closure objectives which are likely to remain consistent for the majority of the prospecting activities.

The EMPR includes a rehabilitation plan. The plan shall outline the closure objectives which are aimed at re-instating the landform, land use and vegetation units to the same as before prospecting operations take place unless a specific, reasonable alternate land use is requested by the landowner. As such, the intended end use for the disturbed prospecting areas and the closure objectives will be defined in consultation with the relevant landowner. Proof of such consultation will be submitted together with the Application for Closure Certificate. The overall aim of the rehabilitation plan is to rehabilitate the environment to a condition as close as possible to that which existed prior to prospecting. This shall be achieved with a number of specific objectives.

1. **Making the area safe.** i.e. Decommission prospecting activities so as to ensure that the environment is safe for people and animals. This entails refilling excavations, sealing boreholes, etc.
2. **Recreating a free draining landform.** This entails earthworks infilling, reshaping, levelling, etc. to recreate as close as possible the original topography and to ensure a free draining landscape.
3. **Re-vegetation.** This involves either reseeding or allowing natural succession depending on the area, climate etc.
4. **Storm water management and erosion control.** Management of stormwater and prevention of erosion during rehabilitation. E.g. cut off drains, berms etc. and erosion control where required.
5. **Verification of rehabilitation success.** Entails monitoring of rehabilitation.
6. **Successful closure.** Obtain closure certificate.

21.2. VOLUMES AND RATE OF WATER USE REQUIRED FOR THE OPERATION

Limited water will be consumed by the surface dust suppression activities (water mist added for dust suppression when required), approximately <500litres per day. If diamond drilling is to take place then it is estimated that up to 40 000 litres per day could be required per day.

21.3. HAS A WATER USE LICENCE BEEN APPLIED FOR?

No prospecting activity will occur within identified watercourses. No water use licence has been applied for as part of this this prospecting right application, however, it is anticipated that abstraction related water uses may be applicable. It is recommended that this be confirmed with the DWS prior to commencement of the invasive prospecting activities that require water and should any of the NWA Section 21 water uses become applicable, then the Applicant will need to apply for the relevant water uses from the Department of Water and Sanitation prior to undertaking such activities.

21.4. IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

TABLE 19: IMPACTS TO BE MITIGATED

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Site clearance	Construction Operation	0.6 ha, short term and localized	• Demarcation of sensitive areas in consultation with relevant specialists and ECO; • Utilise local labour if possible; • Minimise removal of vegetation as far as possible; • Identification and relocation of protected species by a qualified ecologist (and application or the relevant biodiversity permits where required); • Minimize dust generation; • Limit vehicle access; • Implement alien vegetation management; • Ongoing identification of risks and impacts; • Emergency preparedness; • Monitoring and review; and • Avoid disturbance of fauna as much as possible, especially bird nesting sites.	NEMA MPRDA NEMBA NEMAQA Dust regulations NWA DWAF Best Practice Guidelines	Throughout Construction and operation
Site access	Construction Operation	57952 ha, short term and localized	• All employees and visitors to the site must undergo a site induction which shall include basic environmental awareness and site specific environmental requirements (e.g. site sensitivities and relevant protocols/procedures). This induction should be presented or otherwise facilitated by the Contractors EO/Mine EO wherever possible.	NEMA OHS and MHSA	Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Landowners/lawful occupiers must be notified prior to accessing properties. A date and time that is suitable to landowners/lawful occupiers and is reasonable to the applicant should be negotiated and agreed upon. • The number, identity of workers, work location and work to be done must be provided to the landowner/lawful occupier prior to going on site. • Consideration must be taken by the applicant and/or contractors when on site not to interfere with the existing land uses and practices.		
Establishment of site infrastructure	Construction	2,1 ha, short term and localized	• Minimise physical footprint of construction; • Ensure construction is consistent with occupational health and safety requirements; • Minimise vegetation clearance; • Ensure proper and adequate drainage; • Minimise waste and control waste disposal; • Fencing of all drill sites with security access control and warning signs; • Establish waste storage areas for recycling; • Ensure adequate containment of waste to prevent pollution; • Minimise dust generation; • Limit vehicle access to approved access roads; • Prepare contingency plans for spillage and fire risks.	NEMA MPRDA NEMBA NEMAQA Dust regulations NWA DWAF Best Practice Guidelines NHRA	Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Temporary heritage signage around the conserved Haramoep 53 farmstead during the construction (drilling) phase.		
Storage of construction vehicles	Construction and Operation	0,6 ha, short term and localized	• Any equipment that may leak, and does not have to be transported regularly, must be placed on watertight drip trays to catch any potential spillages of pollutants. The drip trays must be of a size that the equipment can be placed inside it; • Drip trays must be cleaned regularly and shall not be allowed to overflow. All spilled hazardous substances must be collected and adequately disposed of at a suitably licensed facility; and • Compacting of soil must be avoided as far as possible, and the use of heavy machinery must be restricted in areas outside of the proposed exploration sites to reduce the compaction of soils.	NWA DWAF BPG	Throughout Construction and operation
Transportation/ access to and from drill sites	Construction and Operation	2,1 ha, short term and localized	• Where possible, drill sites should be located along existing access roads to reduce the requirement for additional access roads; • Any new temporary access routes to a drill site should result in minimal disturbance to existing vegetation; • Prior to accessing any portion of land, the Applicant must enter into formal written agreements with the affected landowner. This formal agreement should additionally stipulate landowners special conditions which would form a legally binding agreement;	NEMA NEMBA CARA NEMAQA Dust Regulations Road Traffic Act	Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• All farm gates must be closed immediately upon entry/exit; • Under no circumstances may the contractor damage any farm gates, fences, etc.; • On-site vehicles must be limited to approved access routes and areas on the site so as to minimize excessive environmental disturbance to the soil and vegetation on site, and to minimize disruption of traffic (where relevant); • All construction and vehicles using public roads must be in a roadworthy condition and their loads secured. They must adhere to the speed limits and all local, provincial and national regulations with regards to road safety and transport; • Damage caused to public roads as a result of the construction activities must be repaired in consultation with the relevant municipal authorities; and • All measures should be implemented to minimize the potential of dust generation.		
Storage of hazardous substances	Construction and Operation	0,6 ha, short term and localized	• All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to prevent pollution of the environment or harm to people or animals. Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution in the event of a spill; and way that does not pose any danger of pollution even during times of high rainfall.	NWA NEMWA DWAF BPG NEMA	Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Hazardous substances must be confined to specific and secured areas, and stored at all time withing bunded areas; • Adequate spill prevention and cleanup procedures should be developed and implemented during the prospecting activities. • Should any major spills of hazardous materials take place, such should be reported in terms of the Section 30 of the NEMA.		
Waste management	Construction and Operation	Short-medium term, localized	• Waste generated on site must be recycled as far as possible. Recyclable waste must not be stored on site for excessive periods to reduce risk of environmental contamination; • Drill muds, formation water (if encountered), etc. would constitute waste and must be classified and ranked in terms of relevant legislation for correct disposal; and • A Waste Management System must be implemented, and provide for adequate waste storage (in the form of enclosed containers) waste separation for recycling, and frequent removal of non-recyclable waste for permanent disposal at an appropriately licensed waste disposal facility. No waste material is to be disposed of on site.	DWAF Minimum requirements for waste disposal NEMWA	Throughout Construction and operation
Prospecting boreholes:	Construction and Operation Decommissioning	0,6 ha, short term	• Vegetation clearing for prospecting sites should be kept to a minimum in order to reduce the disturbance footprint; • Compaction of soil must be avoided as far as possible, and the use of heavy machinery must	SANS 10103 ECA Noise Regulations NEMAQA	Throughout Construction and operation and decommissioning

