Proposed Swartberg Haul Road at Black Mountain Mine, Aggeneys

Final Basic Assessment Report and Environmental Management Programme

Report Prepared for

Black Mountain Mining (Pty) Ltd

Report Number 536396

Report Prepared by

March 2019

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Final Basic Assessment Report and Environmental Management Programme

Black Mountain Mining (Pty) Ltd

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Note:

The Basic Assessment Report (BAR) was updated following the end of the comment period on the Draft BAR to produce this Final BAR for submission to the Department of Mineral Resources.

All changes in this Final BAR are underlined ***and*** *italicised for ease of reference.*

An Issues and Responses Summary, reflecting stakeholder comments received during the public participation process and responses by SRK and/or the proponent, is included as Appendix C3.

BASIC ASSESSMENT PROCESS FOR THE PROPOSED SWARTBERG HAUL ROAD AT BLACK MOUNTAIN MINE, AGGENEYS

March 2019 *DMR Reference Number: NCS 30/5/1/2/2/(517)MR* SRK Project No: 536396

Please note all changes to this document are underlined and italicised for ease of reference

1 INTRODUCTION AND BACKGROUND

Black Mountain Mining (Pty) Ltd (BMM) mines and processes copper, lead and zinc at the Black Mountain and Gamsberg Mines near the town of Aggeneys in the Northern Cape. The Black Mountain Mine ('the Mine'), west of Aggeneys, comprises a processing area (including waste management and ancillary facilities) and two underground shafts: Deeps shaft and Swartberg shaft.

Trucks transport ore and waste rock from the Swartberg shaft using an existing haul road to the processing area. The haul road intersects numerous ancillary roads in the processing area. Access to the Waste Rock Dump (WRD) at this intersection requires heavy vehicles to turn sharply which presents traffic issues and safety concerns.

To alleviate traffic and safety concerns, and to optimise haul distances at the Mine, BMM proposes to construct a new haul road from the top of the WRD to the weighbridge area located adjacent to the existing haul road ('the project').

Key aspects of the project include:

- **Construction of a new haul road:** The new haul road will be 8 m wide to allow for 2-way truck traffic and ~ 1.2 km long;
- **Establishment of laydown areas:** Construction laydown areas will be located within the existing disturbed footprint of the weighbridge area and WRD;
- **Installation of river crossings:** The new haul road will cross eleven ephemeral drainage lines, requiring the installation of eleven pre-cast cement culverts and/or the construction of low-level drift crossings; and
- **Alterations to existing powerline:** An existing 66 kV powerline is located in close proximity to and will traverse the new haul road. BMM will raise the powerline to ensure heavy vehicles can pass safely beneath.

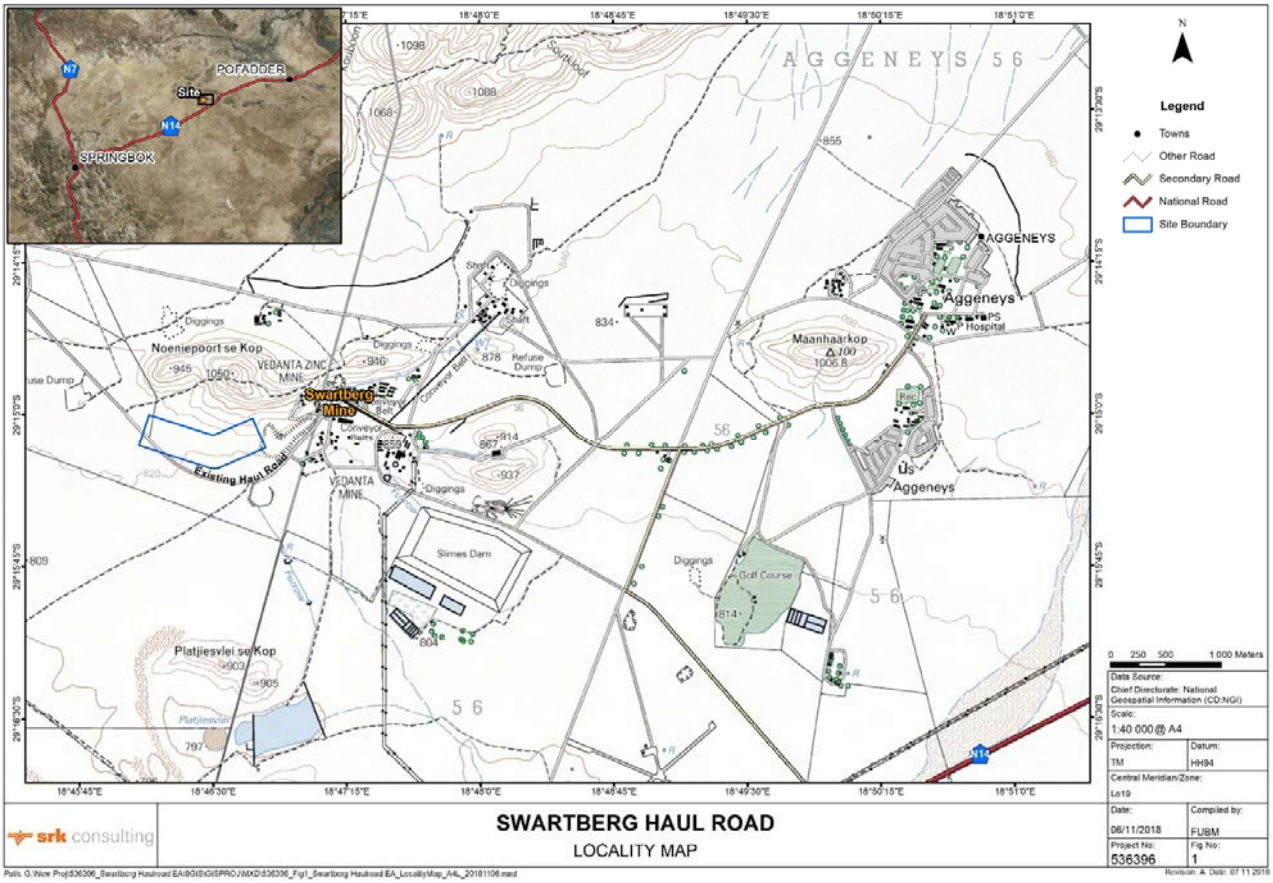


Figure 1: Locality Plan

SRK Consulting (South Africa) (Pty) Ltd (SRK) was appointed by the BMM to undertake the Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA). The BA process was undertaken in accordance with Section 23 of the Environmental Impact Assessment (EIA) Regulations, 2014.

2 ENVIRONMENTAL PROCESS

Appendix 1 of the EIA Regulations, 2014, define the detailed approach to the BA process (see Figure 2).

The main objectives of the BA process are to identify and assess potential issues and environmental impacts and to provide feasible mitigation measures to address any significant impacts identified.

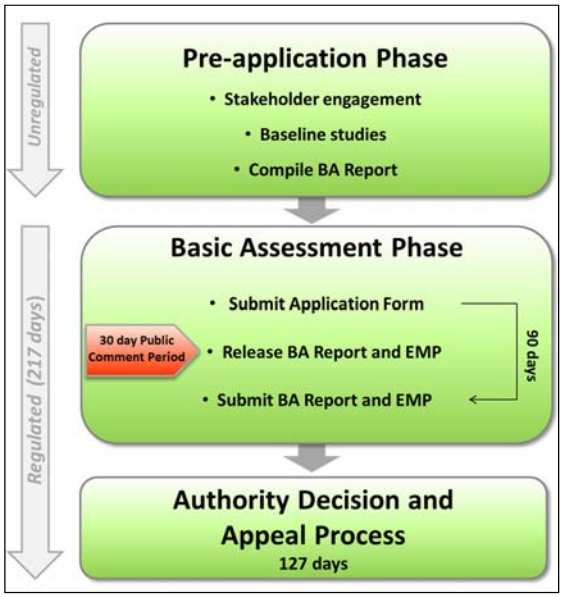


Figure 2: BA Process

3 GOVERNANCE FRAMEWORK

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an Environmental Authorisation (EA) issued by the competent authority, in this case, the Department of Mineral Resources (DMR).

SRK has determined that the proposed project triggers activities listed in terms of Listing Notices (LN) 1 and 3 of the EIA Regulations, 2014, requiring a BA process.

Table 1: Listed activities triggered by the project

No	Description
LN 1	
12	The development of structures with a physical footprint of more than 100 m^2 within 32 metres of a watercourse.
19	The infilling or depositing of any material of more than 10 m^3 into, or the excavation of soil of more than 10 m^3 from a watercourse.
24	The development of a road, where no reserve exists, where the road is wider than 8 m.
LN 3	
4	The development of a road wider than 4 m with a reserve less than 13,5 m within a CBA.
12	The clearance of an area of 300 m^2 or more of indigenous vegetation within a CBA.

Water Use Authorisation (WUA) in terms of the National Water Act 36 of 1998 (NWA) will be required from the Department of Water and Sanitation for water use activities listed in sections 21 (c) and (i).

In addition to EA and WUA, various other permits or licences are required before the project may proceed.

4 DESCRIPTION OF THE SITE AND ENVIRONMENT

The site is located within the BMM Mining Right Area to the west of the WRD and north of an existing haul road on the lower slopes of Noeniepoort.

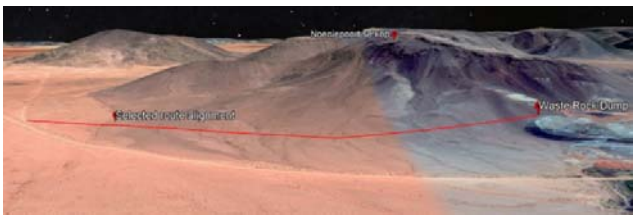


Figure 3:Topography surrounding the site

The site is drained by a number of poorly defined ephemeral drainage lines (see Figure 4). The drainage lines that occur on site are only likely to convey water during rare, heavy thunderstorms in the rainy season and may not flow at all the rest of the year. As such, the drainage lines are neither riparian habitats nor wetlands.

Figure 4: Rocky drainage line

Although the drainage lines are considered to be mostly unmodified, the drainage lines are not considered to be ecologically important or sensitive.

The site falls within the Nama-Karoo Biome and the Bushmanland Bioregion and is identified to fall within Bushmanland Sandy Grassland and Aggeneys Gravel Vygieveld vegetation types (Figure 4).

Figure 5: Vegetation at the site

The site does not fall within any formally protected areas, but a small portion of the haul road will occur within an area identified as a Critical Biodiversity Area. The vegetation on the site is not considered to be sensitive.

Two protected species were recorded on site, however, none of the plant species recorded on site are listed as 'critically endangered' or 'endangered' species.

No archaeological heritage resources were identified within the development footprint. Furthermore, and based on a desktop study, the bedrock underlying the property is unfossiliferous and of no palaeontological interest.

5 ALTERNATIVES

BMM considered four haul road alignment alternatives.

The route alternative selected for assessment was determined based on ecological, safety and design (e.g. slopes, fill material requirements, etc.) considerations. The terrain along the selected route is less undulating and less rocky for most of the route, especially in the western section. Consequently, the drainage lines do not form such deep incisions.

BMM does not consider the other route alternatives to be feasible based on the financial and technical requirements to address the safety and design considerations.

6 STAKEHOLDER ENGAGEMENT

Stakeholder engagement is a key component of the BA process and *was* undertaken in accordance with the requirements of the EIA Regulations, 2014. The key stakeholder engagement activities are summarised in Table 2.

Relevant local, provincial and national authorities, conservation bodies, local forums and surrounding landowners and occupants *were* directly notified of the BA process and the release of the BAR for comment.

Table 2: Stakeholder engagement during the BA process

Activity	Date
Submission of Application form to DMR	26 November 2018
Release BAR to the Public	26 November 2018
Advertise the BAR (local newspaper)	23 November 2018
Comment period	27 November 2018 – 18 January 2019

After notifying stakeholders of the BA Process and release of the BAR, two stakeholder comments were received from the South African Heritage Resources Agency (SAHRA): an interim comment and a final comment.

The main issues raised by SAHRA in the interim comment were:

- *The heritage study previously conducted near the site (as part of a separate process) was not considerd acceptable by the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit, as the report did not assess the development footprint under application including the associated infrastructure;*
- *A Heritage Impact Assessment (HIA) must be undertaken for the development footprint; and*
- *The EAP should apply for an extension of the BA process in terms of section 19(b) of the NEMA Regulations.*

Following receipt of SAHRA's interim comment, SRK engaged the SAHRA case officer on 21 January 2019 to discuss this comment and it was agreed that the applicant could apply to SAHRA for motivation to be exempt from undertaking an HIA, provided that a heritage specialist ground-truthed information presented in the BAR.

SRK appointed a heritage specialist to undertake a site survey to identify potential heritage resources within the development footprint. In summary, the heritage specialist concluded that:

- *The bedrock underlying the property is unfossiliferous and of no palaeontological interest;*
- *No heritage resources were identified within the development footprint during the site survey;*
- *Consequently, the project will have no impact on heritage resources; and*
- *There is no concern from a heritage perspective and no further heritage studies are required.*

These findings were submitted to SAHRA on 25 February 2019 to which SAHRA responded with a final comment. The main points raised in the final comment were:

- *SAHRA has no objections to the proposed development;*
- *SAHRA supports the results of the specialist's report; and*
- *A number of conditions (specified in the final comment) should be incorporated into the EMPr.*

7 FINDINGS AND RECOMMENDATIONS

This *Final* BAR has identified and assessed the potential biophysical and socio-economic impacts associated with the proposed haul road at the Mine.

SRK believes that sufficient information is available for DMR to take a decision regarding authorisation of the project.

The project will result in unavoidable, minor adverse environmental impacts. None of these impacts are considered unacceptably significant and can all be managed to tolerable levels through the effective implementation of recommended mitigation measures.

Key recommendations, considered essential, include:

- Implement the Environmental Management Programme (EMPr) to guide construction, operation and maintenance and to provide a framework for ongoing assessment of environmental performance;
- Designate the Environmental Manager / Officer at BMM to oversee the implementation of the EMPr and supervise any construction activities (particularly within the drainage lines);
- Minimise the physical footprint of the development and areas disturbed by construction activities to the smallest extent possible;
- Rehabilitate all areas disturbed by construction activities (outside of the project footprint); and
- Obtain other permits and authorisations as may be required.

ASSESSMENT OF POTENTIAL IMPACTS

Potential impacts associated with the projects were assessed according to SRK's standard Impact Assessment methodology. For all potentially significant impacts, the significance of the anticipated impact was rated without and with recommended mitigation measures. These impacts are presented in Table 2.

The key mitigation measures on which the significance rating is based (where applicable) are described below.

Impact Significance Ratings Legend: Rating	+ve	-ve
Insignificant	I	I
Very Low	VL	VL
Low	L	L
Medium	M	M
High	H	H
Very High	VH	VH

Table 3: Summary of Impacts

Impact	Significance rating		Key mitigation/optimisation measures
	Without	With	
CONSTRUCTION PHASE IMPACTS			
Soil compaction caused by construction traffic	VL	VL	• Restrict construction activities to the project footprint areas.
Loss of land capability	L	L	• Rehabilitate disturbed areas as soon as possible
Impaired air quality from suspended particulates affecting receptors	VL	I	• Implement dust suppression measures on access roads.
Loss of vegetation	L	VL	• Limit vegetation clearance to what is absolutely essential.
Loss of threatened floral species	L	VL	• Limit vegetation clearance to what is absolutely essential.
Disturbance to terrestrial fauna and loss of habitat during construction	L	VL	• Limit vehicle speeds on internal and haul roads to 40 km/hr. • Prohibit construction activities and driving at night.
Degradation of ephemeral drainage lines	VL	VL	• Construct watercourse crossings / culverts during dry conditions only.
Loss of *heritage* resources during road construction	L	VL	• Limit the footprint of construction activities to what is essential. • *Implement heritage management measures contained in the Mine's approved EMP (including chance and fossil finds procedures).* • *Notify SAHRA APM Unit of any heritage resource discoveries.* • *Notify SAHRA Burial Grounds and Graves Unit if any unmarked human burials are uncovered.* • *Appoint a professional archaeologist or paleontologist to inspect any findings as soon as possible after discovery.*
• **OPERATIONAL PHASE IMPACTS**			
Soil erosion caused by operational activities	L	VL	• Implement drainage control measures and install culverts.
Soil compaction caused by hauling	L	L	• Restrict hauling to designated haul roads.
Loss of land capability	L	L	• Restrict activities to the project footprint areas.
Increased dustfall associated with hauling activities	VL	VL	• Implement existing dust suppression measures at the Mine.
Degradation of ephemeral drainage lines	VL	VL	• Inspect watercourses annually for evidence of erosion at crossings. • Respond to erosion reports by closing gullies and revegetating river.
Loss of vegetation	VL	VL	• Limit vegetation clearance to what is absolutely essential.
Increased faunal mortalities	VL	VL	• Limit night driving as far as possible.

Profile and Expertise of EAPs

SRK Consulting (South Africa) Pty Ltd (SRK) has been appointed by Black Mountain Mining (Pty) Ltd (BMM) as the independent consultants to undertake the Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998 (NEMA).

SRK Consulting comprises over 1 400 professional staff worldwide, offering expertise in a wide range of environmental and engineering disciplines. SRK's Cape Town environmental department has a distinguished track record of managing large environmental and engineering projects and has been practising in the Western Cape since 1979. SRK has rigorous quality assurance standards and is ISO 9001 accredited.

As required by NEMA, the qualifications and experience of the key independent Environmental Assessment Practitioners (EAPs) undertaking the BA are detailed below and Curriculum Vitae provided in Appendix A.

Project Director: Christopher Dalgliesh, BBusSc (Hons), MPhil (EnvSci)
Certified with the Interim Board for Environmental Assessment Practitioners South Africa (CEAPSA)
Chris Dalgliesh is a Partner and Principal Environmental Consultant with over 26 years' experience, primarily in South Africa, Southern Africa, West Africa and South America (Suriname). Chris has worked on a wide range of projects, notably in the natural resources, Oil & Gas, waste, infrastructure (including rail and ports) and industrial sectors. He has directed and managed numerous Environmental and Social Impact Assessments (ESIAs) and associated management plans, in accordance with international standards. He regularly provides high level review of ESIAs, frequently directs Environmental and Social Due Diligence studies for lenders, and also has a depth of experience in Strategic Environmental Assessment (SEA), State of Environment Reporting and Resource Economics. He holds a BBusSci (Hons) and M Phil (Env) and is a Certified Environmental Practitioner of South Africa (CEAPSA).

Project Reviewer: Scott Masson, BSc (Hons) (EnvMan); MLA (L.Arch.)
CEAPSA
Scott Masson is a Senior Environmental Consultant and has been involved in the environmental and landscape architectural field for the past 10 years. His expertise includes Visual Impact Assessment, ESIAs, EMPs, Integrated Water and Waste Management Plans, and environmental planning and sensitivity studies. Scott holds a BSc (Hons) in Environmental Management, a MLA in Landscape Architecture and is a CEAPSA.

Project Manager: Amy Hill, BSc Hons (Biodiversity and Ecology)
Amy Hill is an Environmental Consultant at SRK Consulting and has 4 years of experience in the biodiversity and ecology sector. She has experience in managing a number of Basic Assessment and Water Use Authorisation processes and has contributed to numerous Environmental Impact Assessment processes, notably in the commercial and industrial sectors. Amy has drafted Environmental Management Plans, performed Environmental Control Officer duties and coordinated stakeholder engagement processes. She holds a BSc (Hons) in Biodiversity and Ecology from the University of Stellenbosch.

Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no beneficial interest in the outcome of the assessment which is capable of affecting its independence.

Disclaimer

The opinions expressed in this report have been based on the information supplied to SRK by BMM. SRK has exercised all due care in reviewing the supplied information, but conclusions from the review are reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

Swartberg Haul Road: EAP Affirmation

Section 16 (1) (b) (iv), Appendix 1 Section 3 (1) (r), Appendix 2 Sections 2 (i) and (j) and Appendix 3 Section 3 (s) of the Environmental Impact Assessment (EIA) Regulations, 2014 (promulgated in terms of the NEMA), require an undertaking under oath or affirmation by the EAP in relation to:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and interested and affected parties;
- Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties; and
- The level of agreement between the EAP and interested and affected parties on the Plan of Study for undertaking the environmental impact assessment.

SRK and the EAPs managing this project hereby affirm that:

- To the best of our knowledge the information provided in the report is correct, and no attempt has been made to manipulate information to achieve a particular outcome. Some information, especially pertaining to the project description, was provided by the applicant and/or their sub-contractors. In this respect, SRK's standard disclaimer (inserted in this report) pertaining to information provided by third parties applies.