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
30 sites , with a footprint of 200 m^2 each			be restricted in areas outside of the proposed prospecting sites to reduce the compaction of soils; • All measures should be implemented to minimize the potential of dust generation; • Local residents should be notified of any potentially noisy activities or work and these activities should be undertaken at reasonable times of the day. These works should not take place at night or on weekends; • Noise attenuation on engines must be adequate, and the noisy activities must be restricted as far as is possible to times and locations whereby the potential for noise nuisance is reduced; • When working near to a potential sensitive area, the contractor must limit the number of simultaneous activities to the minimum; • Ensure proper storage of fuels; • On-site vehicles must be limited to approved access routes and areas on the site so as to minimize excessive environmental disturbance to the soil and vegetation on site, and to minimize disruption of traffic; • Workforce should be kept within defined boundaries and to agreed access routes. • No invasive prospecting activities to be undertaken within 100m of a watercourse. • Should any watercourse be affected, then the necessary water use licences should be	Dust Regulations NWA	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			obtained from the Department of Water and Sanitation. • No ablusion of site laydown areas are to be located within 100m of a watercourse. • Where shallow aquifers are encoundered, a survey of the drinking water/ livestock watering boreholes should be undertaken (withing 5km of the prospecting borehole sites). A detailed groundwater monitoring programme should be developed for these drinking water/ livestock watering boreholes and pre- and post-prospecting water quality samples should be taken. • Where drinking water/ livestock watering boreholes are to be affected, and where a pollution event occurs at a particular borehole, then the advise of a geohydrologist should be sought with regards to the need for plugging and casing of the prospecting boreholes.		
Prospecting	Construction and Operation	0,6 ha, short term	• Workers must be easily identifiable by clothing and ID badges. Workers should carry with them, at all times a letter from the applicant stating their employment, title, role and manager contact details.	OHS and MHSA	Throughout Construction and operation
Resource definition drilling	Planning Phase Construction and Operation	0,6 ha, short term	• Local residents (landowners and directly adjacent landowners) should be notified of any potentially noisy activities or work and these activities should be undertaken at reasonable	MPRDA Regulations GN R527 SANS 10103	Planning Phase Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			times of the day. This work should not take place at night or on weekends; • The contractor must attempt to restrict noisy activities as far as is possible to times and locations whereby the potential for noise nuisance is reduced; • Dust suppression methods must be applied when necessary to restrict the visual impact of dust emissions. • Any spills of hydrocarbons or fluids used during operation, must be cleaned up immediately; • An above ground drilling sump must be used to contain drilling mud in order to reduce surface and groundwater contamination. No earthen mud sumps are to be constructed and utilized; • No prospecting boreholes should be drilled in the immediate vicinity of existing private boreholes; • Soils in drilling areas where disturbances will be encountered must be stripped and stockpiled outside affected areas for use after completion of the drilling program. • Topsoil must be adequately stripped to the correct depth and stored separately from subsoils; • Cut of trench and berm must be constructed around the drill pad to prevent contaminated surface runoff from entering shallow aquifers and surrounding water resources, where required by the topography; • A liner should be placed over the drill pad and drip trays must be used in all areas where hydrocarbons are handled; • On-site vehicles must be limited to approved access routes and areas on the site so as to	ECA Noise Regulations NEMAQA Dust Regulations NWA DWAF BPG NHRA	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			minimize excessive environmental disturbance to the soil and vegetation on site, and to minimize disruption of traffic; • Workforce should be kept within defined boundaries ad to agreed access routes; • The designated competent authroity (DMR) may, at the cost of the Applicant, appoint an independent and competent person to undertake borehole examination. • Should any fugitive emissions be detected, then the recommendations of the must be undertaken throughout the drilling activity up to the decommissioning of the wells. • Should any chance finds be uncovered during the construction phase, these must be handled in accordance with the requirements of the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA); and • If a possible heritage site (including graves) or artefact is discovered during construction, all operations in the vicinity of the discovery (at least 30 m buffer) should stop and a qualified specialist contracted to evaluate and recommend appropriate actions. Depending on the type of site that can include initiating a grave relocation process, documentation of structures or archaeological excavations. • Should fossil remains be discovered in the Cenozoic Superficial deposits during any phase of construction, either on the surface or exposed by fresh excavations, the ECO responsible for these developments should be alerted immediately. Such discoveries ought to be protected (preferably in situ) and the ECO should alert SAHRA so that appropriate mitigation (e.g.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			recording, sampling or collection) can be taken by a professional palaeontologist. • The Final BAR and appendices must be submitted to SAHRA for record purposes; • 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/John Gribble 021 462 5402) must be alerted. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Mimi Seetelo 012 320 8490), must be alerted immediately. A professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the findings. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; and • If the development receives an Environmental Authorisation (EA), SAHRA must be informed and all documents pertaining to the EA must be uploaded to the SAHRIS Case file. • Temporary heritage signage around the conserved Haramoep 53 farmstead during the construction (drilling) phase.		
Refuelling	Construction and Operation	Short term and localized	• Refueling may only take place within demarcated areas that is subject to appropriate spill prevention and containment measures refueling	NWA DWAF BPG	Throughout Construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			and transfer of hazardous chemicals and other potentially hazardous substances must be carried out so as to minimize the potential for leakage and to prevent spillage onto the soil; • Drip trays should be utilized in relevant locations (inlets, outlets, points of leakage, etc.) during transfer so as to prevent such spillage or leakage. Any accidental spillages must be contained and cleaned up promptly.		
Maintenance and repair	Construction and Operation	Short term and localized	• Trucks, machinery and equipment must be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks. All leaks must be cleaned up immediately using spill kits or as per the emergency response plan. For large spills a hazardous materials specialist shall be utilized; • Accidental hydrocarbon spillages must be reported immediately, and the affected soil should be removed, and rehabilitated or if this is not possible, disposed of at a suitably icenced waste disposal facility.	NWA DWAF BPG NEMA	Throughout Construction and operation
Borehole Closure	Decommissioning and Closure	Short term and localized	• Where groundwater is encountered during drilling, all affected prospecting boreholes that will not be required for later monitoring or other useful purposes should be plugged and sealed with cement to prevent possible cross flow and contamination between aquifers; • Cement and liquid concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained	NWA DWAF BPG	Throughout Decommissioning and Closure

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			therein. As a result, the contractor shall ensure that: o Concrete shall not be mixed directly on the ground; o The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste, (Washing of visible signs into the ground is not acceptable); and o All excess aggregate shall also be removed.		
Removal of surface infrastructure	Decommissioning	Short term and localized	• All infrastructure, equipment, and other items used during prospecting will be removed from the site. • Compaction of soil must be avoided as far as possible. The use of heavy machinery must be restricted in areas outside of the proposed prospecting sites to reduce the compaction of soils.	MPRDA Rehab Plan	Decommissioning
Removal of waste	Decommisioning	Small scale and localized	• Any excess or waste material or chemicals, including drilling muds etc. must be removed from the site and must preferably be recycled (e.g. oil and other hydrocarbon waste products). Any waste materials or chemicals that cannot be recycled must be disposed of at a suitably licensed waste facility.	NWA DWAF BPG	Decommissioning
Rehabilitation	Rehabilitation	All disturbed areas	• Restoration and rehabilitation of disturbed areas must be implemented as soon as prospecting activities are completed;	MPRDA Rehab Plan NEMA	Rehabilitation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Sites must be restored to the original condition with vegetation cover (where applicable) equaling the surrounding vegetation cover; • All debris and contaminated soils must be removed and suitably disposed of; • Contours and natural surrounding must be reformed; • Natural drainage patterns must be restored; • All surface infrastructure on site must be removed; • Temporary access routes/roads must be suitably rehabilitated; and • Sites must be monitored by the ECO (including relevant specialist's inputs if, necessary) for adequate rehabilitation until the desired rehabilitation objectives have been achieved.		
Consultation	Planning Phase Construciton and Operation	Medium term, local	• Stakeholder engagement will continue throughout the prospecting activities to ensure the community and landowners are kept informed and allowed to raise issues. The Applicant shall attend applicable community meetings with the affected communities. Any issues raised will then be addressed through a grievance mechanism.	NEMA OHS and MHSA	Planning Phase Throughout Construciton and Operation
Monitoring	Post-Operational	All rehabilitated areas	The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1)	MPRDA Rehab Plan	Post-operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			year unless otherwise specified by the competent authority. The monitoring activities during this period will include but not be limited to: • Biodiversity monitoring; and • Re-vegetation of disturbed areas where required. Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed prospecting activities and incorporated into post closure monitoring and management.		