Table of Contents

1. IMPORTANT NOTICE....2

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS....3

3. CONTACT PERSON AND CORRESPONDENCE ADDRESS....4

a) Details of EAP....4

i. Details of the EAP....4

ii. Expertise of the EAP....4

b) Location of the overall Activity....4

c) Locality map....5

d) Description of the scope of the proposed overall activity....7

i. Listed and specified activities....7

ii. Description of the activities to be undertaken....8

e) Policy and Legislative Context....11

f) Need and desirability of the proposed activities....12

g) Motivation for the overall preferred site, activities and technology alternative....13

h) Full description of the process followed to reach the proposed preferred alternatives within the site....13

i. Details of the development footprint alternatives considered....14

ii. Details of the Public Participation Process Followed....15

iii. Summary of issues raised by I&Aps....16

iv. The Environmental attributes associated with the alternatives....17

v. Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts....35

vi. Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;....44

vii. The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected....46

viii. The possible mitigation measures that could be applied and the level of risk....47

ix. Motivation where no alternative sites were considered....47

x. Statement motivating the alternative development location within the overall site....47

i) 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....47

j) Assessment of each identified potentially significant impact and risk....49

k) Summary of specialist reports....53

l) Environmental impact statement....55

i. Summary of the key findings of the environmental impact assessment;....55

ii. Final Site Map....56

iii. Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives....56

m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr....56

n) Aspects for inclusion as conditions of Authorisation....56

o) Description of any assumptions, uncertainties and gaps in knowledge. 56
p) Reasoned opinion as to whether the proposed activity should or should not be authorised 57
i. Reasons why the activity should be authorized or not. 57
ii. Conditions that must be included in the authorisation 58
q) Period for which the Environmental Authorisation is required. 58
r) Undertaking 58
s) Financial Provision 58
t) Explain how the aforesaid amount was derived. 58
i) Confirm that this amount can be provided for from operating expenditure. 58
u) Specific Information required by the competent Authority 59
i. Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:- 59
v) Other matters required in terms of sections 24(4)(a) and (b) of the Act. 59
4. Draft environmental management programme 60
a) Details of the EAP 60
b) Description of the Aspects of the Activity 60
c) Composite Map 60
d) Description of Impact management objectives including management statements 60
ii. Determination of closure objectives. 60
iii. Volumes and rate of water use required for the operation 61
iv. Has a water use licence has been applied for 61
e) Impacts to be mitigated in their respective phases 62
f) Impact Management Outcomes 77
g) Impact Management Actions 77
h) Financial Provision 78
i. Determination of the amount of Financial Provision. 78
i) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives. 78
j) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline. 78
k) Confirm that the financial provision will be provided as determined. 78
l) Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including 79
m) Indicate the frequency of the submission of the performance assessment/ environmental audit report. 80
n) Environmental Awareness Plan 80
ii. Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work. 80
iii. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment. 80
o) Specific information required by the Competent Authority 80
5. UNDERTAKING 81

Appendices

Appendix A	Curriculum Vitae of the EAP
Appendix B	Site Map
Appendix C	*Stakeholder Engagement*
Appendix C1	*Stakeholder Database*
Appendix C2	*Proof of Stakeholder Notification*
Appendix C3	*Issues and Responses Summary*
Appendix C4	*Stakeholder Comments*
Appendix D	Ecology Impact Assessment
Appendix E	*Heritage Specialist Study*

List of Tables

Table 1: Description of properties 4
Table 2: NEMA listed Activities (2014) applicable to the project 7
Table 3: Listed activities 8
Table 4: Alternatives considered for the development of the haul road 14
Table 5: Rainfall recorded at Aggeneys weather station from 1986 - 2018 19
Table 6: Temperature data (°C) for Pofadder weather station over a 29 year period 20
Table 7: Key socio-economic statistics 31
Table 8: Significance of soil compaction caused by construction traffic 36
Table 9: Significance of loss of land capability during construction 36
Table 10: Significance of soil erosion caused by Operational activities 37
Table 11: Significance of soil compaction caused by hauling during Operational activities 37
Table 12: Significance of loss of land capability during Operational activities 38
Table 13: Significance of impaired air quality from suspended particulates affecting receptors during construction 38
Table 14: Significance of increased dustfall associated with hauling activities 39
Table 15: Significance of loss of vegetation 40
Table 16: Significance of loss of threatened floral species during construction 40
Table 17: Significance of disturbance to terrestrial fauna and loss of habitat during construction 41
Table 18: Significance of increased terrestrial mortalities during Operational activities 42
Table 19: Significance of degradation of drainage lines during construction 43
Table 20: Significance of loss of palaeontological resources during road construction 44
Table 21: Criteria used to determine the consequence of the impact 44
Table 22: Method used to determine the consequence score 45
Table 23: Probability classification 45
Table 24: Impact significance ratings 45
Table 25: Impact status and confidence classification 46
Table 26: Summary of potential impacts 49
Table 27: Environmental management and mitigation measures that must be implemented during the *Design Phase* 62
Table 28: Environmental management and mitigation measures that must be implemented during the *Construction Phase* 64
Table 29: Environmental management and mitigation measures that must be implemented during the *Operational Phase* 73
Table 30: Environmental management and mitigation measures that must be implemented during the *Maintenance Phase* 75

List of Figures

Figure 1: Locality map 6
Figure 2: Existing and proposed infrastructure / haul roads 9
Figure 3: Haul road intersection at the processing area 10
Figure 4: Proposed haul road alignment alternatives 13
Figure 5: Topography surrounding the site 18
Figure 6: Ephemeral drainage lines and proposed crossings 21
Figure 7: Vegetation types at the site 22
Figure 8: Plant communities, selected alternative (1) and alternatives screened out (2-4) 23
Figure 9: Plant communities on site 25
Figure 10: Environmental sensitivity 27
Figure 11: Vegetation sensitivity, selected alternative (1) and alternatives screened out (2-4) 29
Figure 12: Specific environmental features and infrastructure on the site 33
Figure 13: Current land use 34

Acronyms and Abbreviations

BA	Basic Assessment
BAR	Basic Assessment Report
BMM	Black Mountain Mining (Pty) Ltd
CBA	Critical Biodiversity Area
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMF	Environmental Management Framework
GDPR	Regional Gross Domestic Product
GN	Government Notice
ha	Hectares
IDP	Integrated Development Plan
IUCN	International Union for Conservation of Nature
KLM	Khâi-Ma Local Municipality
km	Kilometres
LM	Local Municipality
LN	Listing Notice
MPRDA	Mineral and Petroleum Resources Development Act 28 of 2002
MSDS	Material Safety Data Sheet
NCDENC	Northern Cape Department of the Environment and Nature Conservation
NCNCA	Northern Cape Nature Conservation Act 9 of 2009
NDM	Namakwa District Municipality
NEMA	National Environmental Management Act 107 of 1998
NEM:BA	National Environmental Management: Biodiversity Act 10 of 2004
NHRA	National Heritage Resources Act 25 of 1999
NWA	National Water Act 36 of 1998
PES	Present Ecological State
PGDS	Provincial Growth and Development Strategy
PSDF	Provincial Spatial Development Framework
RDL	Red Data List
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African National Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Botanical Institute
SANS	South African National Standard
SCC	Species of Conservation Concern
SDF	Spatial Development Framework

SEMP	Strategic Environmental Management Programme
SoW	Scope of Work
SRK	SRK Consulting (South Africa) (Pty) Ltd
StatsSA	Statistics South Africa
ToR	Terms of Reference
WRD	Waste Rock Dump
WUA	Water Use Authorisation

Glossary

Avifauna	The collective birds of a given region.
Baseline	Information gathered at the beginning of a study which describes the environment prior to development of a project and against which predicted changes (impacts) are measured.
Community	Those people who may be impacted upon by the construction and operation of the project. This includes neighbouring landowners, local communities and other occasional users of the area
Construction Phase	The stage of project development comprising site preparation as well as all construction activities associated with the development.
Consultation	A process for the exchange of views, concerns and proposals about a project through meaningful discussions and the open sharing of information.
Critical Biodiversity Area	Areas of the landscape that must be conserved in a natural or near-natural state in order for the continued existence and functioning of species and ecosystems and the delivery of ecosystem services.
Cumulative Impacts	Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.
Ecological Support Area	Areas which play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development.
Ecology	The study of the interrelationships of organisms with and within their physical surroundings
Ecosystem	The interconnected assemblage of all living organisms that occupy a given area and the physical environment with which they interact.
Environment	The external circumstances, conditions and objects that affect the existence of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Authorisation	Permission granted by the competent authority for the applicant to undertake listed activities in terms of the NEMA EIA Regulations, 2014.
Environmental Impact Assessment	A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project.
Environmental Management Programme	A description of the means (the environmental specification) to achieve environmental objectives and targets during all stages of a specific proposed activity.
Ephemeral	A water body that does not flow or contain water year-round, in response to seasonal rainfall and run-off.
Fauna	The collective animals of a particular region, habitat or geological period.
Flora	The collective plants of a particular region, habitat or geological period.
Heritage Resources	Refers to something tangible or intangible, e.g. a building, an area, a ritual, etc. that forms part of a community's cultural legacy or tradition and is passed down from preceding generations and has cultural significance.

Hydrology	(The study of) surface water flow.
Impact	A change to the existing environment, either adverse or beneficial, that is directly or indirectly due to the development of the project and its associated activities.
Inselberg	An isolated hill or mountain rising abruptly from a plain.
Independent EAP	An independent person with the appropriate qualifications and experience appointed by the Applicant to manage the Environmental Impact Assessment process on behalf of the Applicant.
Integrated Environmental Management	The practice of incorporating environmental management into all stages of a project's life cycle, namely planning, design, implementation, management and review.
Mitigation measures	Design or management measures that are intended to minimise or enhance an impact, depending on the desired effect. These measures are ideally incorporated into a design at an early stage.
Life of Mine	The time in which the ore reserves of a mine will be extracted.
Mining Right	A right to enter upon and occupy a specific piece of ground (in South Africa) for the purpose of working it for the extraction or collection of minerals.
Operational Phase	The stage of the works following the Construction Phase, during which the development will function or be used as anticipated in the Environmental Authorisation.
Perennial river	A river that flows year-round
Red Data List	Species of plants and animals that because of their rarity and/or level of endemism are included on a Red Data List (usually compiled by the IUCN) which provides an indication of their threat of extinction and recommendations for their protection.
Specialist study	A study into a particular aspect of the environment, undertaken by an expert in that discipline.
Stakeholders	All parties affected by and/or able to influence a project, often those in a position of authority and/or representing others.
Sustainable development	Sustainable development is generally defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. NEMA defines sustainable development as the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.

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).

NAME OF APPLICANT:	**Black Mountain Mining (Pty) Ltd**
CONTACT PERSON:	**Pieter David Venter**
TEL NO:	**+27 54 983 9835 / 9802**
FAX NO:	
POSTAL ADDRESS:	**Private Bag X01, Aggeneys, 8893**
PHYSICAL ADDRESS:	**1 Penge Road, Aggeneys, 8893**
FILE REFERENCE NUMBER SAMRAD:	**NC-00066-MR/102**

1. IMPORTANT NOTICE

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

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

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

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

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

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

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

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

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

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

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

PART A
SCOPE OF ASSSSMENT AND BASIC ASSESSMENT REPORT

3. CONTACT PERSON AND CORRESPONDENCE ADDRESS

a) Details of EAP

i. Details of the EAP

Name of the Practitioner: Scott Masson of SRK Consulting (South Africa) (Pty) Ltd ('SRK").

Tel No.: +27-(0)21-659-3071

Fax No. +27-(0)86-530-7003

e-mail address: smasson@srk.co.za

ii. Expertise of the EAP

1) The Qualifications of the EAP

(with evidence)

Profession: Senior Environmental Consultant
Education: MLA (Landscape Architecture), University of Cape Town, 2008
BSc (Hons), (Environmental Management), University of Cape Town, 2004
Registrations / Affiliations: CEAPSA
Member of National Association for Clean Air

Refer to Appendix A for the Curriculum Vitae of Scott Masson.

2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment Procedure)

Scott Masson is a Senior Environmental Consultant and has been involved in the environmental and landscape architectural field for the past 10 years. His expertise includes Visual Impact Assessment, Environmental Impact Assessment, Environmental Management Programmes, Integrated Water and Waste Management Plans, and environmental planning and sensitivity studies.

b) Location of the overall Activity.

Table 1 presents the location and associated cadastral details associated with the proposed site.

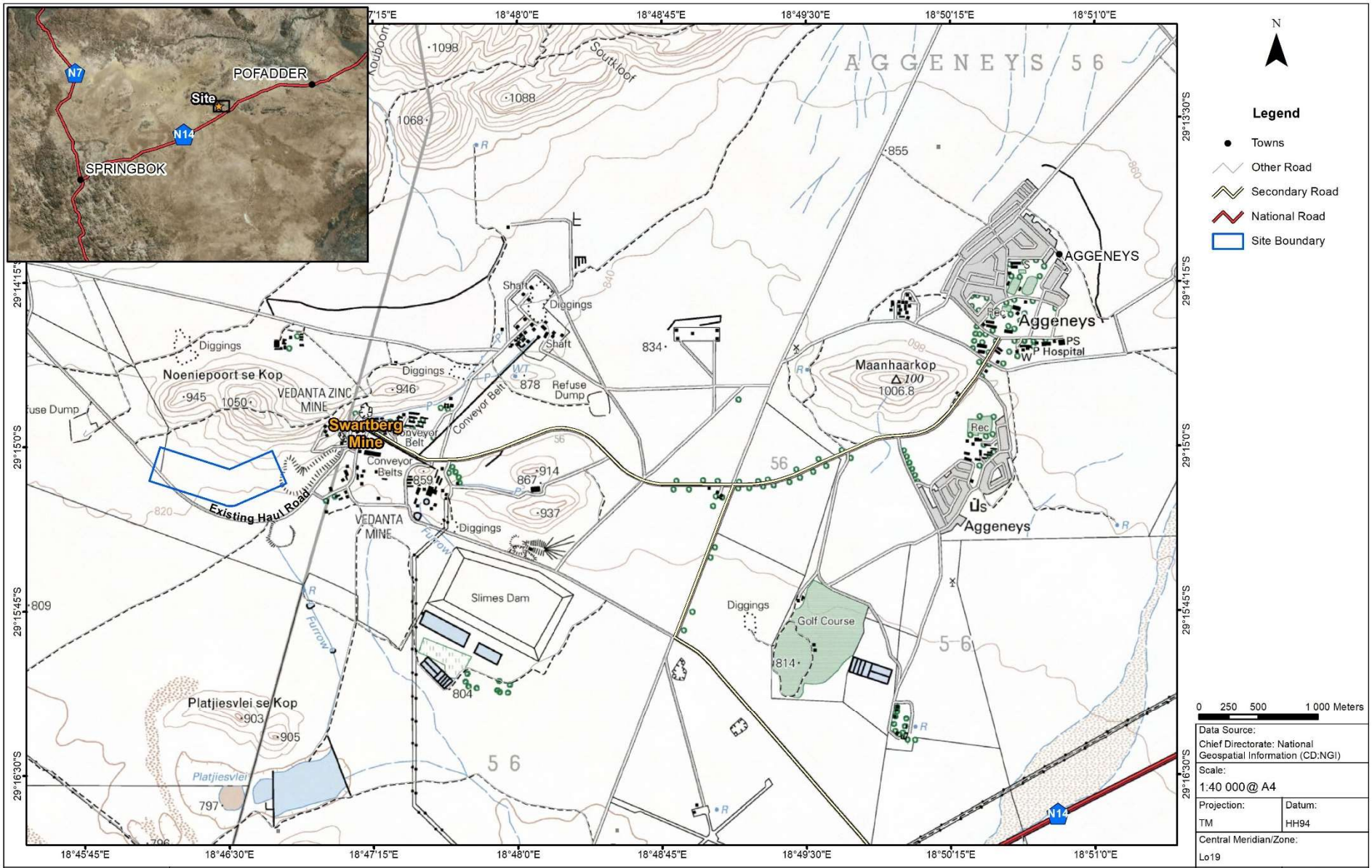
Table 1: Description of properties

Farm Name:	Portion 4, Farm Zuurwater No 62
Application area (Ha)	The proposed haul road will be approximately 1.2 km long and 8 m wide. As such, the disturbance footprint is expected to be ~ 1 ha.
Magisterial district:	Namakwa District Municipality (NDM)
Distance and direction from nearest town	The site is approximately 6 km west of Aggeneys (nearest town).
21 digit Surveyor General Code for each farm portion	C05300000000006200004

c) Locality map

(show nearest town, scale not smaller than 1:250000)

The proposed haul road will be located within BMM's existing mining right area which covers a total area of approximately 24 ha. The study area for the purposes of the BA process comprised a 300 m corridor (i.e. 150 m on each side of the selected route) extending the full length of the proposed haul road route (the site). Figure 1 illustrates the location of the site in relation to the regional setting.



srk consulting

SWARTBERG HAUL ROAD

LOCALITY MAP

Data Source: Chief Directorate: National Geospatial Information (CD:NGI)	
Scale: 1:40 000@ A4	
Projection: TM	Datum: HH94
Central Meridian/Zone: Lo19	
Date: 06/11/2018	Compiled by: FUBM
Project No: 536396	Fig No: 1

Path: G:\New Proj\536396_Swartberg Haulroad EA\8GIS\GISPROJ\MXD\536396_Fig1_Swartberg Haulroad EA_LocalityMap_A4L_20181106.mxd

Revision: A Date: 07 11 2018

d) Description of the scope of the proposed overall activity

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

i. Listed and specified activities

In terms of Section 24 of the National Environmental Management Act 107 of 1998 (NEMA), an application for Environmental Authorisation (EA) must be submitted to the competent authority for activities listed in the Environmental Impact Assessment (EIA) Regulations, 2014, promulgated in terms of Section 24(5) of NEMA (GN 982 as amended by GN 326), and EA obtained prior to the commencement of those activities. Listing Notices 1-3 in terms of NEMA list activities that require EA ("NEMA listed activities").

Activities listed in Listing Notice (LN) 1 and LN3 require a Basic Assessment (BA) process, while activities listed in LN2 require Scoping and Environmental Impact Reporting (S&EIR).

The proposed project includes activities that are listed in terms of the EIA Regulations, 2014 (see Table 2).

Table 2: NEMA listed Activities (2014) applicable to the project

No.	Listed activity	Description
Listing Notice 1 (GN R983)		
12	The development of infrastructure or structures with a physical footprint of 100 square metres or more within a watercourse.	The haul road will cross 11 drainage lines. Pre-cast cement culverts and/or low-level drift crossings will be constructed at each crossing. The crossings / culverts will be at least 8 m wide and will vary in length depending on the width of the drainage line. The cumulative development footprint of all crossings / culverts will be in excess of 100 m^2.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The installation / construction of 11 pre-cast cement culverts and/or low-level drift crossings within drainage lines is likely to trigger this activity.
24	The development of a road wider than 8 metres outside of an urban area.	The haul road will be approximately 8 m wide, with an additional disturbance footprint of approximately 1 m on either side. The haul road will be approximately 1.2 km long.
Listing Notice 3 (GN R985)		
4.	The development of a road wider than 4 metres with a reserve less than 13,5 metres in the Northern Cape: (ii) Outside urban areas: (ee) In Critical Biodiversity Areas (CBAs) as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	A portion of the new haul road (~ 160 m) with a width of 8 m will occur within an area identified as CBA 1 in terms of the 2016 Northern Cape Critical Biodiversity Area Map (SANBI) which updates, revises and replaces all older systematic biodiversity plans and associated products for the province including the: • Namakwa District Biodiversity Sector Plan; • Cape Fine-Scale Plan; and • Richtersveld Municipality Biodiversity Assessment.

No.	Listed activity	Description
12	The clearance of an area of 300 square metres or more of indigenous vegetation in the Northern Cape: (ii) Within CBAs identified in bioregional plans.	A portion of the new haul road (~1 280 m^2) will occur within an area identified as CBA 1 in terms of the 2016 Northern Cape Critical Biodiversity Area Map (SANBI) which updates, revises and replaces all older systematic biodiversity plans and associated products for the province including the: • Namakwa District Biodiversity Sector Plan; • Cape Fine-Scale Plan; and • Richtersveld Municipality Biodiversity Assessment.

The proposed development activities, extent and relevant applicable listing notice are included in Table 3.

Table 3: Listed activities

NAME OF ACTIVITY *(E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc* *E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)*	**Aerial extent of the Activity** Ha or m²	**LISTED ACTIVITY** Mark with an X where applicable or affected.	**APPLICABLE LISTING NOTICE** (*GNR 544, GNR 545 or GNR 546)*
Construction of the haul road	~ 1 ha	X	GN R983 (Activity 24), GN R985 (Activity 4)
Site clearance	9 600 m² (of which ~ 1 280 m^2 will occur within an area identified as CBA1)	X	GN R985 (Activity 12)
Drainage line crossings	In excess of 100 m²	X	GN R983 (Activity 12 and 19)
Laydown areas	Less than 1 ha	-	-
Source material from existing borrow pit	-	-	-
Raising of an existing 66 kV powerline	Raised by 8 -10 m	-	-

ii. Description of the activities to be undertaken

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

Black Mountain Mining (Pty) Ltd (BMM) mines and processes copper, lead and zinc at the Black Mountain and Gamsberg Mines near the town of Aggeneys in the Northern Cape. The Black Mountain Mine ('the Mine'), west of Aggeneys, comprises a processing area (including waste management and ancillary facilities) and two underground shafts:

- Deeps shaft (produces copper, lead and zinc, with silver as a by-product); and
- Swartberg shaft (produces primarily copper and lead, with silver as a by-product).

The Mine has been in operation since 1980.

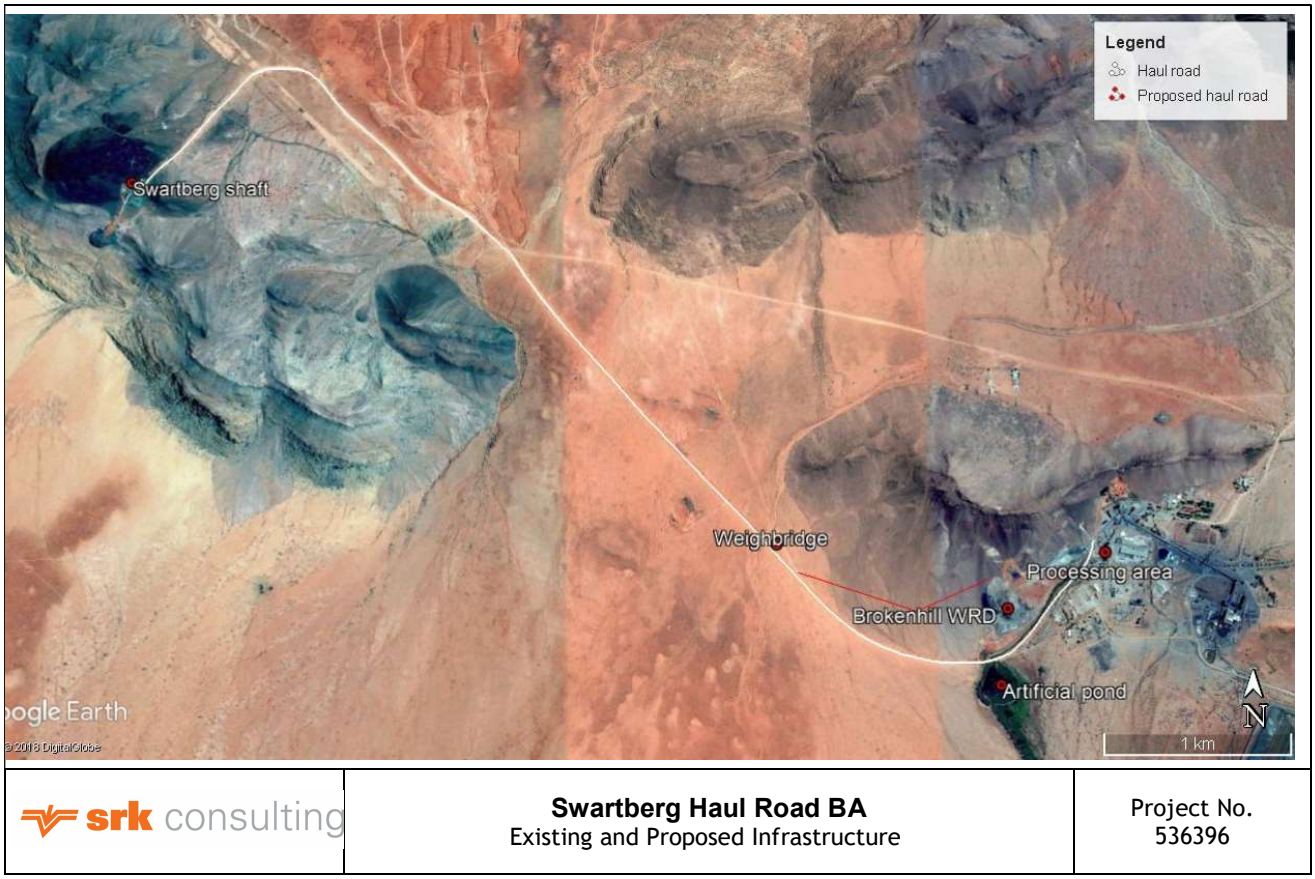


Figure 2: Existing and proposed infrastructure / haul roads

Trucks transport ore and waste rock from the Swartberg shaft using an existing haul road to the processing area (see Figure 2). Currently 30 to 40 loads of ore and waste rock are transported per day by five to seven trucks, which is expected to increase in future. The haul road intersects numerous ancillary roads in the processing area (see Figure 3). Access to the Brokenhill Waste Rock Dump (WRD) at this intersection requires heavy vehicles (transporting ~34 tonne loads) to turn sharply which presents ltraffic issues and safety concerns.

To alleviate traffic and safety concerns, and to optimise haul distances at the Mine, BMM proposes to construct a new haul road from the top of the WRD to the weighbridge area located adjacent to the existing haul road (see Figure 3).

The project will occur entirely within BMM's approved Mining Right Area.

Key aspects of the project include:

- Construction of a new haul road: The new haul road will be 8 m wide to allow for 2-way truck traffic and ~ 1.2 km long. Additional fill, if required, will be sourced from BMM's existing (approved) borrow pit south-east of the processing area;
- Establishment of laydown areas: Laydown areas will be located within the existing disturbed footprint of the weighbridge area and WRD;
- Installation of river crossings: The proposed haul road will cross 11 ephemeral drainage lines, requiring the installation of eleven pre-cast cement culverts and/or construction of low-level drift crossings; and
- Alterations to existing powerline: An existing 66 kV powerline is located in close proximity to and over the proposed haul road. BMM will raise the powerline to ensure heavy vehicles can pass safely beneath.

srk consulting	**Swartberg Haul Road BA** Haul Road Intersection at the Processing area	Project No. 536396

Figure 3: Haul road intersection at the processing area

e) Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.** (E.g. In terms of the National Water Act a Water Use License has/ has not been applied for)
Mineral and Petroleum Resources Development Act, 2002 (MPRDA)	BMM holds an approved Mining Right for the Mine. In terms of Section 102 of the MPRDA, BMM must submit an application to amend the approved EMPr to include the project through the BA process.	The Section 102 application was submitted to the Department of Mineral Resources (DMR) on 26 November 2018.
National Environmental Management Act 107 of 1998 (NEMA)	BMM has a responsibility to ensure that the proposed activities and the BA process conform to the principles of NEMA. The proponent is obliged to take actions to prevent pollution or degradation of the environment in terms of Section 28 of NEMA, and to ensure that the environmental impacts associated with the project are considered and mitigated where possible.	An application for EA was submitted to the DMR on 26 November 2018.
EIA Regulations, 2014 (GN R982) as amended by GN R 326 on 7 April 2017	BMM is obliged to apply for EA for the activities listed in Table 2 and to undertake a BA process in support of the application, in accordance with the procedure stipulated in the EIA Regulations 2014.	
National Environmental Management: Biodiversity Act 10 of 2004 (NEM:BA)	One Threatened or Protected Species (ToPS) [quiver tree (*Aloidendron dichotomum*)] was recorded on site, however, this is located at least 50 m north of the selected route and will not be displaced on account of the road construction / operation. The site is not situated in any threatened ecosystem as both the Aggeneys Gravel Vygieveld and the Bushmanland Sandy Grassland vegetation type on site have a "*least threatened*" status.	The status of the site in terms of NEM:BA, and the impact of the project on the biodiversity of the area, has been considered and assessed as part of the BA.
National Water Act 36 of 1998 (NWA)	The construction of the haul road (specifically the installation of cement culverts and/or low-level drift crossings in the drainage lines) triggers water use activities in terms of section 21 (c) and (i) of the NWA.	BMM will apply for Water Use Authorisation (WUA) from the Department of Water and Sanitation (DWS) contemporaneously with the EA application process.
National Heritage Resources Act 25 of 1999 (NHRA)	Section 38 of the National Heritage Resources Act 25 of 1999 (HNRA) requires that any person who intends to undertake certain categories of development (including the construction of linear infrastructure exceeding 300 m in length) must notify the South African Heritage Resource Agency	Details regarding the location, nature and extent of the proposed development were submitted to the South African Heritage Resources Information System (SAHRIS) in *December 2018 and SAHRA issued a final comment (in support of the project) on 7 March 2019 (see Appendix C4).*

	(SAHRA) at the very earliest stage of initiating such a development and must furnish details of the location, nature and extent of the proposed development.	
Northern Cape Nature Conservation Act (2009) (NCNCA)	No person may, without a permit, pick, import, export, transport, possess, cultivate or trade in a specimen of a specially protected plant or a protected plant species. Two specially protected and 21 protected plant species were recorded on site.	Permits will have to be obtained from the Northern Cape Department of Nature Conservation (NCDENC) for the removal of all protected plant species.
Northern Cape Provincial Growth and Development Strategy (2011) (PGDS)	The PGDS defines a vision for the Northern Cape: 'building a prosperous, sustainable growing provincial economy to eradicate poverty and improve development for a caring society'. The overarching objective of the PGDS is to ensure the integration of development processes and, in particular, to facilitate sustainable development throughout the province.	Mining is recognised as a significant sector contributing to the regional and national economies. The proposed development will improve the operation of an existing mine.
Northern Cape Provincial Spatial Development Framework (2012) (PSDF)	The PSDF recognises the mining industry to be of national and international importance.	
Namakwa District Biodiversity Sector Plan (2008)	The Namakwa District Biodiversity Sector Plan is intended to help guide land-use planning, environmental assessments and authorisations; and, natural resource management in order to promote development which occurs in a sustainable manner.	This document was considered during the compilation of the BA Report (BAR), EMPr and in the Ecology Impact Assessment.
Environmental Management Framework (EMF) and Strategic Environmental Management Plan (SEMP) for the Namakwa District Municipality (2011)	The EMF and SEMP identifies a number of strategic management measures to ensure that environmental resources in the NDM are managed sustainably. One such measure is the encouragement of mining where environmental impacts are deemed to be acceptable, the appropriate environmental controls are in place and economic benefits will exceed potential environmental impacts.	Environmental and socio-economic impacts have been assessed in the BAR.
Namakwa District Municipality Integrated Development Plan (2017 -2022) (IDP)	The IDP recognises the mining industry as a main economic sector and important job driver in the region. It further recognises the closure of mines as having a negative socio-economic impact.	Mining is recognised as a significant sector contributing to the regional and national economies. The proposed development will improve the operation of an existing mine.
Khai-Ma Local Municipality IDP	The IDP recognises the mining industry as the "backbone" of the region's economy.	

f) Need and desirability of the proposed activities.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

Trucks transport ore and waste rock from the Swartberg shaft to the processing area using an existing haul road. The haul road intersects numerous ancillary roads in the processing area (see Figure 3). Access to the WRD at this intersection requires heavy vehicles to negotiate a sharp bend which presents logistical traffic issues and safety concerns.

The proposed haul road will alleviate traffic and safety concerns at this intersection, and will also optimise haul distances at the Mine by reducing the 17.3 km distance between the WRD and Swartberg shaft by 1.2 km.

Ultimately, the new haul road will optimise operations at the Mine by improving hauling efficiency.

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

BMM considered four haul road alignment alternatives (see Figure 4).

Figure 4: Proposed haul road alignment alternatives

The selected route alternative (in red in Figure 4) was determined based on biological, safety and design (e.g. slopes, fill material requirements, etc.) considerations. The terrain along the selected route is less undulating and less rocky for most of the route, especially in the western section. Consequently, the drainage lines do not form such deep incisions (which is a benefit from an ecological perspective). Furthermore, the site investigation undertaken by the ecology specialist revealed the presence of one ToPS (quiver tree) to the north of the WRD. Two of the screened-out alignment alternatives would have traversed this ToPS which is located at least 50 m north of the selected route.

BMM does not consider the other route alternatives to be feasible based on the financial and technical requirements to address the safety and design considerations for the other route alternatives.

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

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

i. Details of the development footprint alternatives considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

(a) the property on which or location where it is proposed to undertake the activity;

(b) the type of activity to be undertaken;

(c) the design or layout of the activity;

(d) the technology to be used in the activity;

(e) the operational aspects of the activity; and

(f) the option of not implementing the activity.

Appendix 1, Section 3 (h)(i) of the EIA Regulations, 2014, requires that all BA processes must identify and describe alternatives to the proposed activity that are feasible and reasonable. Different types or categories of alternatives can be identified, e.g. location alternatives, type of activity, design or layout alternatives, technology alternatives and operational alternatives. The "No-Go" or "no development" alternative must also be considered.

Not all categories of alternatives are applicable to this project, as discussed in Table 4.

Table 4: Alternatives considered for the development of the haul road

Type / category of alternative	Description of alternatives considered
(a) the property on which or location where it is proposed to undertake the activity;	BMM owns Portion 4, Farm Zuurwater No 62, the property on which the Mine and proposed haul road is located. BMM considered four road alignment (route) alternatives (see Figure 4). The motivation for the selected alternative, and the reasons why the other alternatives were screened out are discussed above in Section 3(g). Furthermore, the ecology specialist considered environmental opportunities and constraints of all four alternatives and, although the selected alternative crosses more watercourses than the other alternatives, no fatal flaws were identified for this alternative.
(b) the type of activity to be undertaken;	The purpose of the project is to alleviate traffic and safety concerns at the intersection near the WRD, and to optimise haul distances between the WRD and Swartberg shaft. No other activity alternatives (other than the No-Go alternative) are considered acceptable or viable by the proponent, and activity alternatives (other than the No-Go alternative) are not considered further in the BA process.
(c) the design or layout of the activity;	See (a) above.
(d) the technology to be used in the activity;	Conveyers were also considered but were deemed unviable as they cannot accommodate the current volumes of ore and waste rock from the Mine.
(e) the operational aspects of the activity; and	Operational activity alternatives do not apply to the haul road, which is intended to address operational constraints, e,g. traffic and safety.
(f) the option of not implementing the activity.	The No-Go alternative implies that the haul road will not be constructed and the road safety at the mine will not be improved, and haul distances not optimised. This will inhibit future development at the Mine, and indirectly, in the region. In other words, the benefit of increased road safety and haul distance optimisation will be forgone.

	As a number of protected plant species and drainage lines occur on the site, biophysical impacts associated with the project would not materialise if the project does not proceed.

ii. Details of the Public Participation Process Followed

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

Public participation *was* undertaken to raise public and authority awareness of the proposed project.

The key activities are described in further detail below.

- Placement of notice boards (size A2, in English and Afrikaans) at the entrance to the Mine;
- Placement of an advertisement (in English and Afrikaans) in one local newspaper (23 November 2018);
- Notification of stakeholders in terms of Section 41 (2) (b) of GN R982 of 2014; and
- Stakeholders and the public were invited to register on the stakeholder database for the project on or before 26 November 2018.

Comments received on the BAR *have been* collated into an Issues and Responses Summary which *is appended to* the Final BAR. *The Final BAR has been updated (where necessary) taking stakeholder input into account. The Final BAR will then* be submitted to the DMR for decision making.

Proof of *stakeholder engagement is appended to* the Final BAR *(see Appendix C).*

Newspaper Advertisements and Posters

A newspaper advertisement (in English and Afrikaans) announcing the commencement of the BA process, the availability of the BAR and inviting IAPs to register on the project database was placed in Die Plattelander on 23 November 2018.

In addition to the advertisement, a set of A2 posters (in English and Afrikaans) were placed at the entrance to the Mine. These posters contained brief details of the proposed project and process and the contact details of the consultant.

Identification of Key Stakeholders and IAPs

Relevant IAPs from local, provincial and national authorities, conservation bodies, Non-Governmental Organisations groups, local businesses and forums and surrounding land owners and occupants were considered for inclusion in the initial notification of the project and BA process. Relevant authorities were automatically registered as IAPs. Owners of properties neighbouring the site were notified but not automatically registered as IAPs.

As specified in GN R 982, authorities and all persons who *submited* written comments, or request in writing to be placed on the register *were* registered as IAPs.

The stakeholder database is attached as Appendix C*1*. The database of registered stakeholders *has been* updated throughout the process.

Notification of BAR for Public Comment

The release of the BAR for public review was communicated to all identified IAPs by post, email or fax on or by 26 November 2018. Hard copies of the full report *were* placed at the following venues:

- Aggeneys Public Library;
- BMM security offices at the Mine; and
- SRK's office in Rondebosch, Cape Town.

An electronic version of the report *was* also available on SRK's website www.srk.co.za.

Hard copies of the BAR were sent to the following Organs of State on 26 November 2018 for comment:

- DMR;
- DWS;
- NCDENC;
- Namakwa District Municipality; and
- Khai-Ma Local Municipality.

DMR was notified that the reports were sent to the organs of state listed above to request their comment. Proof of notifications *are included Appendix C2.*

Stakeholders *were* afforded a 30 day comment period, *between 27 November 2018 and* 18 January 2019.

Submission and Acceptance of Final BAR

Following initial review of the BAR, issues raised by authorities and the public *were* summarised and responded to in an Issues and Responses Summary, which *is* appended to the Final BAR. The *Final* BAR *was* updated (*where* necessary) taking stakeholder input into account.

SRK does not believe that the minor updates constitute "significant changes" or "significant new information" in terms of Regulation 19 (1)(b) of the EIA Regulations, 2014. As such, the Final BAR has been submitted to DMR for decision making.

iii. Summary of issues raised by I&Aps

(Complete the table summarising comments and issues raised, and reaction to those responses)

After notifying stakeholders of the BA Process and release of the BAR, two stakeholder comments were received from SAHRA: an interim comment (dated 18 January 2019) and a final comment (dated 7 March 2019).

The main issues raised by SAHRA in the interim comment were:

- *The heritage study previously conducted near the site (as part of a separate process) was not considerd acceptable by the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit, as the report did not assess the development footprint under application including the associated infrastructure;*
- *A Heritage Impact Assessment (HIA) must be undertaken for the development footprint; and*
- *The EAP should apply for an extension of the BA process in terms of section 19(b) of the NEMA Regulations.*

Following receipt of SAHRA's interim comment, SRK engaged the SAHRA case officer on 21 January 2019 to discuss this comment and it was agreed that the applicant could apply to SAHRA for motivation to be exempt from undertaking an HIA, provided that a heritage specialist ground-truthed information presented in the BAR, i.e. that no significant heritage resources occur within the project footprint, and that there would be little to no impacts on heritage resources.

SRK appointed Cedar Tower Services (hereafter referred to as the "heritage specialist") to undertake a site survey to identify potential heritage resources within the development footprint. In summary, the heritage specialist concluded that:

- *Based on a desktop study, the bedrock underlying the property is unfossiliferous and of no palaeontological interest;*
- *No heritage resources were identified within the development footprint during the site survey;*
- *Consequently, the project will have no impact on heritage resources; and*
- *There is no concern from a heritage perspective and no further heritage studies are required.*

These findings were submitted to SAHRA on 25 February 2019 to which SAHRA responded with a final comment. The main points raised in the final comment were:

- *The SAHRA APM Unit has no objections to the proposed development;*
- *SAHRA supports the results of the specialist's report; and*
- *A number of conditions (specified in the final comment) should be incorporated into the EMPr.*

The issues and associated responses are presented in the Issues and Responses Summary provided in Appendix C3 of the Final BAR. Copies of the full comments are provided in Appendix C4.

iv. The Environmental attributes associated with the alternatives

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

1) Baseline Environment

a) Type of environment affected by the proposed activity

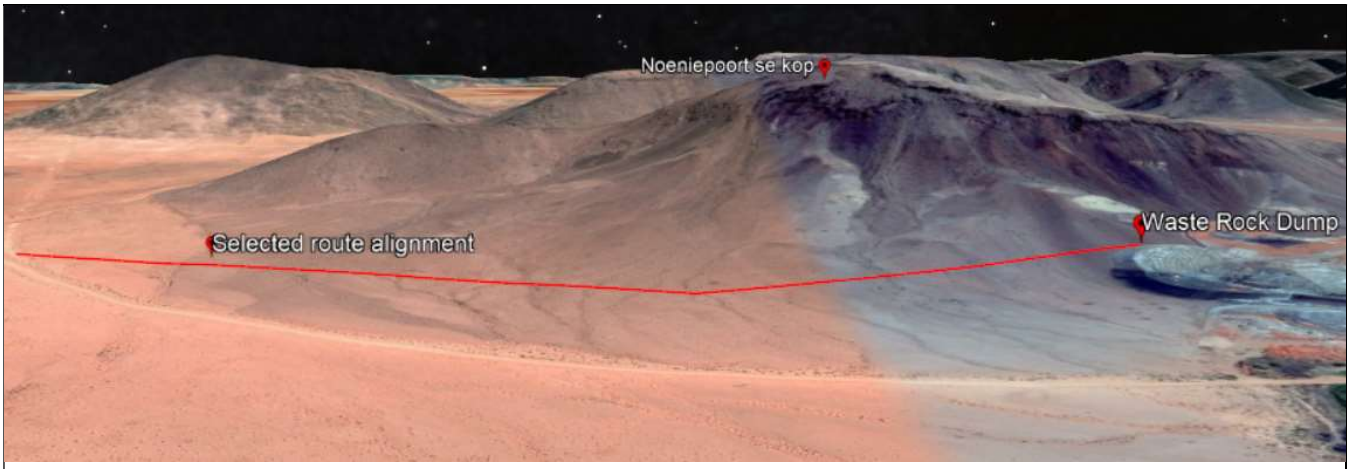
(its current geographical, physical, biological, socio- economic, and cultural character).

Topography

The topography of the NDM is characterised by mountainous areas, ridges, steep slopes, undulating hills and plateaus, floodplains and coastal dunes. The Kamiesberg mountain range forms an escarpment from Garies in the southeast to Springbok in the northeast. The Kamiesberg mountain range is characterised by granite and gneiss rock formations and steep rocky slopes that are separated by sandy plains and lowland areas. The mountain range functions as an important rain catchment area (Chidley et al., 2011).

The lowest lying areas of the NDM are situated along the coastal plain belt to the west of the N7.

The area surrounding the site is characterised by rocky slopes (north of the site) and sandy plains (south and southwest of the site) (Ekotrust, 2018) (see Figure 5). The site is located on the southern slopes and plains of Noeniepoort se kop inselberg at approximately 810 m - 840 m metres above sea level.



srk consulting	**Swartberg Haul Road BA** Topography Surrounding the Site	Project No. 536396

Figure 5: Topography surrounding the site

Geology

The prominent inselbergs and ranges of hills which characterise the arid landscape of the area are formed by the metavolcanic-metasedimentary units of the Bushmanland Group that usually occur as major, often overturned, synformal infolds in the associated granitic gneisses (Paleo Field Services, 2007).

The rocky slopes of the mountain on site consist of medium- to thick-bedded, white quartzite and pelitic schist, with interbedded sillimanite bodies (Kwr - Wortel Formation of the Aggeneys Subgroup, Bushmanland Group (Geological Series, 2007). The sandy plains to the east and west (Qs2) are covered by quaternary sand, scree, rubble and sandy soils.

Climate

Regional Climate

The NDM has a typical arid to semi- arid climate. Rainfall is low and unreliable. Summers have characteristically high temperatures and winters have mild to cold temperatures. The northern areas of the NDM experience the highest mean annual temperatures, while the cooler areas have the highest rainfall. The cold Benguela Current influences the climatic conditions by producing coastal fog and dew during the winter months (Chidley et al, 2011).

Rainfall

Rainfall in the NDM is among the lowest in the country. The western parts of the NDM (the Succulent Karoo, including the Garies area) are characterised by winter rainfall while the Nama Karoo is characterised by late summer rainfall. The south eastern areas of the NDM, (a band along the escarpment from Sutherland to Nieuwoudtville) receive most rainfall (between 400 mm and 600 mm per annum). The majority of the NDM receives rainfall less than 200 mm per annum.

The mean annual rainfall for Aggeneys (recorded from 1986 to 2017) was 100.9 mm, ranging from a minimum of 27.6 mm in 2015 to a maximum of 219.5 mm in 2006 (see Table 5).

Most rain is recorded between January and April, with least rainfall occurring between May and September (see Table 5) (BMM, 2018).

Table 5: Rainfall recorded at Aggeneys weather station from 1986 - 2018

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1986	2.0	2.0	20.0	31.0	1.0	34.0				16.0			106.0
1987		3.0	27.0	8.0				1.3	32.0	1.0	2.8		75.1
1988		26.0	88.0		6.0	2.0	1.0	10.0	3.5		10.0	42.0	188.5
1989	3.0	18.0		31.0		2.0	6.0						60.0
1990		13.0	6.5	40.0	5.0	13.0	2.0					12.0	91.5
1991	35.0		29.0	7.0	2.0				20.0	45.5		1.0	139.5
1992						4.5	5.0	1.5					11.0
1993	35.0		9.5	33.5	13.5	6.0	2.0			1.0	12.5	1.5	114.5
1994	20.5	21.5	6.0	12.0		6.0	10.0						76.0
1995	42.5	1.5	13.5		6.5		2.0	7.5	15.5	28.0	9.5	34.0	160.5
1996	10.0	16.0			3.5	2.0	65.0	9.0	8.5	15.5	39.0	3.0	171.5
1997		9.0	22.0	1.0	18.5	0.5	6.0		1.0	0.5	0.5	3.0	62.0
1998	1.0	1.0	20.5		5.5			33.0	19.0	3.5	1.0	17.0	101.5
1999		14.0	22.5	24.0	10.0			1.5	12.0	29.0	12.0	35.0	160.0
2000	7.5	90.0	6.0	5.0	0.5	0.5	7.5		2.0				119.0
2001	0.5	7.0	7.0	109.0	1.0		20.0	7.0	2.0	0.5	38.5		192.5
2002	0.5	15.5	18.5	35.0	10.5	3.5	1.0	35.0	4.0	7.0	3.5	3.0	137.0
2003		5.0	0.5					18.0		2.5	11.0	5.0	42.0
2004	7.5	6.0	5.0	8.0	6.0				3.0	17.0	1.0		53.5
2005	45.0	2.0	8.5	31.0	15.0			2.5		57.0	2.0	1.5	164.5
2006	47.0	45.0		75.0	14.0	1.5	2.0	35.0					219.5
2007	13.0		8.0	1.0	2.0	10.5	1.5	2.5		5.0	8.5	19.0	71.0
2008	4.0	11.0	23.0	0.5	23.0	33.0	15.0	2.0		3.5	11.0	2.0	128.0
2009		77.5	2.0		1.5	13.0	8.0	4.0			6.0		112.0
2010	24.0	20.0	4.0		3.5							20.0	71.5
2011	2.0	10.5	48.5	4.0	22.0	6.0		7.0			3.0		103.0
2012		20.5	7.5	3.0		6.3				2.0		9.0	48.3
2013	4.8			26.0				6.0				6.5	43.3
2014	28.0	15.5	17.5	6.0		6.0					29.0	3.0	105.0
2015	8.0			7.6	0.2	7.6	0.6	2.8	0.4			0.4	27.6
2016	27.4		0.4	2.2	2.2		0.6			3.4			36.2
2017	16.4	10.2	3.6			2.8			1.6		3.4	0.2	38.2
2018	0.4	4.6	18.8	5.0									
Month	16.0	17.9	16.4	21.1	7.5	8.0	8.6	10.3	8.9	13.2	10.7	10.9	
Mean	12.0	14.4	13.3	15.7	5.4	5.0	4.9	5.8	3.9	7.4	6.4	6.8	**100.9**

Source: BMM, 2018

Ambient Temperature

The NDM can be divided into a number of climatic regions. The NDM has an average annual temperature of less than 18°C.

The nearest town for which temperature data was available at the time of this study was Pofadder, approximately 50 km east of the site.

The mean annual temperature for Pofadder is 18.6°C (see Table 6), with maximum and minimum temperatures measured as 40.6°C and -1.4°C.

The highest mean daily maximum (33.0°C) is recorded in January and lowest mean daily minimum (5.1°C) is recorded in June.