21.5. IMPACT MANAGEMENT ACTIONS AND OUTCOMES

TABLE 20: SUMMARY OF IMPACT MANAGEMENT ACTIONS AND OUTCOMES

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
Site clearance	• Deterioration and damage to existing access roads and tracks; • Dust generation; • Clearance of vegetation; • Invasion by alien species;	Topography; Soil; Air Quality; Surface Water; Groundwater; Transportation	Construction Operation	Avoid and control through implementation of EMP mitigation measures (e.g. speed limit enforcement,	NEMA NEMBA CARA Threatened or Protected Species (TOPS) regulations

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
	• Sedimentation • Erosion			vehicle maintenance)	NEMAQA Dust regulations NWA DWAF best Practice Guidelines
Establishment of base camps and access	• Interference with existing land uses • Safety and security risks to landowners and lawful occupiers; • Deterioration and damage to existing access roads and tracks; • Dust generation; • Clearance of vegetation; • Pollution of soils • Contamination on surface and ground	Topography; Landform; Soil disturbance; Fauna and Flora; Air Quality; Surface Water; Groundwater; Socioeconomics	Construction Operation	Avoidance and control through preventative measures (e.g. communication with landowners, site access control) Remedy through application of mitigation measures in EMP	NEMA MPRDA NEMBA CARA Threatened or Protected Species (TOPS) regulations NEMAQA Dust regulations NWA DWAF best Practice

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
					Guidelines
Storage of construction vehicles	• Pollution of surface and groundwater resources from potential hydrocarbon spills; and • Compaction of soils	Surface water; Groundwater; Soils.	Construction Operation	Avoid through implementation of EMP mitigation measures (e.g. communication with landowners) Control through implementation of ESMS	Protected Species (TOPS) regulations NEMAQA Dust regulations NWA DWAF best Practice Guidelines
Transportation to and from drill sites	Soil compaction; Disturbance and Loss of fauna and flora; Wearing and tearing of existing roads; and Dust generation from increased traffic.	Soil disturbance; Fauna and Flora; Air quality.	Construction Operation	Avoid and control through implementation of EMP mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	NEMA NEMBA CARA Threatened or Protected Species (TOPS) regulations NEMAQA

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
					Dust regulations NWA DWAF best Practice Guidelines
Storage of hazardous sustances	Potential hydrocarbon spills that could pollute surface and ground water resources.	Surface water; Groundwater.	Construction Operation	Avoid and control through implementation of EMP mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	NEMA NEMBA NWA DWAF best Practice Guidelines
Waste management	Pollution of habitats and surrounding areas.	Pollution	Construction Operation	Avoid and control through implementation of EMP mitigation measures (e.g. speed limit enforcement,	DWAF minimum requirement for waste disposal

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
				vehicle maintenance)	
Prospecting boreholes	Vegetation clearance; Possible erosion; Changes in drainage and surface hydrology; Soil disturbance and compaction; Emissions from vehicles; Land use conflict; Noise disturbance due to acoustic sources; Dust generation; Disturbance or damage of palaeontological rsources; Potential spills of hydrocarbons; Influx of people; Impact on groundwater	Ecology; Topography; Access/footprint; Soil disturbance; Noise; Air Quality; Socio-economics; Groundwater	Construction Operation Decommissioning	Control through implementation of EMPR mitigation measures	SANS10103 ECA Noise Regulations NEMAQA Dust regulations NWA
Resource definition drilling	Vegetation clearance Removal of topsoil; Changes in drainage and surface hydrology; Drainage and soil contamination; Land use conflict; Dust generation;	Air Quality; Noise; Surface water; Groundwater,	Operation	Control through implementation of EMPR mitigation measures	SANS10103 ECA Noise Regulations NEMAQA Dust regulations

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
	Disturbance of wildlife and communities in close vicinity; New access roads; Increased transportation; Damage to local infrastructure; Disturbance or damage of palaeontological rsources; Influx of people; Waste water discharge; Spillage and leaks of hydrocarbons; Pollution or interplay between groundwater aquifers; Waste disposal.				NWA DWAF best Practice Guidelines
Refuelling	Potential hydrocarbon spills that could pollute soil or surface and/or groundwater resources.	Pollution; Surface water; Groundwater	Construction Operation	Control through implementation of EMPR mitigation measures	NWA DWAF best Practice Guidelines
Maintenance and repair	Potential hydrocarbon spills that could pollute surface andgroundwater resources.	Pollution; Surface water; Groundwater	Construction Operation	Control through implementation of EMPR mitigation measures	NWA

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
Borehole closure	• Pollution of groundwater resources; • Potential pollution of habitats with cement residue that may be exposed to runoff etc.	Pollution; Groundwater	Decommisioning	Control through implementation of EMPR mitigation measures	NWA
Removal of surface infrastructure	• Soil compaction; • Pollution of soil and surrounding vegetation.	Landform; Topography; Soils.	Decommisioning	Control through implementation of EMPR mitigation measures	MPRDA In accordance with Rehabilitation plan
Rehabilitation	• Soil compaction; • Soil and Water contamination; • Erosion; • Change is drainage and surface hydrology; • Loss of habitat; and • Disturbance to wildlife and communities in close vicinity	Topography Land use Soil disturbance Ecology Surface water Groundwater	Rehabilitation	Control through implementation of EMPR mitigation measures	MPRDA In accordance with Rehabilitation plan
Monitoring of rehabilitated sites	• Soil compaction; • Soil and Water contamination; • Erosion; • Disturbance to wildlife; and communities in close vicinity.	Topography Land use Soil disturbance Ecology Surface water	Post-operation	Control through adhering to monitoring requirements	MPRDA and regulations

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standard to be Achieved
		Groundwater			