Table 6: Temperature data (°C) for Pofadder weather station over a 29 year period

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Mean daily max.	33.0	32.4	30.1	25.4	21.4	17.8	18.0	20.0	23.6	26.5	30.0	32.1	25.8
Monthly max.	40.6	39.6	39.2	35.7	31.3	26.0	27.6	31.0	35.2	37.9	39.4	40.5	40.6
Mean daily min.	16.6	17.2	16.0	12.4	8.6	5.7	5.1	6.0	8.6	10.9	14.0	15.5	11.4
Monthly min.	6.4	5.6	4.4	0.5	-0.4	-2.7	-3.0	-2.7	-1.2	1.6	4.0	5.0	-3.0
Mean monthly temperature	24.8	24.8	23.0	18.9	15.0	11.8	11.6	13.0	16.1	18.7	22.0	23.8	18.6

Source: Ekotrust, 2018

Hydrology and Surface Water

This section is based on the Ecological Impact Assessment (2018) undertaken by Ekotrust (see Appendix D).

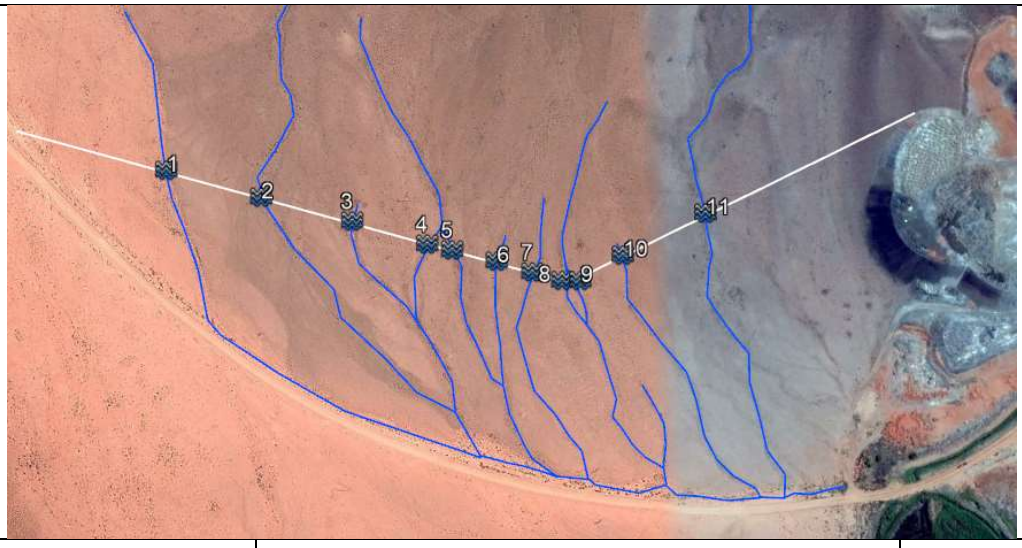
Catchment

The study area falls within the D82C quaternary catchment in the Lower Orange Water Management Area (Vedanta, 2017).

The general drainage direction is from north to south, with small to medium watercourses that are nonperennial. There are three very large sub-catchments that drain from the mountain range in the north towards the town of Aggeneys, Deeps and towards Swartberg respectively. These sub-catchments can contribute major volumes of run-off because of the size of these catchments. Mitigation measures, in the form of cut-off berms, have already been put in place to protect the Deeps area and the town of Aggeneys from the run-off from these catchments during big storm events (Vedanta, 2017).

Drainage Features

The proposed haul road will traverse 11 ephemeral drainage lines (see Figure 6).



srk consulting	**Swartberg Haul Road BA** Ephemeral Drainage Lines and Proposed Crossings	Project No. 536396

Figure 6: Ephemeral drainage lines and proposed crossings

The site is drained by a number of poorly defined ephemeral drainage lines (hereafter referred to as “drainage lines”) that run southwards from Noeniepoort se kop to the existing haul road in the south. Storm water that reaches the existing haul road diverts eastwards (naturally).

The drainage lines that occur on site are likely to convey water flow during rare, heavy thunderstorms in the rainy season and may not flow at all during droughts. As such, the drainage lines are neither riparian habitats nor wetlands (Ekotrust, 2018).

Ecological Condition of Drainage Lines

Present Ecological Status (PES) and Ecological Importance and Sensitivity (EIS) were calculated for the drainage lines.

PES refers to the degree to which ecological conditions of an area have been modified from natural conditions (Ekotrust, 2018). The results of the PES analysis show that the drainage lines are considered to be **Category A: unmodified or approximated natural condition**.

The ecological importance of a watercourse or river is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales. Ecological sensitivity (or fragility) refers to the system’s ability to resist disturbance and its capability to recover from disturbance once it has occurred (resilience).

A median score of <1.0 was obtained which means that the drainage lines fall in the **Category D: Marginal/Low** category, i.e. drainage lines that are not ecologically important and sensitive (unique) at any scale. The biodiversity of these drainage lines is ubiquitous and not sensitive to flow and habitat modifications. They play an insignificant role in moderating the quantity and quality of water of major rivers.

Terrestrial Vegetation and Habitats

This section is based on the Ecological Impact Assessment (2018) undertaken by Ekotrust (see Appendix D).

Vegetation Types

The site falls within the Nama-Karoo Biome and the Bushmanland Bioregion (Mucina & Rutherford 2006).

The site is identified to fall within one vegetation type [Bushmanland Sandy Grassland (NKb 4)] as identified by Mucina and Rutherford (2006) (see Figure 7).

Based on fieldwork undertaken by Ekotrust in October 2018, it was determined that the western and southern portions of the site fall in the Bushmanland Sandy Grassland (NKb 4) vegetation type, and that the northern and eastern portions of the site fall within the Aggeneys Gravel Vygieveld (SKr 19) vegetation type.

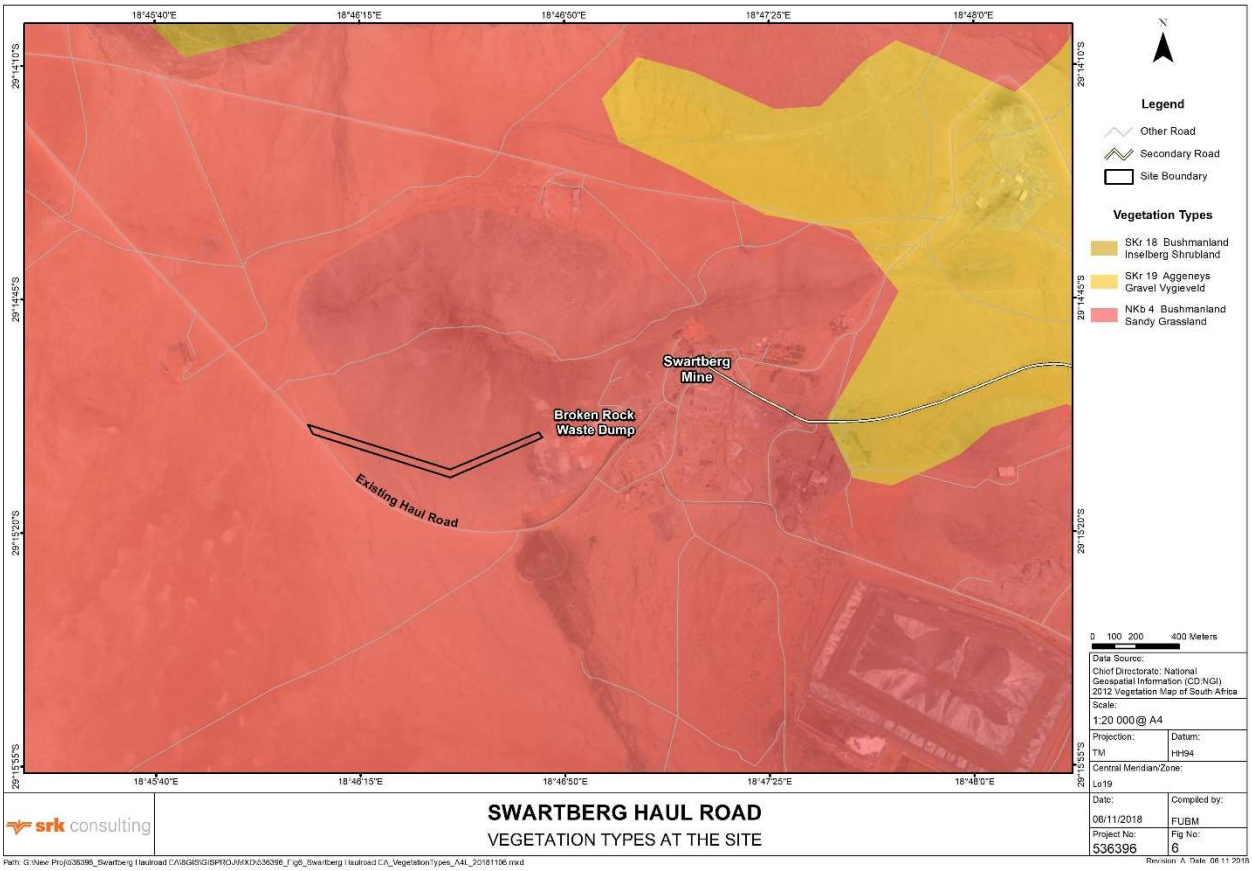


Figure 7: Vegetation types at the site

Source: Ekotrust, 2018

Bushmanland Sandy Grassland (NKb 4)

This vegetation type is typical in northern Bushmanland in the surrounds of Aggeneys and a few isolated patches in eastern Bushmanland. Its distribution follows the course of the Koa River, a palaeoriverine system of the Orange River. The landscape consists of sandy grassland dominated by *Stipagrostis* species (e.g. *S. brevifolia, S. ciliata, S. obtusa* and *S. anomala*), *Schmidtia kalahariensis* and many drought-resistant shrubs such as *Rhigozum trichotomum* and *Sisyndite spartea*. Other grass species include *Aristida adscensionis, Centropodia glauca* and *Enneapogon desvauxii*. The forb layer is represented by *Gazania lichtensteinii, Grielum humifusum, Tribulus zeyheri, Dicoma capensis* and *Sesamum capense*. Prominent dwarf shrubs include *Eriocephalus microphyllus*, *Tetraena microphyllum*, *Hermannia spinosa* and *Monechma incanum*.

The conservation status of the Bushmanland Sandy Grassland is "*least threatened*" (NEM:BA, 2011) and is not conserved in any statutory conservation areas.

Aggeneys Gravel Vygieveld (SKr 19)

This vegetation type occurs at the foothills or on peneplains of inselbergs in northern Bushmanland from Pofadder westwards towards Namaqualand. The terrain is flat to slightly sloping with quartz layers alternating with red sandy soils, supporting a sparse layer of dwarf shrubs and dwarf leaf-succulents of the families Aizoaceae, Crassulaceae, Euphorbiaceae, Portulacaceae and Zygophyllaceae. Prominent shrubs and dwarf shrubs include *Ruschia divaricata, Euphorbia gariepina, Kleinia longiflora, Lycium cinereum, Monsonia crassicaule, Aptosimum spinescens* and *Pegolettia retrofracta*. Succulent herbs include *Crassula corallina, C. deltoidea, Dinteranthus* species*, Avonia* species *and Conophytum* species.

The conservation status of the Bushmanland Sandy Grassland is "*least threatened*" (NEM:BA 2011) and is not conserved in any statutory conservation areas.

Plant Communities

Four plant communities occur within the site (Ekotrust, 2018) (see Figure 8).

srk consulting	**Swartberg Haul Road BA** Plant Communities on the site	Project No. 536396

Figure 8: Plant communities, selected alternative (1) and alternatives screened out (2-4)

Source: Ekotrust, 2018

Gravel and Rocky foot- and midslopes

This dwarf shrubland is found on the footslopes and plains within the central and eastern portions of the site (see Photo 1, Figure 9). In these areas, the shallow soils are covered by gravel as well as large rocks.

The plant community is characterised by *Larryleachia marlothii, Avonia albissima* and *Mesembryanthemum arenosus*. No trees or shrubs were recorded. The open dwarf shrub layer includes species such as *Zygophyllum decumbens, Euphorbia gariepina, Salsola tuberculata, Mesembryanthemum arenosus, Pteronia* sp. and *Portulacaria fruticulosa.* The most prominent forbs are *Sesamum capense, Ursinia nana, Didelta carnosa, Gazania lichtensteinii, Heliophila species* and *Kewa salsoloides*. The grass layer is poorly developed

with *Enneapogon desvauxii* (d), *Enneapogon scaber* and *Stipagrostis uniplumis* the prominent species.

Protected species include *Larryleachia marlothii, Euphorbia gariepina, Avonia albissima, Avonia papyracea, Trianthema parvifolia* and *Mesembryanthemum arenosus.*

Rocky Midslopes

This dwarf shrubland is found on the mid- and footslopes in the north eastern parts of the site (see Photo 2, Figure 9), where shallow soils are covered by large rocks.

The plant community is characterised by *Aloidendron dichotomum*, *Boscia foetida*, *Mesembryanthemum schenkii*, *Mesembryanthemum noctiflorum*, *Anacampseros baeseckii*, *Ruschia centrocapsula* and *Tylecodon rubrovenosus*. The sparse tree and shrub layer include some individuals of *Aloidendron dichotomum* and *Boscia foetida*. The open dwarf shrub layer includes species such as *Mesembryanthemum schenkii, Mesembryanthemum noctiflorum, Euphorbia gariepina, Portulacaria fruticulosa* and *Hermannia spinosa*. The most prominent forbs are *Ursinia nana, Sericocoma avolans, Acanthopsis hoffmannseggiana, Heliophila species, Didelta carnosa* and *Gazania lichtensteinii*. The grass layer is poorly developed with *Enneapogon desvauxii* (d), *Enneapogon scaber* and *Eragrostis obtusa* the prominent species.

Protected species include *Aloidendron dichotomum, Boscia foetida, Hoodia gordonii, Euphorbia gariepina, Avonia papyracea, Mesembryanthemum schenkii, Mesembryanthemum noctiflorum, Anacampseros baeseckii, Tylecodon rubrovenosus, Tylecodon reduplicata, Drosanthemum sp., Trianthema parvifolia* and *Ruschia centrocapsula*.

Drainage Lines

This diverse dwarf shrubland is found along the small and narrow drainage lines flowing from the mountain in the north southwards through the site (see Photo 3, Figure 9). The drainage lines on the footslopes and plains are covered by sandy to sandy loam soils, while higher up it becomes rockier.

The drainage lines are diverse in floristic composition depending on the location on site. The plant community is characterised by species such as *Parkinsonia africana, Lycium oxycarpum, Lycium cinereum, Microloma incanum, Osteospermum sinuatum, Eriocephalus scariosus* and *Aptosimum spinescens*. The sparse tree and shrub layer include some individuals of *Parkinsonia africana, Lycium oxycarpum* and *Lycium cinereum.* The open dwarf shrub layer includes species such as *Rhigozum trichotomum* (d), *Euphorbia gariepina, Salsola tuberculata, Monechma incanum, Kleinia longiflora, Microloma incanum, Osteospermum sinuatum, Melolobium microphyllum, Eriocephalus scariosus* and *Aptosimum spinescens.* The most prominent forbs are *Trianthema parvifolia, Blepharis macra, Chascanum gariepense, Heliophila* spp.*, Gazania lichtensteinii* and *Didelta carnosa.* The grass layer is poorly developed with various *Stipagrostis* species, *Aristida engleri, Enneapogon desvauxii, Enneapogon scaber* and *Eragrostis obtusa* the prominent species.

Protected species include *Larryleachia marlothii, Hoodia gordonii, Euphorbia gariepina, Mesembryanthemum arenosus, Mesembryanthemum crystallinum, Mesembryanthemum* sp., *Microloma incanum, Tetragonia arbuscula, Tetragonia reduplicata* and *Trianthema parvifolia.*

Sandy Plains

This open dwarf shrubland is found on the sandy plains to the west and southwest of the site (see Photo 4, Figure 9). The sandy soils are medium to deep with little gravel and rock cover.

The plant community is characterised by *Stipagrostis uniplumis, Hermannia stricta, Sisyndite spartea, Augea capensis* and *Monsonia parvifolia*. The shrub layer is represented by *Sisyndite spartea, Diospyros austro-africana, Phaeoptilum spinosum, Lycium oxycarpum* and *Lycium cinereum*. The open dwarf shrub layer includes species such as *Monechma incanum, Kleinia longiflora, Hermannia stricta, Tetragonia arbuscula, Salsola tuberculata, Limeum aethiopicum* and *Mesembryanthemum tetragonum*. The most prominent forbs are *Monsonia parvifolia, Foveolina dichotoma, Blepharis mitrata, Heliophila species, Didelta carnosa* and *Gazania lichtensteinii*. The grass layer is poorly developed with *Stipagrostis uniplumis, Stipagrostis ciliata, Stipagrostis obtusa* and *Enneapogon desvauxii* the prominent species.

Protected species include *Euphorbia gariepina, Euphorbia rhombifolia, Mesembryanthemum crystallinum, Tetragonia arbuscula* and *Mesembryanthemum tetragonum*.

Photo 1: Gravel slopes and plains

Photo 2: Rocky midslopes

Photo 3: Rocky drainage line against the slopes

Photo 4: Sandy plains in the south and west

srk consulting	**Swartberg Haul Road BA** Four Plant Communities on Site	Project No. 536396

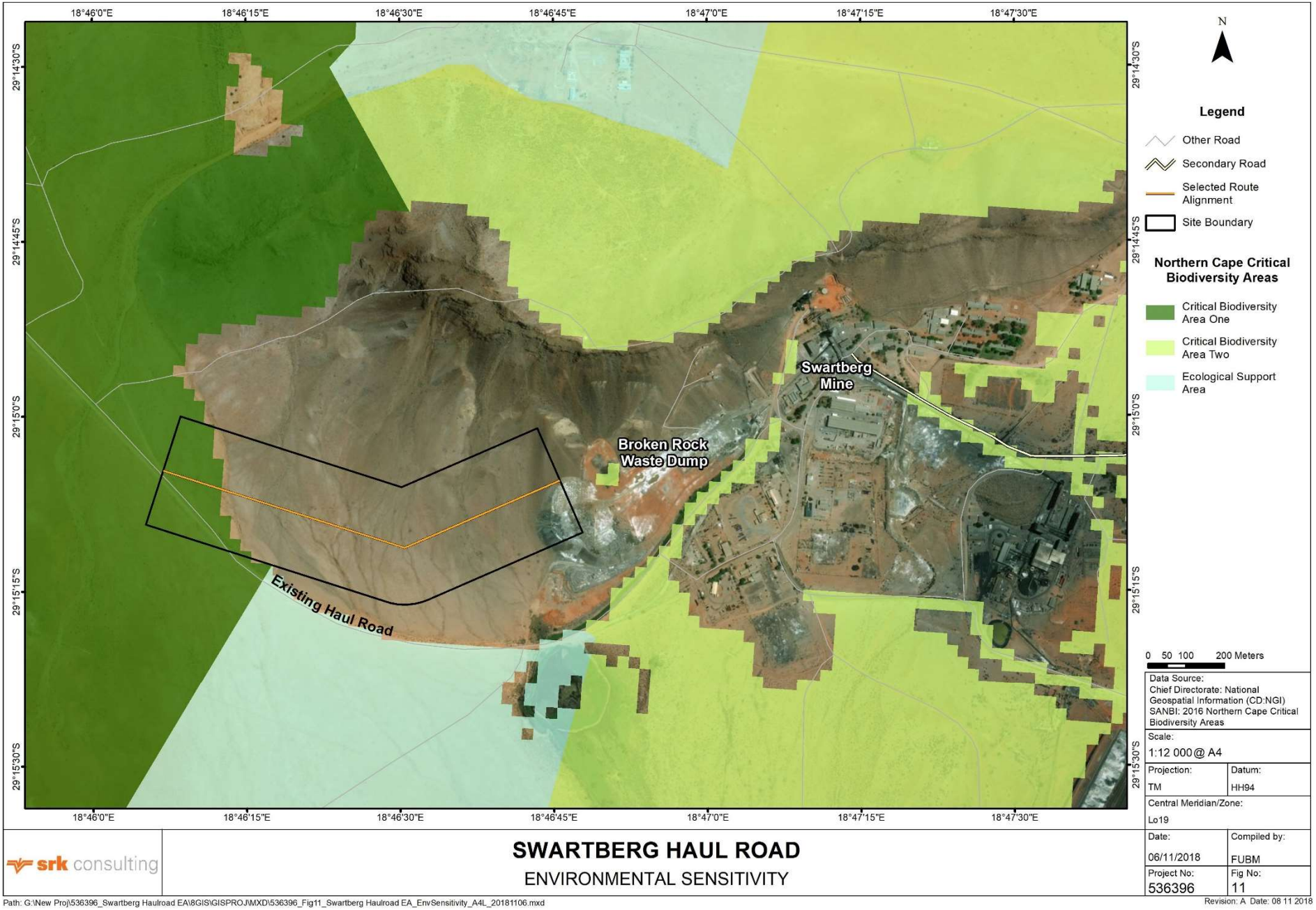
Figure 9: Plant communities on site

Source: Ekotrust, 2018

A total of 92 plant species was recorded on the site during a vegetation survey in October 2018. The mean species richness for the site is 36 species per habitat, with the highest species richness associated with the drainage lines.

Conservation

CBAs are areas required to meet biodiversity targets for ecosystems, species or ecological processes. CBAs should be kept in a natural or near-natural state, with no further loss of habitat or land-use change permitted. A small portion of the haul road (~1 280 m^2) will occur within an area identified as CBA 1 in terms of the 2016 Northern Cape Critical Biodiversity Area Map (SANBI) (see Figure 10)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29°14'45"S
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Other Road
Secondary Road
Selected Route Alignment
Site Boundary
Northern Cape Critical Biodiversity Areas
Critical Biodiversity Area One
Critical Biodiversity Area Two
Ecological Support Area
Swartberg Mine
Broken Rock Waste Dump
Existing Haul Road
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Data Source:
Chief Directorate: National Geospatial Information (CD:NGI)
SANBI: 2016 Northern Cape Critical Biodiversity Areas
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Datum:
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Central Meridian/Zone:
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The site does not fall within any formally protected areas and no nationally protected trees were noted on site.

In terms of the NCNCA (2009), two '*specially protected*' and 21 '*protected plant*' species were recorded on site (a list of protected plant species is available in the Ecology Impact Assessment – see Appendix D).

None of the plant species recorded on site are listed as '*critically endangered*' or '*endangered*' species in terms of the NEM:BA (2013). Only one species, *Aloidendron dichotomum*, is classified as '*vulnerable*', however, this is located at least 50 m north of the selected route alternative and will not be displaced on account of construction, operation or closure activities.

The site is located along the southern boundary of the Gariep Centre of Endemism (Van Wyk & Smith 2001). Six endemic plant species were recorded on site and are listed in the Ecology Impact assessment (see Appendix D).

Ecological Sensitivity

Sensitivity is the vulnerability of a habitat to any impact. In this region, a dune, wetland or ridge system would be more vulnerable to development than a sandy plain would. The following indicators were used to evaluate the sensitivity of the vegetation on site:

- Threatened status of the regional vegetation type wherein the proposed site is situated;
- Percentage of red list plant species per community or site;
- Number of protected tree species per community or site;
- Percentage of provincially protected plant species;
- Percentage of endemic plant species per community or site (endemic to vegetation type);
- Conservation value of community (habitat) or site;
- Species richness per plant community or per sample plot (number of plant species);
- Degree of connectivity and/or fragmentation of the habitat, i.e. high connectivity and low fragmentation infers a low rating;
- Soil erosion potential; and
- Resilience (this is a measure of the ability of a particular habitat/plant community to recover after an impact, i.e. high resilience infers low rating).

Overall, the sensitivity of vegetation on the site is rated as low (i.e. the sensitivity is not significant enough and should not have an influence on the decision about the project) to very low (usually applicable to habitats in poor condition or that have been transformed, especially by human activities) (see Figure 11).

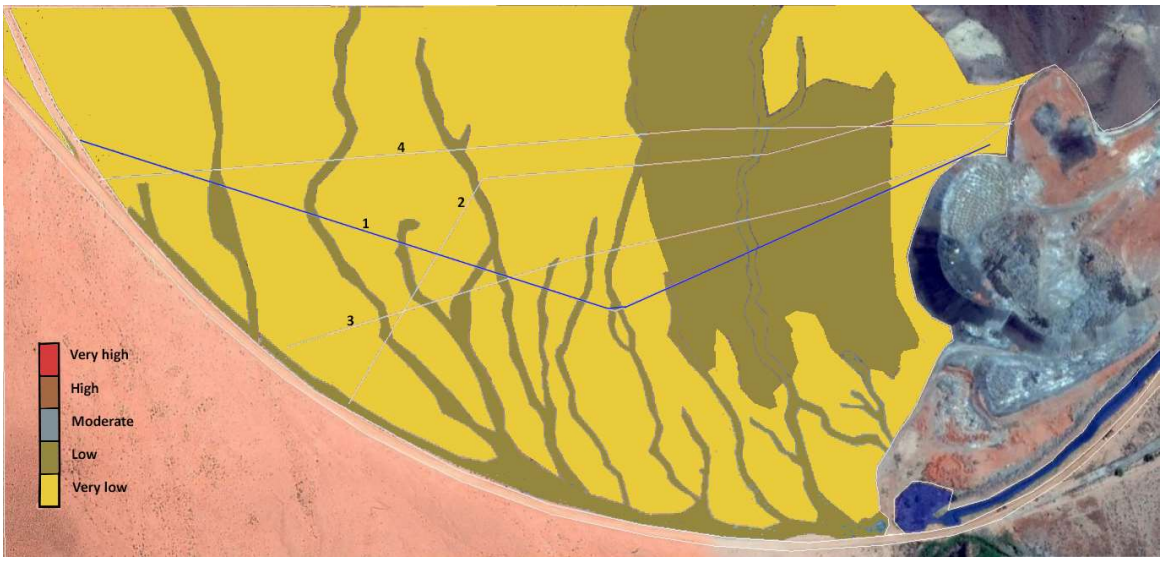

Figure 11: Vegetation sensitivity, selected alternative (1) and alternatives screened out (2-4)

Source: Ekotrust, 2018

Fauna

The site is located within the Mining Right Area with no farming activities and limited free roaming wildlife utilising the area. Considering the aridity of the area, fauna populations are relatively low, but with heterogeneity and diversity adapted to the harsh environments (Endemic Vision, 2017).

Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from literature and various spatial databases.

While detailed lists of faunal species are available in the Ecology Impact Assessment (see Appendix D), the below focusses on species of conservation concern that may occur in the site.

Mammals

The site falls within the distribution range of approximately 50 terrestrial mammal species, of which two are classified as '*vulnerable*' in terms of the International Union for Conservation of Nature (IUCN) red list of threatened species: Black-footed cat and Leopard. All others are categorised as either '*Near threatened*', '*Least concern'* or '*Data deficient*'.

Avifauna

Approximately 174 bird species are expected to occur in the region according to the bird distribution data obtained between 2007 and 2017 on the South African Bird Atlas 1 and 2 (SABAP1 & 2) (2017) (Ekotrust, 2018), of which three species are classified as '*vulnerable'* in terms of the IUCN red list of threatened species: Kori Bustard, White-backed Vulture and Ludwig's Bustard.

Reptiles

The site falls within / near the distribution range of at least 49 reptile species, which is indicative of a fairly high species diversity. One tortoise, 19 snake, 19 lizard and skink, one

chameleon and nine gecko species are likely to occur in the region (Todd, 2012). However, snakes are expected to be very rare in the exposed habitat of the site.

Amphibians

No amphibians are expected to occur on site due to the aridity of the area.

Invertebrates

Approximately nine scorpion species are expected to occur in the region.

Historical and Cultural Environment

In response to comments received from SAHRA during the public comment period, an archaeologist was appointed to conduct a survey of the site and its environs to determine if any heritage resources are located within the development footprint and to ground-truth the information presented in the draft BAR.

The study (included in Appendix E) concluded that no archaeological heritage resources were identified within the development footprint (CTS, 2019). Furthermore, and based on a desktop study, the bedrock underlying the property is unfossiliferous and of no palaeontological interest (Pether, 2012).

Socio-Economic Environment

Regional Context

The study area is located within the NDM, which includes the Local Municipalities (LMs) of Richtersveld, Nama Khoi, Kamiesberg, Hantam, Karoo Hoogland and Khâi-Ma (KLM). The NDM has the smallest population in the Northern Cape and the overall population density in the NDM is estimated at one person per square kilometre (NDM, 2012).

According to Census 2011 data available from Statistics South Africa (StatsSA), the NDM had a population of 115 842, more than 10 000 below the 2007 estimate (NDM, 2012), but more than in 2001. This indicates that the population has not grown as rapidly as anticipated, or declined between 2007 and 2011. Some 8.8% of the population reside in the KLM, 10.3% in the Richtersveld LM, 40.6% in the Nama Khoi LM, 18.6% in the Hantam LM, 10.8% in the Karoo Hoogland LM, and 10.7% in the Khâi-Ma LM (Census, 2011).

The NDM has an economic growth rate of 2.03% per annum, which is lower than the Northern Cape Province growth rate (2.4%) and is less than half of the national growth rate (5%) measured from 1996 to 2007. The NDM has an undiversified economy, heavily reliant on mining. Mining contributes approximately 52% to the Gross Geographic Product (GGP) (CNdV, 2012). In 2007, the Nama Khoi LM made the largest contribution to the GGP (41.7%), followed by the Richtersveld LM (17.3%) (NDM, 2012).

Mining and agriculture are the biggest employers in the NDM. Trade, catering and accommodation contribute 13% to the GGP, while the remaining sectors in total contribute less than 10%. The mining growth rate declined by 0.3% between 2001 and 2007, while trade, catering and accommodation (mainly tourism activities) have significantly increased their contribution to both GGP and employment in the NDM. The economy of NDM has diversified from a vulnerable economy with an over reliance on mining in 1995 to a more diversified economy with reliance on mining, community services and trade in 2007 (CNdV, 2012). However, the increase in the community services sector indicates increased dependence on social assistance within the NDM (NDM, 2012).

In 2001, 29 279 persons were employed and 11 663 were unemployed in the NDM, with a total (formal) labour force of 40 942 and an unemployment rate of 28% (CNdV, 2012).

According to StatsSA (2011), the unemployment rate in the NDM decreased to 20.1% in 2011. However, the NDM economy remains unable to absorb and employ the full complement of job market entrants and participants (CNdV, 2012).

The highest unemployment rate in 2011 was recorded for the Kamiesberg LM (30.8%) and the lowest was for the Hantam LM (11.8%). Unemployment declined most markedly in the Richtersveld LM, from 35.5% in 2001 to 18.6% in 2011, while in the Khâi-Ma LM unemployment increased from 15.3% in 2001 to 22.1% in 2011 (Census, 2011).

In 2011, 6.6% of the population in the NDM had no education, while the highest level of education for 18.8% of the population was matric, with 7.4% of the population having a tertiary education (StatsSA 2011). Indications are that qualified persons leave the NDM to seek work elsewhere due to the lack of suitable education facilities and employment opportunities in the NDM (NDM, 2012).

The IDP identifies economic development and job creation as one of the urgent developmental issues in the NDM (NDM, 2012).

The NDM is characterised by unique flora and several nature reserves are located in the area, including the Namaqua National Park. The unspoilt and sparsely inhabited environment make the NDM highly suitable for adventure tourism and outdoor recreational activities, including camping, fishing, hiking, mountain biking and star gazing. The area is also unique in terms of its historical and cultural heritage (Chidley et al., 2012). The potential for energy production, diamond mining and beneficiation, scientific research and development, mainly in the fields of astronomy and biodiversity, tourism and conservation initiates has also been identified. Development in the agricultural sector is challenging due to the scarcity of suitable land, poor transport networks and linkages to markets (CNdV, 2012).

Local Context

The population of the KLM is estimated to be ~12 465 people in 2011 (approximately 10.7% of the total population of the NDM). The municipality is sparsely populated (+/- 1 person/km^2) and most people are settled in its five (5) towns: Aggeneys, Onseepkans, Pella, Pofadder and Witbank.

Key socio-economic statistics for the municipality are shown in Table 7.

Table 7: Key socio-economic statistics

Key Statistics	
Total population	12,465
Young (0-14)	25,9%
Working Age (15-64)	68,6%
Elderly (65+)	5,5%
Dependency ratio	45,7
Gender (female: male) ratio	111,1
Growth rate	0,83% (2001-2011)
Population density	1 persons/km^2
Unemployment rate	22,1%
Youth unemployment rate	23,6%
No schooling aged 20+	3,9%
Higher education aged 20+	5,8%
Matric aged 20+	18,1%

Key Statistics	
Number of households	3,796
Number of Agricultural households	810
Average household size	3,2
Female headed households	34%
Formal dwellings	86,1%
Housing owned/paying off	46,6%
Flush toilet connected to sewerage	69%
Weekly refuse removal	75,6%
Piped water inside dwelling	45,5%
Electricity for lighting	89,6%

Source: StatsSA, 2011

The KLM contributes 8.8% towards the NDM's economy and 1.3% towards the province's economy (Urban Econ, 2016). The primary sector (predominantly mining and quarrying) contribute 67% towards the municipal Regional Gross Domestic Product (GDPR).

Mining and quarrying are the prominent industries within the primary sector and contribute 51%, whilst the agriculture industry contributes 15% to the overall economy.

The average household annual income in the KLM was R 99 144.00 in 2016. The Mine is the main source of income in KLM (Urban Econ, 2016).

b) Description of the current land uses

The site is located within the BMM Mining Right Area between the Swartberg shaft and the processing area. Beyond the Mining Right Area, the land use is predominantly grazing (sheep, cattle and goats), with evidence of historic bulk sampling and prospecting activities on some of the neighbouring farms (Endemic Vision, 2017).

c) Description of specific environmental features and infrastructure on the site

The key environmental features of the site are the dry drainage lines (see Photo1, Figure 12) that the new haul road will cross and Noeniepoort se kop north of the new haul road (see Photo 2, Figure 12).

Significant infrastructure includes the existing haul road south of the proposed new haul road (see Photo3, Figure 12), a powerline and water pipeline (see Photo4, Figure 12).

Photo 1: Rocky drainage line

Photo 2: Noeniepoort se kop

Photo 3: Existing haul road and weighbridge

Photo 4: Water pipeline and powerline

srk consulting	**Swartberg Haul Road BA** Specific Environmental Features and Infrastructure	Project No. 536396

Figure 12: Specific environmental features and infrastructure on the site

d) Environmental and current land use map

(Show all environmental, and current land use features)

Figure 10 illustrates environmental sensitivity and Figure 13 illustrates land cover.

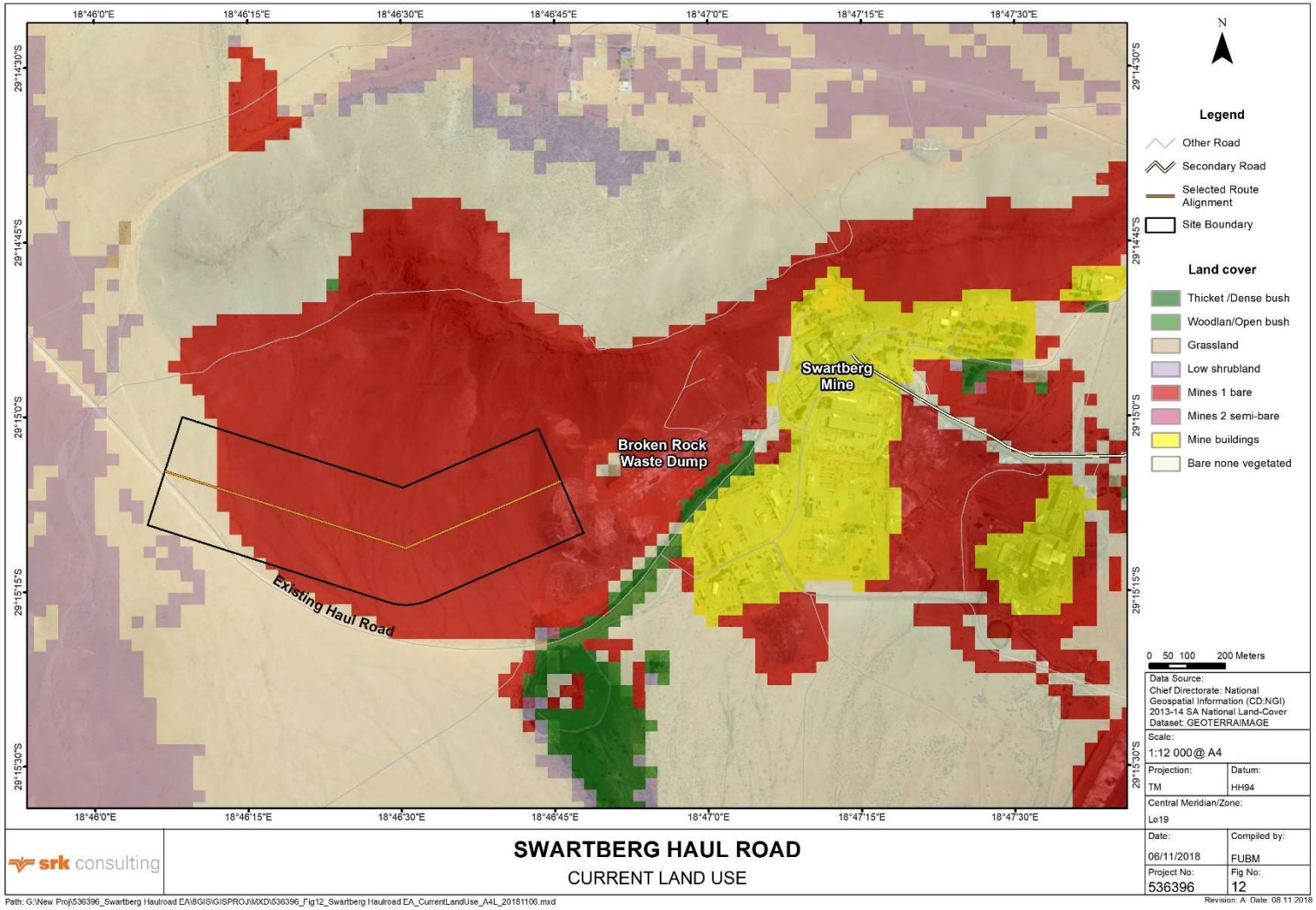

Figure 13: Current land use

v. Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

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

Based on the professional experience of the EAPs, legal requirements, the nature of the proposed activity, the nature of the receiving environment and issues raised in the stakeholder engagement process, the following key environmental issues – potential negative impacts and potential benefits – were identified:

- Soil and land capability – disturbance to the soil profiles and loss of land use and land capability;
- Air quality – impaired air quality from suspended particulates affecting receptors;
- Terrestrial ecology – potential loss of vegetation and protected plant species, and the potential loss of or disturbance to fauna and faunal habitats;
- Freshwater ecology – potential degradation of ephemeral drainage lines; and
- Heritage – potential loss of *heritage* resources during road construction.

Direct impacts associated with the Construction,Operational and Closure Phases of the project have been quantitatively assessed both with and without recommended mitigation measures. This was undertaken to assess significance according to the methodology laid out in Section 3(h)(vi).

Potential Soil and Land Capability Impacts

Assessment of Impacts: Construction Phase

The following potential direct Construction Phase impacts on the soil and land capability were identified:

- LC1: Soil Compaction caused by Construction Traffic; and
- LC2: Loss of Land Capability.

Potential Impact LC1: Soil Compaction caused by Construction Traffic

Repetitive movement of construction vehicles and machinery over exposed surfaces will compact the soil in the project footprint areas (i.e. the haul road and laydown areas), disturbing soil structure. Physical disturbance may increase the risk of erosion (by wind and stormwater) and may damage soil structure, reduce water infiltration rates and water retention capacity.

Soil compaction will be a long-term impact, but will be restricted to the proposed construction footprint areas.

The impact is assessed to be of ***very low*** significance with and without the implementation of mitigation (Table 8).

Table 8: Significance of soil compaction caused by construction traffic

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Short-term	Very low	Definite	**VERY LOW**	-ve	High
	1	1	1	5				
Essential mitigation measures: ▪ Restrict construction activities to the project footprint areas. ▪ Restrict vehicle movements to haul roads and laydown areas and prohibit vehicle parking or storage of construction materials outside these areas.								
With mitigation	Local	Low	Short-term	Very low	Probable	**VERY LOW**	-ve	High
	1	1	1	5				

This impact can be managed to a *moderate* degree, and is *reversible*.

Potential Impact LC2: Loss of Land Capability

The construction of the haul road will cause physical disturbance to the soil and compromise land capability.

Although the loss of land capability due to construction will convert to a long-term impact in the Operational Phase, the site is already in poor condition due to previous mining-related activities and heavy grazing, resulting in a very sparse vegetation cover. As such, the site has a low grazing capacity land capability and the change in land use will not cause any loss to agricultural production in the area.

The impact is assessed to be of ***low*** significance with and without the implementation of mitigation (Table 9).

Table 9: Significance of loss of land capability during construction

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term	Low	Definite	**LOW**	-ve	High
	1	1	3	5				
Essential mitigation measures: ▪ Restrict construction activities to the project footprint areas. ▪ Rehabilitate disturbed areas incrementally and as soon as possible, not necessarily waiting until completion of the Construction Phase.								
With mitigation	Local	Low	Long-term	Low	Probable	**LOW**	-ve	High
	1	1	3	5				

This impact can be managed to a *moderate* degree, and is *reversible*.

Assessment of Impacts: Operational Phase

The following potential direct Operational Phase impacts on soil and land capability were identified:

- LC3: Soil Erosion caused by Operational Activities;
- LC4: Soil Compaction caused by Hauling; and
- LC5: Loss of Land Capability.

Potential Impact LC3: Soil Erosion caused by Operational Activities

Soil erosion (by wind and stormwater) in areas cleared of natural vegetation reduces soil quality because of the loss of nutrient-rich topsoil and the reduced water-holding capacity of severely eroded soils.

Soil erosion can only be prevented as soil particles transported away by wind and water energy cannot be recovered.

The impact is assessed to be of ***low*** significance and with the implementation of mitigation is reduced to ***very low*** (Table 10).

Table 10: Significance of soil erosion caused by Operational activities

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term[1]	Low	Probable	**LOW**	-ve	High
	1	1	3	5				
Essential mitigation measures: ▪ Implement drainage control measures and install culverts or drifts to manage the natural flow of surface runoff from the haul road.								
With mitigation	Local	Low	Long-term	Low	Possible	**VERY LOW**	-ve	High
	1	1	3	5				

This impact can be managed to a *moderate* degree, and is *reversible*.

Potential Impact LC4: Soil Compaction caused by Hauling

Heavy vehicles continuously moving over the soil surface (e.g. hauling waste from Swartberg shaft to the WRD) will cover and damage / compact the soil.

The impact is assessed to be of ***low*** significance with and without the implementation of mitigation (Table 11).

Table 11: Significance of soil compaction caused by hauling during Operational activities

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term	Low	Definite	**LOW**	-ve	High
	1	1	3	5				
Essential mitigation measures: ▪ Restrict hauling to designated haul roads and no additional roads or turn-around areas should be created.								
With mitigation	Local	Low	Long-term	Low	Probable	**LOW**	-ve	High
	1	1	3	5				

This impact can be managed to a *moderate* degree, and is *reversible*.

Potential Impact LC5: Loss of Land Capability

Transport activities along the haul road will cause physical disturbance to the soil and compromise land capability.

The areas' very low grazing capacity / wilderness land capability and the change in land use will not cause any loss to agricultural production in the area. Land capability will be temporarily lost, but this impact is reversible with appropriate rehabilitation.

The impact is assessed to be of ***low*** significance with and without the implementation of mitigation measures (Table 12).

[1] BMM have confirmed that the current life of mine is 2022, but that projects are currently underway to extend this by 15 to 20 years. As such, SRK have assumed the worst-case scenario ("long-term") for the duration of Operational activities.

Table 12: Significance of loss of land capability during Operational activities

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term	Low	Definite	**LOW**	-ve	High
	1	1	3	5				
Essential mitigation measures: ▪ Restrict activities to the project footprint areas.								
With mitigation	Local	Low	Long-term	Low	Probable	**LOW**	-ve	High
	1	1	3	5				

This impact can be managed to a *high* degree, and is *reversible*.

Assessment of Impacts: Closure Phase

Impacts on soil and land capability are expected to occur primarily during the Construction and Operational Phases. No additional impacts are anticipated during the Closure Phase.

Potential Air Quality Impacts

Assessment of Impacts: Construction Phase

The following potential direct Construction Phase impact on air quality was identified:

- A1: Impaired air quality from suspended particulates affecting receptors.

Potential Impact A1: Impaired air quality from suspended particulates affecting receptors

Construction activities, particularly vegetation clearing and earthworks, are expected to generate dust in the construction area, temporarily affecting air quality in the area immediately surrounding the site. Emissions are also anticipated from vehicles and other equipment.

These activities are not expected to cause health impacts as emissions from vehicles and other equipment (including nitrogen oxides (NO_X), carbon dioxide (CO_2), carbon monoxide (CO) and volatile organic compounds (VOC)) are likely to be very low, and will be limited in extent and duration.

Increased dust deposition could potentially harm physiological processes of plants and a reduction in the photosynthetic capacity of plants. However, the dust levels are not likely to exceed normal dust levels associated with construction activities and will be limited in extent and duration.

The increase in dust from construction activities is unlikely to be noticeable to off-site receptors.

The impact is assessed to be of ***Very Low*** significance without mitigation and ***insignificant*** with the implementation of mitigation measures (see Table 13).

Table 13: Significance of impaired air quality from suspended particulates affecting receptors during construction

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Short-term	Very Low	Definite	**VERY LOW**	-ve	High
	1	1	1	3				
Essential Mitigation Measures: ▪ Implement existing dust suppression measures at the Mine on access roads.								
With mitigation	Local	Low	Short-term	Very Low	Possible	**INSIGNIFICANT**	-ve	High
	1	1	1	3				

This impact can be managed to a *high* degree, and is *reversible*.

Assessment of Impacts: Operational Phase

The following potential direct Operational Phase impact on air quality was identified:

- A2: Increased Dustfall Associated with Hauling Activities

Potential Impact A2: Increased Dustfall Associated with Hauling Activities

Particulate emissions (e.g. dust) entrained from exposed soils (sparse vegetation) by the movement of vehicles over unpaved areas contribute to elevated dust levels.

The area is rural, the site is remote, and no sensitive air quality receptors are located in close proximity to the site.

The impact is assessed to be of ***very low*** significance with and without the implementation of mitigation (Table 14).

Table 14: Significance of increased dustfall associated with hauling activities

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Medium-term	Very Low	Probable	**VERY LOW**	-ve	High
	1	1	2	4				
Essential mitigation measures: ▪ Implement existing dust suppression measures at the Mine on access roads.								
With mitigation	Local	Low	Medium-term	Very Low	Probable	**VERY LOW**	-ve	High
	1	1	2	5				

This impact can be managed to a *high* degree, and is *reversible*.