22. FINANCIAL PROVISION

On 20th November 2015 the Minister promulgated the Financial Provisioning Regulations under the NEMA. The regulations aim to regulate the determine and making of financial provision as contemplated in the NEMA for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, prospecting, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future. These regulations provide for, inter alia:

- Determination of financial provision: An applicant or holder of a right or permit must determine and make financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of prospecting, prospecting, mining or production operations, as contemplated in the Act and to the satisfaction of the Minister responsible for mineral resources.
- Scope of the financial provision: Rehabilitation and remediation; decommissioning and closure activities at the end of operations; and remediation and management of latent or residual impacts.
- Regulation 6: Method for determining financial provision – An applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:
    - Annual rehabilitation – annual rehabilitation plan
    - Final rehabilitation, decommission and closure at end of life of operations – rehabilitation, decommissioning and closure plan; and
    - Remediation of latent defects.
- Regulation 10: An applicant must-
    - ensure that a determination is made of the financial provision and the plans contemplated in regulation 6 are submitted as part of the information submitted for consideration by the Minister responsible for mineral resources of an application for environmental authorisation, the associated environmental management programme and the associated right or permit in terms of the Mineral and Petroleum Resources Development Act, 2002; and
    - Provide proof of payment or arrangements to provide the financial provision prior to commencing with any prospecting, prospecting, mining or production operations.
- Regulation 11: Requires annual review, assessment and adjustment of the financial provision. The review of the adequacy of the financial provision including the proof of payment must be independently audited (annually) and included in the audit of the EMPR as required by the EIA regulations.

Appendix 4 of the Financial Provisioning Regulations provides the minimum content of a final rehabilitation, decommissioning and closure plan (FRDCP). A detailed FRDCP has been compiled and included as Appendix E.

22.1. OTHER GUIDELINES

The following additional guidelines which relate to financial provisioning and closure have been published in the South African context:

- Best Practice Guideline G5: Water Management Aspects for Mine Closure: This guideline was prepared by the DWS and aims to provide a logical and clear process that can be applied by mines and the competent authorities to enable proper mine closure planning that meets the requirements of the relevant authorities. This guideline is aimed primarily at larger scale mines and does not specifically address closure issues related to closure of prospecting activities, however certain principles related to closure and water management are relevant. The following technical factors which should be considered during closure, and which are likely to relate to prospecting activities, have been considered:
    - Land use plan: directly interlinked with water management issues insofar as water is required to support the intended land use- in this regard the surrounding communities and the land uses implemented rely on available ground and surface water to be sustained. Management of water quality and quantity has been identified as an aspect to be covered in the FRDCP (Appendix E).
    - Public participation and consultation: consultation is fundamental to closure and there is a need for full involvement of stakeholders in the development of the final closure plans, and in the agreement of closure objectives- in this regard this FRDCP has been made available through the Basci Assessment public participation process for comment by relevant stakeholders.
- Guideline for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine: The objectives of the guideline include the need to improve the understanding of the financial and legal aspects pertaining to the costing of remediation measures as a result of mining activities. Whilst this guideline predates the recent NEMA Financial Provisioning Regulations, it does contain certain principles and concepts that remain valid and have been considered in the FRDCP (Appendix E).

22.2. DESCRIBE THE CLOSURE OBJECTIVES AND THE EXTENT TO WHICH THEY HAVE BEEN ALIGNED TO THE BASELINE ENVIRONMENT DESCRIBED UNDER THE REGULATION

Consideirng the relatively limited impact of the proposed prospecting activities, the closure objectives are aimed at re-instating the landform, land use and vegetation units to the same as before prospecting operations take place unless a specific, reasonable alternate land use is requested by the landowner. As such, the intended end use for the disturbed prospecting areas and the closure objectives will be defined in consultation with the relevant landowner. Proof of such consultation will be submitted together with the Application for Closure Certificate. The overall aim of the rehabilitation plan is to rehabilitate the environment to a condition as close as possible to that which existed prior to prospecting. This shall be achieved with a number of specific objectives.

1. **Making the area safe.** i.e. Decommission prospecting activities so as to ensure that the environment is safe for people and animals. This entails refilling excavations, sealing boreholes, etc.

2. **Recreating a free draining landform.** This entails earthworks infilling, reshaping, levelling, etc. to recreate as close as possible the original topography and to ensure a free draining landscape.
3. **Re-vegetation.** This involves either reseeding or allowing natural succession depending on the area, climate etc.
4. **Storm water management and erosion control.** Management of stormwater and prevention of erosion during rehabilitation. E.g. cut off drains, berms etc. and erosion control where required.
5. **Verification of rehabilitation success.** Entails monitoring of rehabilitation.
6. **Successful closure.** Obtain closure certificate.

22.3. CONFIRM SPECIFICALLY THAT THE ENVIRONMENTAL OBJECTIVES IN RELATION TO CLOSURE HAVE BEEN CONSULTED WITH LANDOWNER AND INTERESTED AND AFFECTED PARTIES

The Public Participation Process (PPP) is a requirement of several pieces of South African Legislation and aims to ensure that all relevant Interested and Affected Parties (I&AP's) are consulted, involved and their opinions are taken into account and a record included in the reports submitted to Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP for the as part of the prospecting right application needs to be managed sensitively and according to best practises in order to ensure and promote:

- Compliance with national legislation;
- Establish and manage relationships with key stakeholder groups; and
- Encourage involvement and participation in the environmental study and authorisation/ approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Introduce the proposed project;
- Explain the environmental authorisations required;
- Explain the environmental studies already completed and yet to be undertaken (where applicable);
- Determine and record issues, concerns, suggestions, and objections to the project;
- Provide opportunity for input and gathering of local knowledge;
- Establish and formalise lines of communication between the I&AP's and the project team;
- Identify all significant issues for the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent negative environmental impacts and maximize and/or promote positive environmental impacts associated with the project.