Assessment of Impacts: Closure Phase

Impacts on air quality during the Closure Phase are anticipated to be the same as the Construction Phase impacts.

Potential Terrestrial Ecology Impacts

Assessment of Impacts: Construction Phase

The following potential direct Construction Phase impacts on terrestrial ecology were identified:

- T1: Loss of Vegetation;
- T2: Loss of Threatened Floral Species; and
- T3: Disturbance to Terrestrial Fauna and Loss of Habitat.

This section is largely informed by the Ecology Impact Assessment (see Appendix D). It should, be noted, however, that SRK has rated some impacts slightly lower than the ecology specialist. This is largely due to different impact rating methodologies and a different interpretation of the spatial extent of the impact. SRK believes that the specialist over emphasises the impact at the project footprint extent rather than considering the impact in the context of the overall site, thereby increasing the probability rating.

Potential Impact T1: Loss of Vegetation

The proposed haul road will traverse two vegetation types: Bushmanland Sandy Grassland and Aggeneys Gravel Vygieveld. Both vegetation types are listed as '*Least Threatened*' since habitats of both vegetation types are intact, i.e. more than 80% of the vegetation type is adequately conserved in parks and reserves. Furthermore, overall sensitivity of all plant communities on site are assessed to be *low* to *very low*.

Construction activities anticipated to lead to a loss of indigenous vegetation include the construction / clearing of the new haul road.

The clearing required for the new haul road will affect vegetation that are well conserved and with '*Least Threatened'* conservation status. Therefore, and provided that the site has low to very low sensitivity, clearing required for the project will be easily sustainable on a regional scale. The loss of the vegetation may, however, cause a loss of protected and endemic species and potentially result in the proliferation of alien species (Ekotrust, 2018).

The impact is assessed to be of ***low*** significance without mitigation and ***very low*** significance with the implementation of mitigation measures (see Table 15).

Table 15: Significance of loss of vegetation

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term	Low	Probable	**LOW**	-ve	High
	1	1	3	5				
Essential Mitigation Measures: ▪ Limit vegetation clearance and the footprint of construction activities to what is absolutely essential. ▪ Define all areas outside of the planned project and construction footprint as no-go areas.								
With mitigation	Local	Low	Long-term	Low	Possible	**VERY LOW**	-ve	High
	1	1	3	5				

This impact can be managed to a *moderate* degree, and is *reversible*.

Potential Impact T2: Loss of Threatened Floral Species

The site survey indertaken by the ecologist revealed the presence of one ToPS, *Aloidendron dichotomum*, which is listed as *"vulnerable"* in terms of the IUCN Red List, however, this is located at least 50 m north of the selected route and will not be displaced on account of construction activities.

Although no threatened floral species were observed within the project footprint during the site inspection by the ecologist, this may be strongly influenced by the season in which the survey was carried out, i.e. the survey was conducted during the dry season (October 2018) and most bulbous and summer annual plant species were not present. Consequently, the number of these plant species encountered is probably an underestimate of the number of species which could potentially occur on site.

Despite the above, many protected and endemic species were recorded and some individuals of these species will be destroyed by the proposed road.

The impact is assessed to be of ***low*** significance without mitigation and ***very low*** significance with the implementation of mitigation measures (Table 16).

Table 16: Significance of loss of threatened floral species during construction

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term	Low	Probable	**LOW**	-ve	Medium
	1	1	3	5				
Essential Mitigation Measures: ▪ Limit vegetation clearance and the footprint of construction activities to what is absolutely essential. ▪ Define all areas outside of the planned project and construction footprint as no-go areas.								
With mitigation	Local	Low	Long-term	Low	Possible	**VERY LOW**	-ve	Medium
	1	1	3	5				

This impact can be managed to a *moderate* degree, and is *irreversible*.

Potential Impact T3: Disturbance to Terrestrial Fauna and Loss of Habitat

The sandy to sandy loam soils on site are suitable in places for burrowing animals such as aardvarks and ground squirrels. The prominent mountains, rocky outcrops and ridges surrounding the site are suitable for many wildlife species of rocky habitats.

It is typical that faunal species will be disturbed due to habitat (vegetation) loss. This may also alter bahavioural patterns of some animals.

Aspects of the construction of project that are anticipated to lead to disturbance to terrestrial fauna and loss of habitat are as follows:

- Disturbance and removal of vegetation (habitats);
- Increased noise levels due to increased human presence and / or construction activities;
- Compaction of soils that may alter behavioural patterns; and
- Increased vehicle traffic that could pose an increased collision risk for slow-moving fauna (snakes and tortoises).

The habitat on site is fairly homogeneous with little variation. The project footprint (~0.96 ha) is a relatively small area in relation to the wider study area and available habitat and the construction of the haul road is unlikely to have a significant impact on the broader faunal species richness in the area (Ekotrust, 2018).

The impact is assessed to be of ***low*** significance without mitigation and ***very low*** significance with the implementation of mitigation measures (Table 17).

Table 17: Significance of disturbance to terrestrial fauna and loss of habitat during construction

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term	Low	Probable	**LOW**	-ve	High
	1	1	3	5				
Essential mitigation measures: ▪ Limit vegetation clearance and the footprint of construction activities to the minimum required. ▪ Confine construction vehicles and staff to designated roadways and construction areas and strictly prohibit the indiscriminate movement of construction vehicles and staff through vegetation outside of the construction footprint. ▪ Limit vehicle speeds on internal and haul roads to 40 km/hr during construction. ▪ Conduct environmental induction for all construction staff to increase awareness in fauna protection. ▪ Prohibit trapping, collecting and hunting of fauna. ▪ Usher any faunal species within the construction footprint towards more suitable habitat within the surrounding areas. Threatened fauna should be relocated by a suitably qualified environmental officer. ▪ Prohibit construction activities and driving at night. ▪ Limit soil compaction to the minimum required. ▪ Immediately clean up spills and dispose of contaminated soil at a licensed waste disposal facility. ▪ Do not leave trenches open for extended periods.								
With mitigation	Local	Low	Long-term	Low	Possible	**VERY LOW**	-ve	High
	1	1	3	5				

This impact can be managed to a *high* degree, and is *irreversible*.

Assessment of Impacts: Operational Phase

The following potential direct operational phase impacts on terrestrial ecology were identified:

- T4: Increased faunal mortalities.

Potential Impact T4: Increased faunal mortalities

Faunal mortalities may be caused by collisions with heavy and maintenance vehicles, increased human activity and litter. Slow-moving species such as tortoises may be particularly prone to vehicle collision mortalities.

The raised powerline may marginally increase the probability of avifaunal collisons and mortalities associated with the powerline. Species most heavily affected are heavy-bodied birds with limited manoeuvrability such as bustards, storks, cranes and various species of waterbirds (CvR, 2017).

The impact is assessed to be of ***very low*** significance with and without the implementation of mitigation measures (Table 18).

Table 18: Significance of increased terrestrial mortalities during Operational activities

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term	Low	Possible	**VERY LOW**	-ve	Medium
	1	1	3	5				
Essential Mitigation Measures: ▪ Train staff to increase awareness of environmental concerns. ▪ Limit night driving as far as possible to minimize negative effects on nocturnal animals. ▪ Enforce speed limits on site.								
With mitigation	Local	Low	Long-term	Low	Improbable	**VERY LOW**	-ve	Medium
	1	1	3	5				

This impact can be managed to a *high* degree, and is *irreversible*.

Assessment of Impacts: Closure Phase

Impacts on terrestrial ecology during the Closure Phase are anticipated to be the same as the Construction Phase impacts.

Freshwater Ecology Impacts

Assessment of Impacts: Construction Phase

The following potential direct Construction Phase impact on freshwater ecology was identified:

- FE1: Degradation of Ephemeral Drainage Lines

This section is largely informed by the Ecology Impact Assessment (see Appendix D). It should, be noted, however, that SRK has rated the impact slightly lower than the ecology specialist. This is largely due to different impact rating methodologies and a different interpretation of the spatial extent of the impact. SRK believes that the specialist over emphasises the impact at the project footprint extent rather than considering the impact in the context of the overall site, thereby increasing the probability rating.

Potential Impact FE1: Degradation of Ephemeral Drainage Lines

Elevan ephemeral drainage lines were identified traversing the proposed haul road route. The project would entail the installation of eleven (pre-cast) cement culverts and / or construction of low-level drift crossings across the beds of the affected drainage lines and increased vehicle movement over these culverts during construction activities.

Construction activities are anticipated to lead to the following disturbances to drainage lines:

- Physical disturbance from construction such as:
  - Infilling of drainage line margins;
  - Clearing of vegetation (discussed above);
  - Compaction from trampling and vehicles;
  - Creation of tracks and scour holes; and
  - Loss and removal of topsoil;

- Temporary diversion of flows from the creation of tracks and scour holes, vegetation clearing and compaction; and
- Contamination (from e.g. cement and hydrocarbons).

Although the condition of all the affected drainage lines is assessed to be of a mostly natural, unmodified condition the drainage lines are not ecologically important and sensitive (unique) at any scale.

The drainage lines are considered to be of *low* to *very low* ecological sensitivity, indicating low to very low sensitivity changes in flows and physical disturbance.

The impact is assessed to be of ***very low*** significance with and without the implementation of mitigation measures (Table 19).

Table 19: Significance of degradation of drainage lines during construction

	Extent	*Intensity*	*Duration*	*Consequence*	*Probability*	*Significance*	*Status*	*Confidence*
Without mitigation	Local	Low	Long-term	Low	Possible	**VERY LOW**	-ve	High
	1	1	3	5				
Essential Mitigation Measures: ▪ Construct new watercourse crossings during dry conditions only, and when no rainfall is forecast. ▪ Appoint a suitably qualified engineer to design and supervise the correct installation of all culverts and drfits. ▪ Limit the footprint area of the construction activity to what is absolutely essential. ▪ Define all areas outside of the planned project and construction footprint (including roads and walking routes) as no-go areas. ▪ Close and rehabilitate erosion gullies as they form.								
With mitigation	Local	Low	Long-term	Low	Improbable	**VERY LOW**	-ve	High
	1	1	3	5				

This impact can be managed to a *high* degree, and is *reversible*.

Assessment of Impacts: Closure Phase

Impacts on freshwater ecology during the Closure Phase are anticipated to be the same as the Construction Phase impacts.

Potential Heritage Impacts

Assessment of Impacts: Construction Phase

One potential Construction Phase impact on the *heritage* resources of the area was identified:

- H1: Loss of *heritage* resources during road construction.

Potential Impact H1: Loss of heritage resources during road construction

Building the new haul road may disturb buried *heritage* resources.

An archaeologist was appointed to conduct a survey of the site and its environs to determine if any heritage resources are likely to be impacted by the proposed development and to ground-truth the information contained in the draft BAR.

The study (included in Appendix E) concluded that no archaeological heritage resources were identified within the development footprint (CTS, 2019). Furthermore, and based on a desktop study, the bedrock underlying the property is unfossiliferous and of no palaeontological interest (Pether, 2012).

It is, *however,* not possible to predict the condition or quantity of material that may be found *underground* (if any) *and as such, SRK has assessed the potential impact on heritage resources conservatively.*

The impact is assessed to be of ***low*** significance without mitigation and ***very low*** significance with the implementation of mitigation measures (Table 20).

Table 20: Significance of loss of *heritage* resources during road construction

	Extent	Intensity	Duration	Consequence	Probability	Significance	Status	Confidence
Without mitigation	Local	Low	Long-term	**Low**	Possible	**LOW**	– ve	Medium
	1	1	3	**5**				
Essential mitigation measures: • Limit clearance and the footprint of construction activities to what is absolutely essential. • Alert personnel to possibility of finding historical resources and follow "Chance Finds Procedure". • *Implement all heritage management measures contained in the Mine's approved EMP (including chance and fossil finds procedures).* • *Notify SAHRA APM Unit of any heritage resource discoveries (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations).* • *Notify SAHRA Burial Grounds and Graves Unit if any unmarked human burials are uncovered.* • *Appoint a professional archaeologist or palaeontologist, depending on the nature of the finds, to inspect any findings as soon as possible after discovery. 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.*								
With mitigation	Local	Low	Long-term	**Low**	Improbable	**VERY LOW**	– ve	Medium
	1	1	3	**5**				

This impact can be managed to a *high* degree, and is *irreversible*.

Assessment of Impacts: Closure Phase

Impacts on *heritage* resources during the Closure Phase are anticipated to be the same as the Construction Phase impacts.

The No-Go Alternative

The No-Go alternative implies that the haul road will not be constructed and the road safety at the mine will not be improved, and haul distances not optimised. This will inhibit future development at the Mine. In other words, the benefit of increased road safety and haul distance optimisation will be forgone.

As a number of protected plant species and drainage lines occur on the site, biophysical impacts associated with the project would not materialise if the project does not proceed.

vi. Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

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

The assessment of impacts was based on specialists' expertise, SRK's professional judgement, field observations and desk-top analysis.

The significance of potential impacts that may result from the proposed project was determined in order to assist decision-makers (typically by a designated competent authority or state agency, but in some instances, the applicant).

The **significance** of an impact is defined as a combination of the **consequence** of the impact occurring and the **probability** that the impact will occur.

The criteria used to determine impact consequence are presented in the table below.

Table 21: Criteria used to determine the consequence of the impact

Rating	Definition of Rating	Score
A. *Extent* *– the area over which the impact will be experienced*		
Local	The site (i.e. 300 m corridor on either side of the selected route) and immediate surrounds	1

Regional	The region (Municipality or catchment)	2
(Inter) national	Nationally or beyond	3
B. ***Intensity***– *the magnitude of the impact in relation to the sensitivity of the receiving environment, taking into account the degree to which the impact may cause irreplaceable loss of resources*		
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. ***Duration***– *the timeframe over which the impact will be experienced and its reversibility*		
Short-term	Up to 2 years and reversible	1
Medium-term	2 to 15 years and reversible	2
Long-term	More than 15 years and irreversible	3

The combined score of these three criteria corresponds to a **Consequence Rating**, as follows:

Table 22: Method used to determine the consequence score

***Combined Score* (A+B+C)**	3 – 4	5	6	7	8 – 9
Consequence Rating	Very low	Low	Medium	High	Very high

Once the consequence was derived, the probability of the impact occurring was considered, using the probability classifications presented in the table below.

Table 23: Probability classification

Probability– *the likelihood of the impact occurring*	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall **significance** of impacts was determined by considering consequence and probability using the rating system prescribed in the table below.

Table 24: Impact significance ratings

		Probability			
		Improbable	Possible	Probable	Definite
Consequence	Very Low	**INSIGNIFICANT**	**INSIGNIFICANT**	**VERY LOW**	**VERY LOW**
	Low	**VERY LOW**	**VERY LOW**	**LOW**	**LOW**
	Medium	**LOW**	**LOW**	**MEDIUM**	**MEDIUM**
	High	**MEDIUM**	**MEDIUM**	**HIGH**	**HIGH**
	Very High	**HIGH**	**HIGH**	**VERY HIGH**	**VERY HIGH**

Finally the impacts were also considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The prescribed system for considering impacts status and confidence (in assessment) is laid out in the table below.

Table 25: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a 'benefit')
	– ve (negative – a 'cost')
Confidence of assessment	
The degree of confidence in predictions based on available information, SRK's judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **INSIGNIFICANT**: the potential impact is negligible and **will not** have an influence on the decision regarding the proposed activity/development.
- **VERY LOW**: the potential impact is very small and **should not** have any meaningful influence on the decision regarding the proposed activity/development.
- **LOW**: the potential impact **may not** have any meaningful influence on the decision regarding the proposed activity/development.
- **MEDIUM**: the potential impact **should** influence the decision regarding the proposed activity/development.
- **HIGH**: the potential impact **will** affect the decision regarding the proposed activity/development.
- **VERY HIGH**: The proposed activity should only be approved under special circumstances.

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

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

BMM owns Portion 4, Farm Zuurwater No 62, the property on which the Mine and proposed haul road is located. The new haul road will be located within the Mining Right Area.

The locations of the Swartberg shaft and the WRD are fixed, which dictates the possible haul road route (between the two) (and therefore location / layouts). The motivation for the new haul road is two-fold: it will improve road safety at the Mine and reduce haul distances, thus maximising operational efficiency.

BMM proposed four route alternatives for the haul road. The selected route alternative (in red in Figure 4) was determined based on safety and design (e.g. steep slopes, fill material requirements, etc.) considerations. The terrain along the selected route is less undulating and rocky for most of the route, especially in the western section. BMM does not consider the other route alternatives to be feasible based on the financial and engineering input that will be required to address the safety and design considerations for the other route alternatives.

Upon assessment of the four layout alternatives, the ecology specialist confirmed that the selected alternative was acceptable from an ecological perspective. This layout was selected for assessment and no other layout alternatives were assessed.

viii. The possible mitigation measures that could be applied and the level of risk

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

A public comment period is currently underway and will end on 18 January 2019. Comments received on the BAR will be collated into an Issues and Responses Summary which will be appended to the Final BAR to be submitted to the DMR for decision making.

Refer to Section 3(h)(v) for the identified impacts, the key mitigation / optimisation measures and the significance rating without and with mitigation.

ix. Motivation where no alternative sites were considered

Refer to Section 3(h)(vii)i.

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

(Provide a statement motivating the final site layout that is proposed)

The existing location of Swartberg mine relative to the RWD limits the ore and rock waste movement to a long, narrow corridor. The steep slopes to the north of the site, and reedbeds to the southeast of the site further restricts the area that can be considered.

BMM proposed four route alternatives for the haul road. The selected route alternative (in red in Figure 4) was determined based on safety and design (e.g. steep slopes, fill material requirements, etc.) considerations. The terrain along the selected route is less undulating and rocky for most of the route, especially in the western section. BMM does not consider the other route alternatives to be feasible based on the financial and engineering input that will be required to address the safety and design considerations for the other route alternatives.

Upon assessment of the four layout alternatives, the ecology specialist confirmed that the selected alternative was acceptable from an ecological perspective. This layout was selected for assessment and no other layout alternatives were assessed.

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

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

An Ecology Impact Assessment was undertaken as part of the BA process to investigate the key potential ecology issues and impacts identified. These key issues and impacts have been identified based on:

- The legal requirements;
- The nature of the proposed activity;
- The nature of the receiving environment; and
- The professional experience of the EIA team.

The Ecology Impact Assessment and ***Heritage Study*** is attached as Appendices D to E of this report. Soil and land capability, air quality and socio-economic impacts were assessed by experienced EAPs and SRK specialists, and stand-alone specialist studies were not considered necessary.

The significance of the identified impacts is assessed using SRK's proven impact rating methodology [see Section 3(h)(vi)]. Practicable mitigation and optimisation measures are recommended and impacts are rated in the prescribed way both without and with the assumed effective implementation of mitigation and optimisation measures.

j) Assessment of each identified potentially significant impact and risk

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

Table 26 below summarises the potentially significant impacts and their significance ratings before and after application of mitigation and/or optimisation measures. The supporting impact assessment conducted by the ecology specialist is included in Section 3(h)(v).

Table 26: Summary of potential impacts

Potential negative impacts are shaded in reds, benefits are shaded in greens. Insignificant impacts have not been shaded. Only key (non-standard essential) mitigation / optimisation measures are presented.

ID #	Impact	Significance rating		Key mitigation/optimisation measures
		Before mitigation/ optimisation	After mitigation/ optimisation	
CONSTRUCTION PHASE IMPACTS				
LC	**Impacts on Soil and Land Capability**			
LC1	Soil compaction caused by construction traffic	Very Low	Very Low	• Restrict construction activities to the project footprint areas. • Restrict vehicle movements to haul roads and laydown areas and prohibit vehicle parking or storage of construction materials outside these areas.
LC2	Loss of land capability	Low	Low	• Restrict construction activities to the project footprint areas. • Rehabilitate disturbed areas incrementally and as soon as possible, not necessarily waiting until completion of the Construction Phase.
A	**Impacts on Air Quality**			
A1	Impaired air quality from suspended particulates affecting receptors	Very Low	Insignificant	• Implement dust suppression measures on access roads.
T	**Impacts on Terrestrial Ecology**			
T1	Loss of vegetation	Low	Very Low	• Limit vegetation clearance and the footprint of construction activities to what is absolutely essential. • Define all areas outside of the planned project and construction footprint as no-go areas. • Demarcate construction footprints and restrict access beyond these areas.
T2	Loss of threatened floral species	Low	Very Low	• Limit vegetation clearance and the footprint of construction activities to what is absolutely essential. • Define all areas outside of the planned project and construction footprint as no-go areas. • Demarcate construction footprints and restrict access beyond these areas.

ID #	Impact	Significance rating		Key mitigation/optimisation measures
		Before mitigation/ optimisation	After mitigation/ optimisation	
T3	Disturbance to terrestrial fauna and loss of habitat during construction	Low	Very Low	• Limit vegetation clearance and the footprint of construction activities to the minimum required. • Confine construction vehicles and staff to designated roadways and construction areas and strictly prohibit the indiscriminate movement of construction vehicles and staff through vegetation outside of the construction footprint. • Limit vehicle speeds on internal and haul roads to 40 km/hr during construction. • Conduct environmental induction for all construction staff to increase awareness in fauna protection. • Prohibit trapping, collecting and hunting of fauna. • Usher any faunal species within the construction footprint towards more suitable habitat within the surrounding areas. Threatened fauna should be relocated by a suitably qualified environmental officer. • Prohibit construction activities and driving at night. • Limit soil compaction to the minimum required. • Immediately clean up spills and dispose of contaminated soil at a licensed waste disposal facility. • Do not leave trenches open for extended periods.
FE	**Impacts on Freshwater Ecology**			
FE1	Degradation of ephemeral drainage lines	Very Low	Very Low	• Construct new watercourse crossings / culverts during dry conditions only, and when no rainfall is forecast.. • Appoint a suitably qualified engineer to design and supervise the correct installation of all culverts. • Limit the footprint area of the construction activity to what is absolutely essential. • Define all areas outside of the planned project and construction footprint (including roads and walking routes) as no-go areas. • Close and rehabilitate erosion gullies as they form. • Ensure that construction-associated waste (e.g. plastic, rubble) is disposed of appropriately on a frequent and ongoing basis. • Ensure that vehicle and machinery refuelling is managed to minimise pollution opportunities.
H	**Impacts on Heritage**			
H1	Loss of *heritage* resources during road construction	Low	Very Low	• Limit clearance and the footprint of construction activities to what is absolutely essential. • Alert personnel to possibility of finding historical resources and follow "Chance Finds Procedure". • *Implement all heritage management measures contained in the Mine's approved EMP (including fossil finds procedures).* • *Notify SAHRA APM Unit of any heritage resource discoveries (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations).* • *Notify SAHRA Burial Grounds and Graves Unit if any unmarked human burials are uncovered.* • *Appoint a professional archaeologist or palaeontologist, depending on the nature of the finds, to inspect any findings as soon as possible after discovery. 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.*
OPERATIONAL PHASE IMPACTS				
LC	**Impacts on Soil and Land Capability**			
LC3	Soil erosion caused by operational activities	Low	Very Low	• Undertake vegetation clearance and soil stripping immediately prior to construction activities. • Implement drainage control measures and install culverts to manage the natural flow of surface runoff from the haul road.

ID #	Impact	Significance rating		Key mitigation/optimisation measures
		Before mitigation/ optimisation	After mitigation/ optimisation	
LC4	Soil compaction caused by hauling	Low	Low	• Restrict hauling to designated haul roads and no additional roads or turn-around areas should be created.
LC5	Loss of land capability	Low	Low	• Restrict activities to the project footprint areas.
A	**Impacts on Air Quality**			
A2	Increased Dustfall Associated with Hauling Activities	Very Low	Very Low	• Implement existing dust suppression measures at the Mine on access roads.
FE	**Impacts on Freshwater Ecology**			
FE2	Degradation of ephemeral drainage lines	Very Low	Very Low	• Inspect watercourses annually during routine maintenance and report on evidence of erosion at crossings. • Respond to reports of erosion by closing gullies and reshaping and revegetating river.
T	**Impacts on Terrestrial Ecology**			
T4	Loss of vegetation	Very Low	Very Low	• Limit vegetation clearance, pruning and the footprint of maintenance activities to what is absolutely essential; • Restrict driving to the disturbance footprint of the haul road; • Appoint a suitably qualified engineer to design and supervise the correct installation of all culverts.
T5	Increased faunal mortalities	Very Low	Very Low	• Train staff to increase awareness of environmental concerns. • Limit night driving as far as possible to minimize negative effects on nocturnal animals. • Enforce speed limits on site.
CLOSURE PHASE IMPACTS				
A	**Impacts on Air Quality**			
	Same as Construction Phase impacts			
T	**Impacts on Terrestrial Ecology**			
	Same as Construction Phase impacts			
FE	**Impacts on Freshwater Ecology**			
	Same as Construction Phase impacts			
H	**Impacts on Heritage**			
	Same as Construction Phase impacts			

k) Summary of specialist reports.

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

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
Ecology Impact Assessment	**Construction Phase**		
	• Confine vegetation clearance to the footprint of the proposed haul road and avoid unnecessary clearance.	X	Chapter 9 of the Ecology Impact Assessment
	• Install culverts or pipe at all drainage line crossings to allow the natural functioning of the watercourses.		
	• Appoint a suitably qualified person to plan, design and supervise the correct construction of the road and culverts to minimize the impact on the environment.		
	• Confine soil compaction and levelling to the footprint of the proposed haul road.		
	• Design roads to reduce the risk of erosion.		
	• Wet roads regularly to control dust generation. Other suitable dust control mitigation measures can also be considered.		
	• Adhere to SANS noise standards.		
	• Prohibit construction at night.		
	• Staff must undergo environmental awareness training to increase their awareness of environmental concerns. All construction contractors and crew should attend and pass an induction course. Although road kills cannot be avoided, the increased awareness of drivers should be able to reduce the number of fatalities.		
	• Limit night driving.		
	• Enforce speed limits on all roads on site.		
	• Implement a monitoring program for the early detection of alien invasive plant species and a control program to combat declared alien invasive plant species should be employed.		
	• No alien species should be used in rehabilitation.		
	Operational Phase		

	• Avoid vegetation clearance wherever possible and avoid new areas.	X	Section 3(h)(v)
	• Restrict driving to designated roads.		
	• Staff must undergo environmental awareness training to increase their awareness of environmental concerns. All construction contractors and crew should attend and pass an induction course. Although road kills cannot be avoided, the increased awareness of drivers should be able to reduce the number of fatalities.		
	• Limit night driving.		
	• Enforce speed limits on all roads on site.		
	• Maintain the haul road.		
	• Implement a monitoring program for the early detection of alien invasive plant species and a control program to combat declared alien invasive plant species should be employed.		
	• No alien species should be used in rehabilitation.		
Heritage Study	*No recommendations made.*		

Attach copies of Specialist Reports as appendices

I) Environmental impact statement

i. Summary of the key findings of the environmental impact assessment;

The proposed haul road will entail so-called triple bottom line costs, i.e. social, environmental and economic costs. The triple bottom line concerns itself with environmental (taken to mean biophysical) sustainability, social equity and economic efficiency and is typically employed by companies seeking to report on their performance. The concept serves as a useful construct to frame the evaluation of environmental impacts of the project.

The challenge for DMR is to take a decision which is sustainable in the long term and which will probably entail trade-offs between social, environmental and economic costs and benefits. The trade-offs are documented in the report, which assesses environmental impacts and benefits and compares these to the No-Go alternative. SRK believes it will be instructive to reduce the decision factors to the key points which the authorities should consider. These points constitute the principal findings of the BA:

- BMM owns and operates the Black Mountain Mine near the town of Aggeneys in the Northern Cape. The mine holds a Mining Licence (ML2/99), covering an extent of 9,505.7 ha, and an approved EMPr to conduct mining activities at the Mine.
- BMM proposes to construct a new haul road from the top of the WRD to an area near the weighbridge (adjacent to onthe existing haul road). The new haul road will be 8 m wide to allow for 2-way truck traffic and ~ 1.2 km long.
- The new haul road will be located within the Mining Right Area between the Swartberg shaft and processing area, north of an existing haul road.
- The purpose of the project is to alleviate traffic and safety concerns at the existing haul road intersection at the processing area, and to optimise haul distances between the Swartberg shaft and the WRD.
- Key aspects of the project include the construction of a new haul road, establishment of laydown areas within the existing disturbed footprint of the weighbridge area and WRD, installation of 11 cement culverts and / or drifts, and the raising of an existing powerline to ensure heavy vehicles can pass safely beneath.
- BMM considered four haul road route alignments for the proposed haul road. The selected route alternative was determined based on safety and design (e.g. steep slopes, fill material requirements, etc.) considerations. Only the selected route has been presented as feasible to BMM.
- The haul road will cross 11 ephemeral drainage lines. The condition of all the affected drainage lines is assessed to be of a mostly natural, unmodified condition, but the drainage lines are not ecologically important or sensitive (unique) at any scale.
- An ecology specialist and the EAP undertook detailed screening of the study area to assess baseline conditions.
- *An archaeologist was appointed to conduct a survey of the site and its environs to determine if any heritage resources are likely to be impacted by the proposed development. The study concluded that no archaeological heritage resources were identified within the development footprint. Furthermore, and based on a desktop study, the bedrock underlying the property is unfossiliferous and of no palaeontological interest.*
- Potential environmental aspects considered include soil and land capability, air quality, terrestrial ecology and freshwater.

- Key ecological impacts are associated with a loss in vegetation and the degradation of ephemeral drainage lines. These impacts are mitigated to acceptable levels through the strict implementation of the EMPr.
- The No-Go alternative implies that the haul road will not be constructed and the road safety at the mine will not be improved, and haul distances not optimised. This will inhibit future development at the Mine. In other words, the benefit of increased road safety and haul distance optimisation will be forgone.
- A number of mitigation and monitoring measures have been identified to avoid, minimise and manage potential environmental impacts associated with the proposed development. These are further laid out in the EMPr.

ii. Final Site Map

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

The specialists did not identify any specific areas of high sensitivity within the proposed haul footprint that should be designated as “exclusion zones” (see Figure 10).

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

Refer to Section 3(J) for a summary of the positive and negative impacts of the proposed activity.

m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

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

The purpose of the EMPr is to demonstrate how environmental management and mitigation measures will be implemented to ensure that potential environmental pollution and degradation can be minimised, if not prevented. The EMPr guides construction and operational activities and provides a framework for the ongoing assessment of environmental performance.

The objectives of the EMPr are to:

- Ensure compliance with regulatory authority stipulations and guidelines;
- Ensure sufficient allocation of resources;
- Verify environmental performance;
- Respond to changes in project implementation not considered in the EIA;
- Respond to unforeseen events; and
- Provide feedback for continual improvement in environmental performance.

n) Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation

All identified management and mitigation measures included in the EMPr.

o) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

As is standard practice, the report is based on several assumptions and is subject to certain limitations. These are as follows:

- Information provided by BMM, other consultants and specialists is assumed to be accurate and correct;
- SRK's assessment of the significance of impacts of the proposed development on the affected environment has been based on the assumption that the activities will be confined to those described in Section 3 (d);
- Where detailed design information is not available, the precautionary principle, i.e. a conservative approach that overstates negative impacts and understates benefits, has been adopted; and
- A once-off ecology survey was conducted during the dry season (October 2018) and most bulbous and summer annual plant species are unlikely to occur during this time of year. Consequently, the number of these plant species encountered and reported on in the Ecology Impact Assessment is likely to be an underestimate of the number of species which could potentially occur on site.

Notwithstanding the above, SRK is confident that these assumptions and limitations do not compromise the overall findings of the report.

p) Reasoned opinion as to whether the proposed activity should or should not be authorised

i. Reasons why the activity should be authorized or not.

This draft BAR has identified and assessed the potential biophysical and socio-economic impacts associated with the new haul road at the Mine.

In terms of Section 31 (n) of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section, a qualified opinion is ventured, and in this regard SRK believes that sufficient information is available for DMR to take a decision.

The Swartberg haul road project will result in unavoidable, minor adverse environmental impacts. None of these adverse impacts are considered unacceptably significant and all can be managed to tolerable levels through the effective implementation of the recommended mitigation measures. In addition, the project will directly and indirectly benefit the workers at the Mine, as well as the regional economy.

Working on the assumption that BMM is committed to ensuring that the proposed activities are undertaken to high standards, achieved through implementation of the recommended mitigation measures and ongoing monitoring of performance, SRK believes and the BAR demonstrates that through effective implementation of the stipulated mitigation measures, the adverse impacts of this project can be reduced to levels compliant with national (and international) standards or guidelines.

The fundamental decision is whether to allow the development, which is generally consistent with development policies for the area, but which may have limited biophysical impacts.

SRK believes that the BAR and the Ecology Impact Assessment (Appendix D) have clearly shown that the project is generally acceptable. The BAR has also assisted in the identification of essential mitigation measures that will mitigate the impacts associated with these components to within tolerable limits.

In conclusion SRK is of the opinion that on purely 'environmental' grounds (i.e. the project's potential socio-economic and biophysical implications) the application as it is currently articulated should be approved, provided the essential mitigation measures are implemented. Ultimately, however, the DMR will need to consider whether the project benefits outweigh the potential impacts.

ii. Conditions that must be included in the authorisation

Key recommendations, which are considered essential, are:

1. Implement the EMPr to guide construction, operation and maintenance activities and to provide a framework for the ongoing assessment of environmental performance;
2. Designate the Environmental Manager / Officer at BMM to oversee the implementation of the EMPr and supervise any construction activities (particularly within the drainage lines);
3. Minimise the physical footprint of the development and areas disturbed by construction activities to the smallest extent possible;
4. Rehabilitate all areas disturbed by construction activities (outside of the project footprint);
5. Obtain other permits and authorisations as may be required, including, but not limited to:
    a) Water Use Authorisations;
    b) Heritage Approval; and
    c) Permits for the removal of protected plant species.

q) Period for which the Environmental Authorisation is required.

All non-operational activities (i.e. construction activities) will be completed within five (5) years.

r) Undertaking

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

Refer to the EAP Affirmation.

s) Financial Provision

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

BMM has calculated the liability to achieve the total quantum for rehabilitation and remediation of environmental impacts related to the new haul road. The quantum for financial provision is estimated to be R 751 838.31.

BMM has indicated that the new haul road, and the rehabilitation thereof, can be incorporated into the current closure cost. Adjustments to the quantum of financial provision for the amendments are, therefore, not required.

t) Explain how the aforesaid amount was derived.

BMM has indicated that the new haul road, and the rehabilitation thereof, can be incorporated into the current closure cost. Adjustments to the quantum of financial provision for the amendments are, therefore, not required.

i) Confirm that this amount can be provided for from operating expenditure.

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

BMM has indicated that the new haul road, and the rehabilitation thereof, can be incorporated into the current closure cost. Adjustments to the quantum of financial provision for the amendments are, therefore, not required.

u) Specific Information required by the competent Authority

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

1) Impact on the socio-economic conditions of any directly affected person.

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

All potential socio-economic impacts are assessed in Section 3(h)(v).

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

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

A heritage study for the project footprint concluded that no archaeological heritage resources were identified within the development footprint (CTS, 2019). Furthermore, and based on a desktop study, the bedrock underlying the property is unfossiliferous and of no palaeontological interest (Pether, 2012)..

Based on the above, it was *concluded* that heritage impacts were unlikely, *but* have been assessed *conservatively*. Mitigation / management measures have been included in the EMPr, should any heritage resources be identified during excavations.

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

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

Refer to Section 3(h)(ix)

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

4. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

a) Details of the EAP

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

The details and expertise of the EAP are provided in Part A, Section 3 (a).

b) Description of the Aspects of the Activity

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

The activities covered by the EMPr are provided in Part A, Section 3 (d).

c) Composite Map

*(Provide a map **(Attached as an Appendix**) 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)*

The specialist did not identify any specific areas of high sensitivity within the proposed project footprint that should be designated as “exclusion zones” (refer to Figure 10).

d) Description of Impact management objectives including management statements

ii. Determination of closure objectives.

(ensure that the closure objectives are informed by the type of environment described)

The haul road forms part of the BMM operation and as such, will not deviate from the closure objectives already committed to by the Mine.

BMM has a main integrated Closure Management Plan (2010); a Concept Closure Plan to integrate the Gamsberg project (2013) and a Closure Quantum External Review and Amendment (2016) (Endemic Vision, 2017).

The aim of the BMM Closure Management Plan is to ensure that the area transformed by mining, processing and other operational activities is either returned to as natural a state as possible or facilities remaining at the end of Life-of-Mine (LoM) are utilised for other economically viable and sustainable activities.

The BMM Closure Management Plan states that the closure objectives should be achieved in as cost effective a manner as possible, and the closure solution should be sustainable in the long term.

The following key objectives of the Closure Management Plan were identified through environmental, social and physical assessment and public workshops held from 2008 to 2010:

- To secure the effective and sustainable transfer of the municipal services of the town, Aggeneys, and the Pella-drift Water Board to the KLM;
- To ensure that the biodiversity and environment on the site is protected; and

- To make sure that the following commitments will be achieved as a minimum:
    - The site will be made safe for both humans and animals;
    - The site will be rehabilitated to be physically, chemically and biologically stable;
    - The residual impacts will be managed to acceptable levels and will not deteriorate over time; and
    - Closure will be achieved with minimal socio-economic upheaval.

BMM commits to provide sufficient funds at the end of LoM, to properly implement the closure plan, and also to make provision for possible premature closure, and post closure monitoring requirements.

iii. Volumes and rate of water use required for the operation

During the Construction Phase of the project, water will be used for typical construction activities and to supress dust (if required). Water will not be required for the Operational Phase. Volumes cannot be estimated but are likely to be insignificant. BMM purchase water from the Sedibeng-owned Pelladrif Water Board. The additional (negligible) water use will be within BMM's approved allocation.

iv. Has a water use licence has been applied for

Section 21 of the NWA specifies a number of water uses that require WUA in terms of Section 22(1) of the Act. A WUA process must be conducted to obtain authorisation for any of these activities, unless the specific use is listed in Schedule 1 of the NWA or is an existing lawful use.

WUA may be granted by means of a WUL or General Authorisation (GA) (issued in terms of Section 39 of the NWA). The competent authority for WUAs is the DWS.

The project activities trigger the following water use activities in terms of Section 21 of the NWA:

c) impeding or diverting the flow of water in a watercourse; and

i) altering the bed, banks, course or characteristics of a watercourse;

Government Notice (GN) 509 of 2016, promulgated in terms of Section 39 of NWA, specifies the requirements for GA in terms of Sections 21 (c) and (i) of NWA. Some project activites will be undertaken within below ephemeral drainage lines. As such, the project would take place within the regulated area of a watercourse as defined in GN 509 and may impede and/or alter watercourses in the catchment.

GA in terms of GN 509 replaces the need for a water user to apply for a license for Section 21 (c) and (i) water uses that are to take place within the regulated area of a watercourse, provided that these water uses are carried out within the limits and conditions of the GA. Furthermore, the GA does not apply to Section 21 (c) and (i) water uses where the risk class of these uses is medium or high as determined by a suitably qualified specialist during the completion of the prescribed risk matrix (see Appendix D).

Based on the outcomes of the risk matrix for the site, the risk is considered to be *low*, and GA applies to the Section 21 (c) and (i) water uses associated with the project (Ekotrust, 2018).

An application has been submitted to DWS.

e) Impacts to be mitigated in their respective phases

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

The environmental management and mitigation measures that must be implemented for the project during the **Design Phase**, as well as responsibilities and timelines for the implementation of these measures, are laid out in Table 27 below. Design activities include the technical design of the haul road, drainage crossings and stormwater abatement infrastructure.

Table 27: Environmental management and mitigation measures that must be implemented during the *Design Phase*

Design Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[2]**	**Performance Indicators**
Environmental Compliance	1.	Ensure that all required licences and permits have been obtained before the start of construction including WUA and heritage approval.	• BMM	• Before construction activities commence	• Check updated EMPr • BMM to check tender documents and contract	• Required licences/permits on file • Water Use Authorisation obtained • Updated EMPr on file • Incorporated in tender documents
	2.	Finalise the EMPr (if required) to include all conditions of authorisation imposed by DMR and DWS.		• Before construction activities commence		
Planning and Design – Line Crossings	3.	Allow for culverts and/or low-level drift crossings at line crossing points for the uninterrupted flow of water across the road.	• Design engineer	• During detailed design	• Review final designs and project implementation	• Final design and implementation incorporates design mitigation
	4.	Design all drainage line crossings perpendicular to watercourses (where feasible).				
	5.	Design terrace walls using materials that blend in with the surroundings (e.g. sandstone stone-packing, riverstone gabions) where necessary.				
	6.	Get written sign-off of final designs of all watercourse crossings from the Environmental Manager.	• BMM		• Review Environmental Manager approval	• Approval of final design
Planning and Design - Specific to Culverts	7.	Include design measures at all crossings that allow for surface and subsurface flow across the full width of the drainage line.	• Design engineer	• During detailed design	• Review final designs and project implementation	• Final design and implementation incorporates design mitigation
Planning and Design – Specific to Low-level Crossings	8.	Design low-level crossings through lines that allow overtopping even during small floods	• Design engineer	• During detailed design	• Review final designs and project implementation	• Final design and implementation incorporates design mitigation
Planning and Design – Haul Road	9.	Ensure that the haul road is constructed within the project footprint as assessed in the BAR.	• Design engineer	• During detailed design	• Review final designs and project implementation	• Final design and implementation

[2] Unless otherwise indicated, monitoring will be undertaken by the Environmental Manager and / or Environmental Officers, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

	10.	Include appropriate measures in design (including signage) to ensure vehicles do not exceed the speed limit (40 km/hr at sharp turns and 70 km/hr on straights) and remain on the construction footprint.				incorporates design mitigation
Stormwater Management	11.	Include the erosion control and abatement structures in final designs of the road.	• Design engineer	• During detailed design	• Review final designs and project implementation	• Final design and implementation incorporates design mitigation

The environmental management and mitigation measures that must be implemented for the project during the **Construction Phase**, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 28 below. Activities in the Construction Phase include:

- Establishment of site camp and lay-down areas;
- Vegetation clearance;
- Construction of the haul road and low-level crossings;
- Installation of pre-cast culverts (where low-level crossings are not constructed); and
- Raising the existing powerline.

Table 28: Environmental management and mitigation measures that must be implemented during the *Construction Phase*

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Environmental Compliance	1.	Compile monthly inspection reports for submission to BMM management and authorities on request.	• Environmental manager / officer (BMM)	• Throughout construction	• Environmental manager / officer to submit reports to BMM management and authorities on request	• Monthly site inspections and reports
Site Establishment	2.	Submit a Method Statement for Site Camp establishment for approval by the Environmental manager / officer at BMM at least two weeks prior to the start of construction activities.	• Contractors	• Start of construction	• Visual inspections • Method Statement	• Approved Method Statement • Site boundaries demarcated • Signage in place
	3.	Establish a suitably fenced Site Camp at the start of the contract, which will allow for site offices, vehicle, equipment, material and waste storage areas to be consolidated as much as possible. Locate the Site Camp within the existing disturbed footprint of the weighbridge area and/or WRD.				
	4.	Designate the area beyond the boundary of the site camp as “No Go” areas for all personnel on site. No vehicles, machinery, materials or people shall be permitted in the “No Go” area at any time without the express permission of the Environmental Manager / Officer.				
	5.	Locate laydown areas or other temporary use areas within the site camp.				