Landowners and interested and affected parties have been consulted and provided an opportunity to comment on this Basic Assessment Report, EMPR including all decommissioning, closure and rehabilitation plans.

22.4. REHABILITATION PLAN

22.4.1. INTEGRATED REHABILITATION AND CLOSURE PLAN

The main aim in developing this rehabilitation plan is to mitigate the impacts caused by the prospecting activities and to restore land back to a satisfactory standard. It is best practice to develop the rehabilitation plan as early as possible so as to ensure the optimal management of rehabilitation issues that may arise. It is important that the project's closure plan is defined and understood from before starting the process and is complementary to the rehabilitation goals. Rehabilitation and closure objectives need to be tailored to the project at hand and be aligned with the EMPR. The overall rehabilitation objectives for this project are as follows:

- Maintain and minimise impacts to the ecosystem within the study area;
- Re-establishment of the pre-developed land capability to allow for a suitable post-mining land use;
- Prevent soil, surface water and groundwater contamination;
- Comply with the relevant local and national regulatory requirements; and
- Maintain and monitor the rehabilitated areas.

Successful rehabilitation must be sustainable, and requires an understanding of the basic baseline environment, as well as project management to ensure that the rehabilitation program is a success.

It is noted that an application for environmental authorisation must be submitted for closure in accordance with Listing Notice 1 Activity 22 :

The decommissioning of any activity requiring –

I. a closure certificate in terms of Section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); or
II. A prospecting right, mining permit, production right or exploration right, where the throughput of the activity has reduced by 90% or more over a period of 5 years excluding where the competent authority has in writing agreed that such reduction in throughput does not constitute closure.

22.4.2. PHASE 1: MAKING SAFE

In line with the DWAF (2008). Best Practice Guideline A6: Water Management for Underground Mines. All prospecting boreholes that will not be required for later monitoring or other useful purposes should be plugged and sealed with cement to prevent possible cross flow and contamination between aquifers. Cement and liquid concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result, the contractor shall ensure that:

- Concrete shall not be mixed directly on the ground;
- The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste, (Washing of visible signs into the ground is not acceptable); and
- All excess aggregate shall also be removed.

22.4.3. PHASE 2: LANDFORM DESIGN, EROSION CONTROL AND REVEGETATION

Landform, erosion control and re-vegetation is an important part of the rehabilitation process. Landform and land use are closely interrelated, and the landform should be returned as closely as possible to the original landform. Community expectations, compatibility with local land use practices and regional infrastructure, or the need to replace natural ecosystems and faunal habitats all support returning the land as closely as possible to its original appearance and productive capacity. This requires the following:

- Shape, level and de-compact the final landscape after removing all the project infrastructure, dress with topsoil and, where necessary, vegetate with indigenous species. Commission specialists to assist in planning re-vegetation and the management of environmental impact, as required.
- Remove access roads with no beneficial re-use potential by deep ripping, shaping and levelling after the removal and disposal of any culverts, drains, ditches and/or other infrastructure. Natural drainage patterns are to be reinstated as closely as possible.
- Shape all channels and drains to smooth slopes and integrate into the natural drainage pattern.
- Construct contour banks and energy dissipating structures as necessary to protect disturbed areas from erosion prior to stabilisation.
- Promote re-vegetation through the encouragement of the natural process of secondary succession.
- Natural re-vegetation is dependent on de-compaction of subsoils and adequate replacement of the accumulated reserves of topsoil (for example, over the borehole sites), so as to encourage the establishment of pioneer vegetation.
- Remove alien and/or exotic vegetation.
- Undertake a seeding programme only where necessary, and as agreed with the re-vegetation specialist.

22.4.4. PHASE 3: MONITORING AND MAINTENANCE

The post-operational monitoring and management period following decommissioning of prospecting activities must be implemented by a suitable qualified independent party for a minimum of one (1) year unless otherwise specified by the competent authority.

The monitoring activities during this period will include but not be limited to:

- Biodiversity monitoring; and
- Re-vegetation of disturbed areas where required.

Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed prospecting activities and incorporated into post closure monitoring and management.

22.4.5. POST-CLOSURE MONITORING AND MAINTENANCE

Prior to decommissioning and rehabilitation activities, a monitoring programme shall be developed and submitted to the relevant authority for approval, as a part of the Final Rehabilitation Plan. The programme is to include proposed monitoring during and after the closure of the prospecting borehole sites and related activities. It is recommended that the post-closure monitoring include the following:

- Confirmation that any waste, wastewater or other pollutants that is generated as a result of decommissioning will be managed appropriately, as per the detailed requirements set out in the Final Rehabilitation Plan,
- Confirmation that all de-contaminated sites are free of residual pollution after decommissioning.
- Confirmation that acceptable cover has been achieved in areas where natural vegetation is being re-established. 'Acceptable cover' means re-establishment of pioneer grass communities over the disturbed areas at a density similar to surrounding undisturbed areas, non-eroding and free of invasive alien plants.
- Confirmation that the prospecting borehole sites are safe and are not resulting in a pollution hazard.

Annual environmental reports will be submitted to the Designated Authority and other relevant Departments for at least one year post-decommissioning. The frequency and duration of this reporting period may be increased to include longer term monitoring, at intervals to be agreed with the Designated Authority.