[3] Unless otherwise indicated, monitoring will be undertaken by the Environmental Manager and / or Environmental Officers, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
Environmental Awareness Training	6.	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of construction waste and activities on the environment; • Suitable disposal of construction waste and litter; • Key measures in the EMPr relevant to worker's activities; and • How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	• Contractors	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
Ablution Facilities	7.	Utilise existing ablution facilities	• BMM	• Throughout construction	• Visual inspections of ablutions	• Number of incidents of staff not using facilities
Fire Management	8.	Ensure that no fires are permitted on or adjacent to site except in areas designated for this purpose. Any such designated areas should be situated as far as possible from vegetated areas and/or flammable material stores. Suitable firefighting equipment must be readily available in this area.	• Contractors	• Throughout construction	• Inspect fire extinguishers and certificates	• Number of fire incidents • Certified extinguishers in appropriate locations
	9.	Ensure that no smoking is permitted on the site except for within a designated area in the Site Camp (to be included in the Site Camp Method Statement). Suitable firefighting equipment must be readily available in this area.				
	10.	Ensure that sufficient fire-fighting equipment is available on site.				
	11.	Equip all waste storage areas with fire extinguishers.				
	12.	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.				
	13.	Suitably maintain firefighting equipment.				
Hazardous Materials	14.	Utilise existing facilities in the processing area	• Contractors	• Throughout construction	• Visual inspection of hazardous materials handling and storage areas	• Number of incidents of non-compliance with safety procedures concerning hazardous materials, including waste materials • Number of spills of hazardous materials,
	15.	Ensure that contaminants (including cement) are not placed directly on the ground (e.g. mix cement on plastic sheeting).				
	16.	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
	17.	Avoid unnecessary use and transport of hazardous substances.				including waste materials • Evidence of contamination and leaks
	18.	Keep Material Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.				
Transportation and Refuelling	19.	Undertake regular maintenance of vehicles and machinery to identify and repair minor leaks and prevent equipment failures.	• Contractors	• Throughout construction	• Inspect vehicles, machinery and refuelling/maintenance areas	• Number of incidents of non-compliance • Number of leaks and spills
	20.	Undertake any refuelling and maintenance of vehicles/machinery in existing approved maintenance / refuelling areas in the processing area.				
	21.	Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.				
Response to Environmental Pollution	22.	Compile a Method Statement for response to environmental pollution for approval by the Environmental Manager / Officer.	• Contractors	• Before construction commences	• Review Method Statement • Maintain register of pollution events and response • Inspect repaired equipment to ensure proper functioning	• Method Statement • Number of incidents • Time activities stopped • Number of recurring incidents • Availability and completeness of register
	23.	In the event of environmental pollution, e.g. through spillages, immediately stop the activity causing the problem.		• Throughout construction		
	24.	Only resume activity once the problem has been stopped.				
	25.	Repair faulty equipment as soon as possible.				
	26.	Install additional bunding / containment structures around the equipment that was the source of the leak / spillage.				
Waste Management	27.	Submit a Method Statement for waste management (including hazardous waste) for approval by the Environmental Manager / Officer.	• Contractors	• Before start of activities on site • Throughout construction	• Method Statement • Visual inspection of waste collection and disposal areas • Visual inspection of construction areas (litter) • Check waste disposal slips	• Presence of litter • Availability of rubbish bins and skips • Degree to which rubbish bins and skips are filled • Total volume of general and hazardous waste storage capacity • Degree to which different waste is separated
	28.	Aim to minimise waste through reducing and re-using material.				
	29.	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.				
	30.	Collect all waste in bins and/or skips at the construction site.				
	31.	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
	32.	Provide separate bins for hazardous / polluting materials and mark these clearly. Store hazardous / polluting materials on impermeable ground until it is disposed of / collected.				• Frequency of waste collection
	33.	Dispose of waste appropriately to prevent pollution of soil and groundwater.				
	34.	Do not allow any burning or burying of waste on site.				
	35.	Do not dispose of any waste in the drainage lines.				
	36.	Display and explain waste handling and disposal protocols.				
Concrete/Cement Work	37.	Use Ready-Mix concrete rather than batching where possible.	• Contractors	• Throughout construction	• Visual inspection and approval by Environmental Manager / Officer.	• Number of incidents of batching outside works footprint • Contamination of water and soil
	38.	Ensure that no cement truck delivery chutes are cleaned on site. Cleaning operations are to take place where wastewater can be disposed of in the correct manner.				
	39.	Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable).				
	40.	Ensure that cement is mixed on mortar boards and not directly on the ground (where unavoidable).				
	41.	Physically remove any remains of concrete, either solid, or liquid, immediately and dispose of as waste.				
	42.	Place cement bags in bins and dispose of bags as waste to a licensed waste disposal facility.				
	43.	Sweep / rake / stack excess aggregate / stone chip / gravel / pavers into piles and dispose at a licensed waste disposal facility.				
Contaminated Water/Run-off management	44.	Prevent discharge of any pollutants, such as cements, concrete, lime, chemicals, and other contaminated waste water and fuels into any water sources and/or the environment.	• Contractors	• Throughout construction	• Visual inspection of fuel/workshop areas and concrete swills	• Implementation of preventative actions • Visibility of water pollution
	45.	Collect and strictly control runoff from the concrete batching areas.				
Erosion Control	46.	Stabilize exposed slopes within 30 m of any watercourse as soon as these are created (e.g. at stockpiles and cut and fill areas) to prevent sedimentation.	• Contractor	• Throughout construction	• Check that exposed slopes within 30m of any watercourse are stabilized • Check for evidence of erosion gullies	• Evidence of erosion
	47.	Close and rehabilitate erosion gullies as they form.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
	48.	Install silt fences and erosion prevention measures in areas sensitive to erosion.			• Check silt fences and erosion prevention measures are installed in areas sensitive to erosion • Check areas are not cleared prematurely	
	49.	Avoid clearing of vegetation until absolutely necessary.				
Stormwater Management	50.	Collect stormwater from bunded areas in a suitable container and remove from the site for appropriate disposal.	• Contractors	• Throughout construction	• Inspect bunded areas and roads • Inspect stormwater channels and high erosion potential areas	• Incidents of stormwater contamination • Visible leaks/ water wastage • Visible surface erosion
	51.	Use berms and stormwater drainage systems to prevent surface run-off from entering construction areas.				
	52.	Plan for the management of water runoff during infrequent but potentially destructive storms.				
	53.	Implement measures to maximise the infiltration of stormwater on site.				
	54.	Allow for the dissipation of runoff into the surrounding veld from multiple side drains, rather than for the concentration of flows along or off the road in major drainage lines.				
	55.	Regularly maintain stormwater outlets / dissipation drainage lines.				
Water Conservation	56.	Minimise the use of potable water as far as practically possible.	• Contractor	• Throughout construction	• Check for evidence of water wastage • Check that water is recycled and reused where possible	• Water Conservation
	57.	Reuse and recycle water wherever possible.				
Topsoil Stockpiling	58.	Limit construction and lay down areas to areas within the project footprint.	• Contractors	• Before construction commences	• Visual inspection • Regular monitoring of stockpile areas	• Incidents of erosion • Incidents of incorrect storage and harvesting of topsoil
	59.	Designate areas outside the development footprint as “No Go” areas.				
	60.	Designate and demarcate areas to be used for topsoil stockpiling.				
	61.	Remove topsoil prior to the commencement of construction activities and stockpile topsoil in a designated area for rehabilitation.		• During vegetation clearing		
	62.	Locate topsoil stockpiles in an area protected from the wind, and agreed to with the Environmental Manager / Officer and in an area where the topsoil will not have to be relocated prior to replacement for final rehabilitation.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
	63.	Do not stockpile topsoil higher than 4 m or for longer than 6 months to ensure that the nutrient cycles are maintained over a large surface to volume ratio.				
	64.	Ensure suitable control of run-off during the Construction Phase to prevent erosion of topsoil on adjacent land and undeveloped portions of the site.		• During construction		
	65.	Replace harvested topsoil in areas that are to be rehabilitated as soon as sections of the works are completed (i.e. not only following the completion of all works) to maintain soil nutrient cycles.				
Noise Management	66.	Comply with the applicable municipal and/or industry noise regulations.	• Contractors	• Throughout construction	• Visual inspections • Random noise tests	• Results of noise measurements • Number of registered complaints
	67.	Maintain all generators, vehicles and other equipment in good working order to minimise exhaust fumes and excess noise.				
	68.	Enclose diesel generators used for power supply on site to reduce unnecessary noise.				
Air Quality Management	69.	Avoid vegetation clearing until absolutely necessary (i.e. just before excavations).	• Contractors	• Throughout construction	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust coming off construction site • Dust mitigation measures in place • Number of days that dust plumes are visible
	70.	Stabilise exposed surfaces as soon as is practically possible.				
	71.	Avoid excavation and handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.				
	72.	Minimise dust generated off stockpiles: • Locate stockpiles in sheltered areas where possible; • Place the stockpile lengthwise into the wind; • Minimise the slope of the stockpile (maximum slope of 2:1); • Limit stockpile sizes; and • Use the last in – first out system of stockpile management.				
	73.	Limit vehicle speeds to 40 km/hr on unconsolidated and non-vegetated areas.				
	74.	Ensure that any material spilled from trucks during transport to or from the site is cleaned up immediately.				
	75.	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegatated areas once they are on site to reduce dust problems.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
	76.	Reduce airborne dust at construction sites through: • Dampening dust-generating areas withwater; and • Utilising screens in high dust-generating areas.				
	77.	Use high quality (low sulphur) diesel for construction vehicles / equipment.				
	78.	Maintain all generators, vehicles, vessels and other equipment in good working order to minimise exhaust fumes.				
Floral Management	79.	Obtain a permit from NCDENC for the removal of all protected plant species.	• BMM	• Prior to vegetation clearance	• Visual inspection • Permits for removal of protected plant species obtained	• Size of area cleared relative to development footprint • Size of area disturbed outside of construction site boundary • Permits on file
	80.	Restrict construction activities to the project footprint areas and minimise vegetation clearance to what is essential.	• Contractors	• Throughout construction		
	81.	Designate areas outside the construction site boundary as “No Go” areas.				
	82.	Ensure that no vegetation is removed or disturbed outside the delineated construction site boundary.				
	83.	Limit the project footprint to what is absolutely essential.		• Prior to clearing vegetation	• Check for evidence of offsite disturbances / vegetation clearing • Check stockpiles located in disturbed areas • Review early detection of alien species monitoring programme	• Protection of Flora
	84.	Confine soil compaction and levelling to the footprint of the proposed haul road.				
	85.	Ensure that no vegetation is removed or disturbed beyond the approved construction and access footprint.				
	86.	Stockpile all materials in disturbed areas or in areas approved by the Environmental Manager / Officer.				
	87.	Implement a monitoring program for the early detection of alien invasive plant species and a control program to combat declared alien invasive plant species should be employed.		• Prior to construction		
	88.	Get Environmental Manager / Officer approval of laydown areas.		• Prior to construction activities		
Fauna Management	89.	Flush any faunal species within the construction footprint towards more suitable habitat within the surrounding areas. Threatened fauna should be relocated by a suitably qualified environmental officer.	• Contractors	• Throughout construction	• Visual inspection	• Number of animals harmed • Number of incidents of animals mortalities
	90.	Check for nests within the construction footprint prior to construction activities.				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
	91.	Do not harm, catch or kill birds or animals by any means, including poisoning, trapping, shooting or setting of snares.				• Number of avifaunal collisions with powerlines
	92.	Safely remove and relocate any fauna that may be physically harmed by construction activities.				
	93.	Keep the construction site clear of litter and especially plastic, twine and string.				
	94.	Limit vehicle speeds to 40 km/hr on unconsolidated and non-vegetated areas.				
	95.	Prohibit construction at night.				
Protection of Watercourses	96.	Limit the project footprint to what is absolutely essential.	• Contractor	• Throughout construction	• Check for evidence of offsite disturbances	• Protection of drainage lines
	97.	Designate areas outside the development footprint as no-go areas.				
	98.	Restrict access to no-go areas by construction personal.				
	99.	Restrict the movement of vehicles to new and existing access roads only.				
	100.	Construct new watercourse crossings during dry conditions only, and when no rainfall is forecast.		• During construction of watercourses	• Check that construction of watercourse crossings takes place during dry conditions	
Protection of Heritage Resources	101.	Inform employees and contractors that archaeological or paleontological artefacts might be exposed during construction activities.	• BMM • Contractors	• Throughout construction	• Visual inspection • Keep records of finds • *Keep records of all correspondence with authorities*	• Records of heritage finds • Number of incidences of loss/damage to heritage resources • *Appointment of heritage specialist (if required)* • *Permit to undertake Phase 2 rescue operation (if required)*
	102.	Empower staff to stop works on (chance) discovery of heritage resources at the site.				
	103.	On discovery of fossil bones / shells, send information and photographs to a palaeontologist for assessment and to determine preservation, collection and record keeping procedures.				
	104.	*Implement all heritage manage measures contained in the Mine's approved EMP (including fossil finds procedures).*				
	105.	*Notify SAHRA APM Unit of any heritage resource discoveries (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations).*				
	106.	*Notify SAHRA Burial Grounds and Graves Unit if any unmarked human burials are uncovered.*				

Construction Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[3]**	**Performance Indicators**
	107.	*Appoint a professional archaeologist or palaeontologist, depending on the nature of the finds, to inspect any findings as soon as possible after discovery. 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.*				
Site Rehabilitation	108.	Ensure that slopes are immediately stabilized to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.	• Contractors	• Once construction is complete; or • Throughout construction if it takes place in phases / different areas sequentially	• Visual inspection of site • Keep record of rehabilitation measures	• Rehabilitation forms an integral part of construction
	109.	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and other facilities, from the site.				
	110.	Clean up and remove any spills and contaminated soil in the appropriate manner.				
	111.	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.				
	112.	Ensure that affected areas are rehabilitated following construction.				
	113.	Rehabilitate areas adjacent to the site (if disturbance is unavoidable) to at least the same condition as was present prior to construction.				
	114.	Use harvested topsoil for rehabilitation following construction.				
	115.	Rehabilitate all project areas as soon as possible after completion of activities in each area, including removing and/or remediating any contaminated soils.				
	116.	Forbid the planting of alien species during rehabilitation.				

The environmental management and mitigation measures that must be implemented for the project during the **Operational Phase**, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 29 below. Activities in the Operational Phase include hauling activities between the Swartberg shaft and WRD.

Table 29: Environmental management and mitigation measures that must be implemented during the *Operational Phase*

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
Environmental Compliance	1.	Ensure that all required licences and permits have been obtained before the start of operations.	• BMM	• Throughout operations	• Keep record of all permits, licences and authorisations • BMM to check contracts • Keep record of all incidents	• Required licences/permits on file • Environmental management measures in contract documents • Environmental incidents register
	2.	Include applicable environmental management measures in contracts for external service providers.				
	3.	Maintain an environmental incidents register.				
	4.	Update the Operational Phase EMPr with lessons learnt during construction in consultation with the DMR (if better practices are identified during this phase).	• BMM	• Following construction	• Check updated EMPr	• Updated EMPr on file
Vegetation Management	5.	Restrict hauling to the designated haul road and no additional roads or turn-around areas should be created.	• BMM	• Throughout operations	• Visual inspection	• Size of area cleared relative to development footprint • Size of area disturbed outside of construction site boundary • Extent of alien vegetation
	6.	Designate areas outside the project footprint boundary as “No Go” areas and ensure that no vegetation is removed or disturbed outside the delineated boundary.				
	7.	Undertake regular monitoring for alien plants within the project footprint.				
	8.	Conduct regular alien clearing using the best-practice methods for the species concerned. Avoid using herbicides as far as possible				
Stormwater Management	9.	Implement measures (adjusting the routing of flows, dissipating runoff and/or establishing vegetation) to address erosion nick-points along the roads.	• BMM	• Throughout operations	• Visual inspection	• Visible surface erosion
Air Quality Management	10.	Avoid handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.	• BMM	• Throughout operations	• Visual assessment of dust plumes • Visual assessment of dust control measures	• Visibility of dust plumes • Dust mitigation measures in place
	11.	Limit vehicle speeds to 40 km/hr at sharp turns and 70 km/hr on straights.				

[4] Unless otherwise indicated, monitoring will be undertaken by the Environmental Manager / Officer at BMM, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[4]**	**Performance Indicators**
	12.	Ensure that any material spilled from trucks during transport to or from the shaft and WRD is cleaned up immediately.				• Number of days that dust plumes are visible • Size of disturbed areas
Fire Management	13.	Ensure that sufficient fire-fighting equipment is available in all vehicles travelling along the haul road.	• BMM	• Throughout operations	• Visual inspections • Inspect fire extinguishers and certificates.	• Number of fire incidents • Certified extinguishers in appropriate locations
Transportation and Refuelling	14.	Undertake regular maintenance of vehicles and machinery to identify and repair minor leaks and prevent equipment failures.	• BMM	• Throughout operations	• Visual inspection of vehicles, machinery and refuelling/maintenance areas • Keep record of incidents and complaints	• Number of incidents of non-compliance • Number of leaks and spills
	15.	Inspect mining vehicles and equipment for oil / fuel leaks frequently.				
	16.	Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.				
	17.	Restrict hauling to the designated haul road and no additional roads or turn-around areas should be created. No vehicles should be allowed to turn in or pull over into areas abutting the road, other than where formally designated turning or pullover areas have been created and managed.				
	18.	Undertake any refuelling and maintenance of vehicles/machinery in existing approved maintenance / refuelling areas in the processing area.				
	19.	Ensure that vehicle axle loads do not exceed the technical design capacity of the road.				
	20.	Ensure contractors use the designated haul roads for hauling product between the shaft and WRD.				
Faunal Management	21.	Do not harm, catch or kill animals by any means, including poisoning, trapping, shooting, setting of snares and egg collecting.	• BMM	• Throughout operations	• Visual inspection • Inspect powerline	• Number of animals harmed • Number of incidents of animals found in trenches • Monitoring reports
	22.	Keep the operational areas clear of litter and especially plastic, twine and string.				
	23.	Limit vehicle speeds to 40 km/hr at sharp turns and 70 km/hr on straights.				
	24.	Prohibit unnecessary driving at night.				

The environmental management and mitigation measures that must be implemented for the project during the **Maintenance Phase**, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 29 below. Activities in the Maintenance Phase include general road and drainage crossing maintenance.

These measures essentially constitute the Maintenance Management Plan (MMP) for the project.

Table 30: Environmental management and mitigation measures that must be implemented during the *Maintenance Phase*

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Environmental Awareness Training	25.	Provide environmental awareness training to all personnel on site at the start of their employment. Training should include discussion of: • Potential impact of waste and activities on the environment; • Suitable disposal of waste and litter; • Fauna and avifauna protection; • Key measures in the EMPr relevant to worker's activities; and • How incidents and suggestions for improvement can be reported. Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that clearly indicates participants' names.	• BMM	• Before workers start working on-site • Before new activities are undertaken	• Check training attendance register • Observe whether activities are executed in line with EMPr requirements	• Proportion of workers that completed environmental training • Compliance of workers with EMPr
Vegetation Management	26.	Designate areas outside the project footprint boundary as "No Go" areas and ensure that no vegetation is removed or disturbed outside the delineated boundary.	• BMM	• Throughout maintenance	• Visual inspection	• Size of area cleared relative to development footprint
Waste Management	27.	Do not dispose of any waste in the drainage lines.	• BMM	• Throughout maintenance	• Visual inspection of waste collection and disposal areas • Visual inspection operational areas (litter)	• Presence of litter • Availability of rubbish bins and skips
	28.	Prevent littering by staff at work sites by providing bins or waste bags in sufficient locations.				
Stormwater Management	29.	Undertake ongoing maintenance of culverts and drifts by removing sand and debris and dispose material outside of the affected watercourse so that it does not create additional blockages.	• BMM	• Throughout operations	• Visual inspection	• Visible surface erosion • Culverts in place and well maintained
	30.	Undertake bi-annual auditing of the road to assess erosion with photographic records.				

[5] Unless otherwise indicated, monitoring will be undertaken by the Environmental Manager / Officer at BMM, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Operational Phase Measures						
Aspect	**ID**	**Mitigation measure / Procedure**	**Responsible**	**Implementation Timeframe**	**Monitoring Methods[5]**	**Performance Indicators**
Fire Management	31.	Ensure that no fires are permitted on or adjacent to site.	• BMM	• Throughout maintenance	• Visual inspections • Inspect fire extinguishers and certificates.	• Number of fire incidents • Certified extinguishers in appropriate locations
	32.	Ensure that all personnel on site are aware of the location of firefighting equipment in vehicles operated on the haul road.				
	33.	Suitably maintain firefighting equipment.				
Ablution Facilities	34.	Ensure there are sufficient ablution facilities for all site staff at BMM site offices, Brokenhill change house or at the Swartberg surface crusher.	• BMM	• Throughout maintenance	• Visual inspections of ablutions	• Number of incidents of staff not using facilities
Response to Environmental Pollution	35.	In the event of environmental pollution, e.g. through spillages, immediately stop the activity causing the problem.	• BMM	• Throughout maintenance	• Maintain register of pollution events and response • Inspect repaired equipment to ensure proper functioning	• Number of incidents • Time activities stopped • Number of recurring incidents
	36.	Only resume activity once the source has been contained.				
	37.	Repair faulty equipment as soon as possible.				

Closure Plan

The overall closure vision for BMM is to ensure operations are safe, stable and non-polluting over the long-term to integrate with the current agricultural, eco-tourism and economic activities of the area in which the mine is located.

The vision is underpinned by the closure objectives:

- Secure the effective and sustainable transfer of the municipal services of the town, Aggeneys, and the Pella-drift Water Board to the Khai Ma municipality;
- Ensure that the biodiversity and environment on the site is protected; and
- Ensure that the following commitments will be achieved as a minimum:
    - The site will be made safe for both humans and animals;
    - The site will be rehabilitated to be physically, chemically and biologically stable;
    - The residual impacts will be managed to acceptable levels and will not deteriorate over time; and
    - Closure will be achieved with minimal socio-economic upheaval.

The objective of this section is to provide recommendations for the decommissioning, closure and rehabilitation of the road at the end of LoM (assuming the haul road is to be decommissioned), to achieve sustainable land use conditions and avoid or minimise costs and long-term liabilities to BMM.

In order to achieve this, it is essential that the closure plan applied for the Mine is applied to the closure / decommissioning of the haul road.

f) Impact Management Outcomes

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

The impact management outcomes are included in Table 27 to Table 30 as “Performance Indicators”.

g) Impact Management Actions

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

The impact management actions are included in Table 27 to Table 30.

h) Financial Provision

i. Determination of the amount of Financial Provision.

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

Refer to Section 1(d)(ii) for closure objections. The closure plan for the haul road is based on the closure objectives for the Mine.

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

The BAR and EMPr will be released for public review and comment during the stakeholder engagement process. Stakeholders will have the opportunity to review the project scope; the affected environment description; the findings of the specialist study and impact assessment; the recommended management/mitigation measures developed to address the potential impacts; and the closure objectives, plan and financial provision.

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

Environmental management and mitigation measures that must be implemented for rehabilitation during the construction, operational and decommissioning / Closure Phases have been included in the EMPr, including the requirement to review and update the Rehabilitation Plan, if required, to ensure that responsibilities and sufficient resources are allocated to rehabilitation.

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

The Rehabilitation Plan has been accepted by the authorities for previous authorisations and the same closure objectives and RP will be implemented for this project.

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

BMM has confirmed that the financial provision required to manage and rehabilitate the environment for the haul road project can be accommodated within the existing financial provision for the Mine.

k) Confirm that the financial provision will be provided as determined.

BMM has confirmed that the financial provision for the haul road project can be accommodated within the existing financial provision for the Mine.

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

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

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
• Hauling	• Degradation of Ephemeral Drainage Lines	• Audit crossings to assess erosion. • Implement a monitoring program for the early detection of alien invasive plant species.	• Environmental Manager / Officer • Suitably qualified Contractor's Designated Environmental Officer	• Bi-annually with photographic records
• Powerline	• Disturbance to terrestrial fauna and loss of habitat	• Undertake avifaunal monitoring of the powerline.	• Environmental Manager / Officer	• Quarterly throughout the operational phase
• Hauling	• EMPr performance	• Audit the performance of BMM against environmental commitments.	• Environmental Manager / Officer	• Monthly during the Construction Phase • Annually throughout the operational phase
• Hauling	• Rehabilitation progress	• Monitor the success of rehabilitation in terms of the Rehabilitation Plan.	• Environmental Manager	• Annually throughout the operational phase

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

The new haul road and the relevant EMPr will be incorporated into the existing Performance Assessment reports undertaken at BMM.

n) Environmental Awareness Plan

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

BMM and contractors employed at the Mine will be required to provide environmental awareness training to all employees on site during the construction, operational and closure phases (refer to Table 28 to Table 30). Training will include discussion of:

- Potential impact of waste and activities on the environment;
- Suitable disposal of waste and litter;
- Protection of flora;
- Protection of drainage lines;
- Protection of fauna and avifauna;
- *Protection of heritage resources;*
- Key measures in the EMPr relevant to worker's activities; and
- How incidents and suggestions for improvement can be reported.

Employees will be required to attend environmental awareness training before work commences on site and before any new activities are undertaken. Employees will be required to sign an attendance register.

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

The management measures provided in the EMPr are recommended to avoid pollution or the degradation of the environment as far as possible.

Prior to the commencement of construction, maintenance and/or closure activities, Contractors will be required to submit a Method Statement for response to environmental pollution for approval by the Environmental Manager / Officer (refer to Table 28 and Table 30).

BMM has existing procedures in place to prevent and respond to environmental incidents at the Mine (e.g. oil spill clean-up, protection of archaeological resources, protection of no-go areas). BMM will update and apply these procedures in the management of operations for the project.

o) Specific information required by the Competent Authority

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

In terms of Section 41, Regulations 53 and 54 of the MPRDA, BMM is required to make financial provision for the interim and final rehabilitation activities on the site. The existing financial provision will be reviewed annually for adequacy and amended to compensate for new activities (i.e. the new haul road) and/or inflation.

5. UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports ☒

b) the inclusion of comments and inputs from stakeholders and I&APs ; ☒

c) the inclusion of inputs and recommendations from the specialist reports where relevant; ☒and

d) that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. parties are correctly reflected herein. ☒

Prepared by

Scott Masson
Senior Environmental Consultant

Reviewed by

Chris Dalgliesh
Partner

Signature of the environmental assessment practitioner:

SRK Consulting (South Africa) (Pty) Ltd.

Name of company:

March 2019

Date:

-END-

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