The monitoring reports shall include a list of any remedial action necessary to ensure that infrastructure that has not been removed remains safe and pollution free and that rehabilitation of project sites are in a stable, weed and free condition.

22.5. EXPLAIN WHY IT CAN BE CONFIRMED THAT THE REHABILITATION PLAN IS COMPATIBLE WITH THE CLOSURE OBJECTIVES

The rehabilitation plan is complatible with the closure objectives in that is seeks to ensure that negative impacts on the receiving environment that could not be prevented or mitigated during prospecting are rehabilitated. The use of indigenous species during re-vegetation will ensure that ecosystem restoration is initiated and prevent invasion by alien species, the capping of boreholes will prevent future environmental issues related to fluid leakage or lateral movement through the borehole, as well as protect water resources. The appropriate disposal of waste will ensure that land is usable, in alignment with surrounding land uses and that no hazardous materials are left on site post-prospecting.

22.6. CALCULATE AND STATE THE QUANTUM OF THE FINANCIAL PROVISION REQUIRED TO MANAGE AND REHABILITATE THE ENVIRONMENT IN ACCORDANCE WITH THE APPLICABLE GUIDELINE

For a detailed description of the financial provision, please refer to Appendix E for the Final Rehabilitation, Decommissioning and Closure Plan.

22.7. CONFIRM THAT THE FINANCIAL PROVISION WILL BE PROVIDED AS DETERMINED

Financing of the proposed work plan will be sourced from the Black Mountain Mine Exploration (prospecting) budget, the current budget for financial year 2017/ 2018 is R80,000,000. The investment strategy is to maintain this level of funding over the next five year period as Black Mountain Mine plan to undertake a large regional prospecting programme in the Northern Cape to discover new deposits and increase their resource base with

the long term aim of increasing the current life of mine or developing any new discoveries as stand-alone operations.

Arrangements to provide the estimated financial provision prior to commencing with any prospecting operations will be made.

23. MECHANISMS FOR MONITORING COMPLIANCE

TABLE 21: MECHANISMS FOR MONITORING COMPLIANCE

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
Desktop Study: Literature Survey / Review / acquisition of data	None	None	None	None
Geological field mapping	• All Impacts Identified in the EMP	• Site inspections and checklists; • Complaints register	• Contractors Environmental Representative; ECO	• Daily inspections and checklists
Regional Ground Geophysical Surveys	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Site Clearance: **The clearance of an area of 300 square metres or more of indigenous vegetation in Northern Cape Within critical biodiversity areas identified in bioregional plans.**	• Possession of permits for protected species • Relocation of protected species • Alien vegetation management • Implement the recommendations of the	• Document Control • Site Inspections and checklists • Report review and • Development of actions plans	• Contractors Environmental Representative; • Environmental specialist, ECO • Senior Environmental Management	• Once-off control of documents, site visit and reporting; • Monthly site visits; • Monthly Reports Annual Performance Assessment

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
	heritage specialist report and the Heritage Management Plan (See Appendix F).			
Target Prospecting Boreholes: **30 drill sites, each site covering a total area of 200 m²**	• Alien vegetation management • Noise (if any complaints are registered by residents) • Air quality (if complaints are registered) • Surface and groundwater management • Impacts on heritage features • Impact on conserved Harmoep farmstead	• Site Inspections and checklists; • Report review and development of corrective action plans • Inspection of surface water features • Survey of groundwater users and use within 5km of the invasive prospecting sites. • Demarcation of sensitive areas	• Contractors Environmental Representative; • Environmental specialist, ECO • Senior Environmental Management; • Geohydrologist (if required)	• Once-off control of documents, site visit and reporting; • Monthly site visits; • Monthly Reports Annual Performance • Prior to invasive propecting activities and monitoring post-prospecting.
Data Compilation	None	None	None	None

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
Detailed Ground geophysical Surveys	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Widely Spaced Prospecting Boreholes: 30 sites , with a footprint of 200 m2 each	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative; ECO	• Daily inspections and checklists
Closely Spaced Prospecting Boreholes	• Alien vegetation management • Noise (if any complaints are registered by residents) • Air quality (if complaints are registered)	• Site Inspections and checklists; • Report review and development of corrective action plans	• Contractors Environmental Representative; • Environmental specialist, ECO • Senior Environmental Management.	• Once-off control of documents, site visit and reporting; • Monthly site visits; • Monthly Reports Annual Performance
Environmental Screening by ECO	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
Ablutions - Chemical Toilets	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Sample storage (Existing BMM prospecting office. No new infrastructure to be constructed)	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Access Route (Mostly existing roads to be utilised. Access tracks will be made where there are no existing routes.) Approximate total length : 5000 m Approximate width: 3m)	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Temporary general waste storage (General/domestic waste - Wheelie bin)	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
Temporary hazardous waste storage (Hazardous waste – Sealed Container)	• All Impacts Identified in the EMP	• Site Inspections and checklists	• Contractors Environmental Representative	• Daily inspections and checklists
Compilation of geological plans	None	None	None	None
Undertake decommissioning and rehabilitation as per the rehabilitation plan 6 000 m2 +15 000 m2 (Drill sites + Access tracks)	• Alien vegetation management • Noise (if any complaints are registered by residents) • Air quality (if complaints are registered)	• Site Inspections and checklists; • Report review and development of corrective action plans	• Contractors Environmental Representative; • Environmental specialist, ECO • Senior Environmental Management • Surface water specialist	• Monthly site visits; • Monthly Reports and Annual Performance Assessments
Monitoring of rehabilitation efforts	• All Impacts Identified in the EMP	• Site Inspections and checklists	• ECO; • Independent Environmental Auditor	• Monthly reports
Surface Water	• All Impacts Identified in the EMP	• Site Inspections and checklists;	• ECO;	• Monthly Reports

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
		• Report review and development of corrective action plans	• Contractors Environmental Representative; • Senior Environmental Management	
Groundwater	• All Impacts Identified in the EMP	• Site Inspections and checklists; • Report review and development of corrective action plans	• Environmental specialist, ECO • Senior Environmental Management	• Monthly; • If pollution event occurs at boreholes.

24. INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT/ ENVIRONMENTAL AUDIT REPORT

The result of environmental monitoring and compliance to the approved EMPR will be undertaken every second year and submitted to the DMR in the form of an environmental performance assessment. Included in the report will be the following relevant information:

- The period when the performance assessment was conducted;
- The scope of the assessment;
- The procedures used for conducting the assessment;
- Interpreted information gained from monitoring the EMPR;
- Evaluation criteria used during the assessment;
- Results of the assessment are to be discussed and mention must be made of any gaps in the EMPR and how it can be rectified; and
- Yearly updated layout plans.

Any emergency or unforeseen impacts will be reported immediately to the DMR and other relevant government departments.

25. ENVIRONMENTAL AWARENESS PLAN AND TRAINING

Training and environmental awareness is an integral part of a complete EMPR. The overall aim of the training will be to ensure that all site staff are informed of their relevant requirements and obligations pertaining to the relevant authorisations, licences, permits and the approved EMPR and protection of the environment.

The applicant and contractor must ensure that all relevant employees are trained and capable of carrying out their duties in an environmentally responsible and compliant manner, and are capable of complying with the relevant environmental requirements. To obtain buy-in from staff, individual employees need to be involved in:

- Identifying the relevant risks;
- Understanding the nature of risks;
- Devising risk controls; and
- Given incentive to implement the controls in terms of legal obligations.

The applicant shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. All training must be formally recorded and attendance registers retained. The environmental training should, as a minimum, include the following:

- General background and definition to the environment;
- The importance of compliance with all environmental policies;

- The environmental impacts, actual or potential, of their work activities;
- Compliance with mitigation measures proposed for sensitive areas;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving compliance with the environmental policy and procedures and with the requirement of the applicant's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences (legal and/or other) of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities; and
- All operational risks must be identified and processes established to mitigate such risk, proactively. Thus, the applicant needs to inform the employees of any environmental risks that may result from their work, and how these risks must be dealt with in order to avoid pollution and/or degradation of the environment.

In the case of new staff (including contract labour) the contractor / applicant shall keep a record of adequate environmental induction training.

25.1. MANNER IN WHICH EMPLOYEES WILL BE INFORMED OF ENVIRONMENTAL RISKS

Environmental awareness could be fostered by induction course for all personnel on site, before commencing site visits. Personnel should also be alerted to particular environmental concerns associated with their tasks for the area in which they are working. Courses must be given by suitably qualified personnel and in a language and medium understood by personnel. The environmental awareness training programme will include the following:

1. Occupational Health and Safety Training (OHS); and
2. Environmental Awareness Training EMPR management actions.

Environmental awareness training will focus on the following specific aspects and be undertaken in "Tool box talk "topics prior to site access:

1. Waste collection and disposal; and
2. EMPR management options and application.

25.2. MANNER IN WHICH RISKS WILL BE DEALT WITH TO AVOID POLLUTION OR DEGRADATION

The broad measures to control or remedy any causes of pollution or environmental degradation as a result of the proposed prospecting activities taking place are provided below:

- Contain potential pollutants and contaminants (where possible) at source;
- Handling of potential pollutants and contaminants (where possible) must be conducted in bunded areas and on impermeable substrates;

- Ensure the timeous clean-up of any spills;
- Implement a waste management system for all waste stream present on site;
- Investigate any I&AP claims of pollution or contamination as a result of mining activities; and
- Implement the impact management objectives, outcomes and actions, as described in Section 26 above.

It is of critical importance that the broad measures to control or remedy any causes of pollution or environmental degradation are applied during onsite prospecting activities.

26. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No additional information was requested or is deemed necessary.

27. 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&AP's;

(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:

Environmental Impact Management Services (Pty) Ltd

Name of company:

24 July 2017

Date:

The Applicant herewith confirms

(a) The person whose name and identity number is stated below is the person authorised to act as representative of the Applicant in terms of the resolution submitted with the application;

(b) The applicant undertakes to execute the Environmental Management Programme as proposed.

Signature of the applicant / Signature on behalf of the applicant:

BLACK MOUNTAIN MINING (PTY) LTD

Name of company (if applicable):

840504 6579 185

Identity Number of Applicant's Representative

24/07/2017

Date:

28. REFERENCES

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Namakwaland District Biodiversity Sector Plan 2008.

29. APPENDICES

29.1. APPENDIX A: DETAILS AND EXPERIENCE OF THE EAP

29.2. APPENDIX B: PUBLIC PARTICIPATION

29.3. APPENDIX C: MAPS

29.4. APPENDIX D: IMPACT ASSESSMENT CALCULATIONS

29.5. APPENDIX E: FINAL REHABILITATION, DECOMMISSIONING AND CLOSURE PLAN

29.6. APPENDIX F: HERITAGE IMPACT ASSESSMENT REPORT

29.7. APPENDIX G: PALAEONTOLOGICAL IMPACT ASSESSMENT REPORT